

The Effect of Economic and Financial Risks on Foreign Direct Investment in Jordan: Multivariate Analysis

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Abstract

The main objective of this study is to examine and analyze the effect of the economic and financial risks on foreign direct investment in Jordan during the period (1982–2012). We used Multivariate Data Analysis (MVA) to test the hypotheses of this study. The analysis has shown that there is significant effect between all independent variables which consists of economic risks model, financial risks model and foreign direct investment.

The economic risks model includes gross domestic Product (GDP) per head of population, the real annual growth rate of GDP, the annual inflation rate and current account balance as a percentage of GDP.

The financial risks model includes foreign debt as a percentage of GDP, foreign debt service as a percentage of export of goods and services (XGS), current account as a percentage of (XGS) and exchange rate stability.

Finally the researcher suggests several factors that would increase the Jordanian investments, the important factors are: giving investors some advantages such as tax exemptions, improving domestic infrastructure, adequate legislation, regulation and safeguard and acceleration the treatment of investors.

Keywords: foreign direct investment, economic and financial risks, Multivariate Data Analysis (MVA)

1. Introduction

The purpose of this study is to investigate the economic and financial risks that have an impact on foreign direct investment (FDI) in Jordan during the period (1982–2012). To achieve this purpose, it is required to examine and analyze the impact of different factors of economic and financial risks on foreign direct investment in Jordan. According to International Country Risk Guide (ICRG), the economic risks includes the following factors; gross domestic Product (GDP) per head of population, the real annual growth rate of GDP, the annual inflation rate, the budget balance as a percentage of GDP and current account balance as a percentage of GDP; while the financial risks includes the following factors; foreign debt as a percentage of GDP, foreign debt service as a percentage of export of goods and services (XGS), and exchange rate stability (Khrawish & Siam, 2010).

Many researchers (Haile & Assefa, 2006; Alavinasab, 2013) believe that the stability of macroeconomic policies is one of the major challenges facing developing countries.

FDI became very important in different countries (developing and developed countries) because it provides many needed resources to the developing countries such as capital, sophisticated technology add to the skills acquired. Also, these resources are very important to developing countries in order to create jobs and reduce poverty in those countries, beside that developed countries has benefits from its investments and decreased its aids to developing countries (Nayyira et al., 2014). Therefore this study attempts to investigate the effect of the economic risks on foreign direct investment in Jordan during the period (1982–2012) based on time series data by using a Multivariate Analysis (MVA).

Accordingly, this study is divided as follows. The second section incorporates the theoretical and literature review. The theoretical model is described in the third section along with the description of variables and data. Econometrics analysis and empirical results are discussed next. The concluding remarks are given in the fifth section.

2. The Theoretical and Literature Review

Foreign direct investment (FDI) has been seen by countries as an important element to promote economic growth, increase trade, modernize the bureaucracy of the state promote institutional development, adapt the financial and education systems to the new challenges brought by globalization and the modernization of infrastructure particularly in the fields of transports and telecommunications (Louzi & Abadi, 2011; Haile & Assefa, 2006; Michael & Roberto, 2004; Zubair, 2001).

Also, the World Investment Reports (1982, 1990, 2004, 2009 and 2013) and some researchers (Nayyira Zeb et al., 2014; Louzi & Abadi, 2011) have seen that there are three key important factors for foreign investment, these are:

- (1) Importance of FDI for finding markets;
- (2) The importance of FDI for finding resource/asset especially those that access to new resources may not be available in the home country such as natural resources;
- (3) The importance of FDI for efficiency to obtain a high return, such as economics of scale which made to increase the return and decrease the risks.

The above mentioned three key factors considered the important attraction for cash inflows and cash out flows in the world.

Table 1 shows the FDI inflows and FDI outflows during the period (1982–2012) in the world in regarding of the value at current prices.

Table1. Cash flows in the world during the period (1982–2012) (billions of USD)

Years	FDI in flows	FDI out flows
1982	57	28
1990	184	225
1995	207	234
2000	1108	1084
2006	1463	1309
2007	1975	2198
2008	1790	1969
2009	1790	1175
2010	1309	1451
2011	1524	1694
2012	1351	1391

Source: UNCTAD, world investment report, 1982, 1990, 2000, 2004, 2009, 2012 and 2013.

This table shows that the FDI inflows increased from 57 Billion of USD in year 1982 to 184 Billion of USD in year 1990 and it reached to 1351 Billion of USD in year 2012, were the increase about three times during (1882–1990) and seven times during 1990–2012 and the FDI outflows increased from 28 Billion of USD in 1882 to 225 Billion of USD in year 1990 and it reached to 1391 Billion of USD in year 2012, were the increase was 8 times during 1882–1990 and 6.1 times during 1990–2012.

It is believed by many researchers that the increasing of inflows and out flows was caused by important business facilitations and investment promotions and incentives from hosting countries (Louzi & Abadi, 2011; Graham & Barry, 2004; Lipsey, 2001).

Table 2 shows the current value prices for FDI and inflows percentage of GDP during the period (1990–2012) in Jordan.

Table 2. Value at current prices for FDI and inflows percentage of GDP during the period (1990–2012) in Jordan (million USD)

Years	FDI \$	FDI inflows % GDP
1990	\$37.7	0.94
1991	(\$11.9)	-0.28
1992	\$40.7	0.77
1993	(\$33.6)	-0.60
1994	\$2.9	0.05
1995	\$13.3	0.20
1996	\$15.5	0.22
1997	\$360.9	4.98
1998	\$310.1	3.92
1999	\$158.0	1.94
2000	\$913.3	10.79
2001	\$273,06	3.05
2002	\$238.2	2.49
2003	\$547	5.36
2004	\$936.9	8.21
2005	\$1,984.5	15.76
2006	\$3,544.1	23.54
2007	\$2,622.2	15.32
2008	\$2,826.8	12.87
2009	\$2,413.1	10.13
2010	\$1,650.9	6.25
2011	\$1,469.1	5.09
2012	\$1,403.0	4.49

Source: World investment report (1990–2013).

The current prices for FDI and inflows percentage of GDP during the period (1990–2012) in Jordan increased from 37.7 million USD to 1403 million USD, the percentage increased from 0.94% in year 1990 to 4.49% in year 2012, an increase of almost five-fold in 22 years. This ratio is weak for many reasons, mainly from the lack of economic and political stability in the Arab region.

Table 3 shows the cash outflows percentage of GDP during the period (2005–2012) in Jordan.

Table 3. The outflows percentage of GDP during the period (2005–2012) in Jordan

Years	Outflows percentage of GDP
2005	1.30
2006	-0.92
2007	0.28
2008	0.06
2009	0.30
2010	0.11
2012	0.16

Source: International Monetary Fund and World Bank (2005–2013).

We notice that the percentage of cash outflows of FDI in Jordan represents about 0.16 of GDP in year 2012, while the value of cash outflows before 8 years was 1.30 in 2005, and that the percentage of net cash outflows of GDP in year 2006 was -0.92. In the point of view of some researchers that this is due to the lack of economic and political stability in the Arab region and because the international financial crises which effected the Jordanian economy (Louzi & Abadi, 2011).

Also, the impact of economic and financial risks on foreign direct investment was investigated in many studies:

“Determinants of Foreign Direct Investment in Iran” by Alavinasab (2013). This study investigated the effect of economic vectors on FDI in Iran by using econometric models. Therefore, this study found a relationship between annual real growth rate of GDP and FDI.

Another study examined “the role of Foreign Direct Investment in Economic Growth of Pakistan” by (Nayyira Zeb et al., 2014). This study has been applied least square method to examine the FDI on economic growth and three variables. These variables are: trade openness, political instability and terrorist attacks. It found a positive significant effect between these variables and FDI in Pakistan.

Also, there are many studies which examined the effect of economic and financial risks on foreign direct investment such as “The impact of foreign direct investment on economic growth in Jordan” by Louzi and Abadi (2011) and “Determinants of direct foreign investment: Evidence from Jordan” by Khrawish and Siam (2010).

The first study depends on linear regression model over the time 1990 to 2009 to finding the relationship between FDI inflows and economic growth rate.

The second study examined the “determinants of direct foreign investment on Jordan”, this study applied multiple linear regression models through the period (1997–2007) and found a relationship between FDI and economic and financial risks in Jordan. The analysis found that there is a significant effect between foreign direct investment and economic and financial risks.

Another study titled “Impact of Foreign Direct Investment (FDI) on Gross Domestic Product (GDP) in Pakistan” by Misbah (2013), examined the impact of foreign direct investment and gross domestic product in Pakistan and found that there is a significant effect between GDP and FDI.

Laura Alfaro et al. (2010), investigate the impact of foreign direct investment on Promote Growth, and Exploring the Role of Financial Markets on Linkages. They found a relationship between FDI and the role of local financial markets to promote growth through the creation of backward linkages. Also they found a positive spillovers between the foreign and domestic firms and the rest of the economy when the markets are developed.

Wyk and Anil (2008) examined the effect of risks (political risks, economic risks and financial risks) on FDI Flows to Developing Countries. They found a significant positive relationship between FDI and macroeconomic variables, current account balance and political risks.

Also, many researchers studied the effect of economic risks on direct foreign investment like Getinet and Hirut (2006) examined the determinants of foreign direct investment in Ethiopia during the period (1974–2001).

This study applied three variables that effect on FDI. These variables are growth rate of real GDP, export orientation, and liberalization.

(Alan & Saul, 2004) studied the determinants of foreign direct investment into European transition economies during the period (1994–2000). This study used panel data to analyze empirically the determinants of inward FDI to Central Eastern European countries (CEEC). They found that labor costs and market size the most important effects on FDI.

Also, there are many researchers (Coupet & Mayer, 2005; Chan & Gemayel, 2004; Nonnenberg & Mendonca, 2004; Onyeiwu & Shrestha, 2004; Banga, 2003) investigated the effect of economic risks on direct foreign investment. They found that developing countries have higher investment risk than developed countries.

Nonnenberg and Mendonca (2004) studied the determinants of foreign direct investment in developing countries over the period (1975–2000). They found that FDI is correlated macroeconomic policy like inflation risk and average rate of economic growth.

Onyeiwu and Shrestha (2004) examined the determinants of foreign direct investment in Africa during the period (1975–1999). They found a positive significance relationship between foreign capital flows to Africa and macroeconomic policy like economic growth, inflation rates and natural resource availability.

Banga (2003) investigated the determinants and trends of foreign direct investment flows to Asia. She found a positive significant relationship between foreign capital flows and overall economic factors, such as labor costs,

infrastructure and loan costs.

Blomstrom and Kokko (2003) examined the importance of incentives for attracting foreign direct investment (FDI). Finding a relationship between incentives and attracting foreign direct investment (FDI), such as tax exemptions.

Miyamoto (2003) examine the role of human capital formation and skills development to attracting foreign direct investment. He found a positive significant relationship between foreign capital flows and skills development.

Laura et al. (2002) studied the FDI spillovers, financial markets, and economic development, and they found a positive significant relationship between foreign capital flows and the role of financial markets. Also they show a significant relationship between foreign capital flows and well-developed financial markets.

Finally, the current study will attempt to take the advantages from previous studies and work to be applied to the Jordanian economy in order to achieve the economic stability and attracting foreign investment.

3. Methodology

This study applies the Multivariate Data Analysis (MVA) which consists of the principle of multivariate statistics. The data used for this analysis is varying from 1982 to 2012. Two models are examined to test the hypotheses of this study: These models are: economic risks and financial risks. We selected these models because FDI flows in general are affected by economic risks and financial risks, Also, all variables which consists from these models are contributed to encourage FDI. On the other hand companies are willing to invest in foreign countries because investing in these countries has low risks and high return. So, we selected the economic risks and financial risks because it includes many factors contributed to encourage FDI and work to reduce the risks and increase the returns: The most important of these factors are:

- Macroeconomic stability;
- Adequate legislation regulation and safeguarding investment;
- Access to markets;
- Good infrastructure;
- Low tariffs and tax;
- Competitive labor cost.

I think the majority of these factors are available in Jordan.

3.1 Model (1): Economic Risks

It is consisting from the GDP per head of population (GDPPH), the real annual GDP growth rate (GGDP), the annual inflation rate (AIR) and the natural logarithm of current account balance (LCAB) (Chan & Gemayel, 2004). These risks effect on foreign direct investment (FDI). In order to estimate the relationship between these variables and FDI, the following model will be used as:

$$FDIGDP_t = \alpha_0 + \alpha_1 GDPPH_t + \alpha_2 GGDP_t + \alpha_3 AIR_t + \alpha_4 LCAB_t + \varepsilon_t$$

Where:

- FDIGDP is the percentage of foreign direct investment to gross domestic product;
- GDPPH is the GDP per head of population;
- GGDP is the real annual GDP growth rate;
- AIR is the annual inflation rate;
- LCAB is the natural logarithm of current account balance.

3.2 Model (2): Financial Risk

The financial risks consists of the following items: the growth rate in foreign debt services(GFDS), the growth rate in foreign debt goods (GFD), the exchange rate stability factor (ERS), the natural logarithm of current account balances (LCA) and the natural logarithm of real GDP (LGDP). In order to estimate the relationship between these variables and FDI, the following model will be used as:

$$GFDIGDP_t = \alpha_0 + \alpha_1 GFDS_t + \alpha_2 GFD_t + \alpha_3 ERS_t + \alpha_4 LCA_t + \alpha_5 LGDP_t + \varepsilon_t$$

Where:

- GFDIGDP is the growth rate in the percentage of foreign direct investment to GDP;

- GFDS is the growth rate in foreign debt services;
- GFD is the growth rate in foreign debt;
- ERS is the exchange rate stability factor;
- LCA is the natural logarithm of current account balances;
- LGDP is the natural logarithm of real GDP.

3.3 Measurement of Variables

3.3.1 Dependent Variable: Consisting from Foreign Direct Investments (FDI)

It is measured by Net cash inflows of FDI/GDP. In other words: Net cash flows (NCF) = cash inflows of FDI—Cash out flows of FDI. In general DFI measures the expansion of firms' foreign operations, whereas portfolio investment and other investment measure the net flow of funds (Madora & Jeff, 2006).

3.3.2 Independent Variables

a. Economic risk

(1) Gross Domestic Product (GDP) per head of population (GDPPH)

It equals the total economic output divided by the number of people.

In other words, GDP per head of population (GDPPH) = total economic output / number of people.

(2) Real annual Growth rate of GDP (RAGDPG)

Real annual Growth rate of GDP (RAGDPG) measured by economic growth and adjusted for inflation

$$\text{Economic Growth} = \frac{GDP_2 - GDP_1}{GDP_1}$$

(3) Annual inflation rate (AIR)

There are two prices indices used in calculating inflation: CPI and the GDP deflator. So, the inflation rates derived from different price indices will themselves be different.

In other words Annual inflation rate = % change in the average of the index for the past 30 days vs average for the same period a year ago.

(4) Current account balance as a percentage of GDP (CAB)

It is measured by the total of exports and income receipts—total of imports and income payments—net transfer from individual. Whereas the current account represents a summary of the flow of funds between specified country and all other countries

b. Financial risk

(1) Foreign debt as a percentage of GDP (FD)

It means a debt-to-GDP ratio and it is measured by government debt/government of gross domestic product (GDP).

(2) Foreign debt services as a percentage of XGS (FDS)

It is measured by FDS/(XGS), whereas, the foreign debt services includes export of debt services and import of debt services, the difference between export of debt services and import of debt services equal the net debt of services.

(3) Current account as a percentage of XGS (CA)

It is measured by the total of net exports of goods, services, net income/exports of goods and services. The export of goods and services includes the value of all goods and other market services provided to the rest of the world.

(4) Exchange rate stability (ERS)

It is measured by the rates of currency in one country for the currency of another. It is useful for planning a vacation or wants to wire money to investment.

3.4 Description of Variables

Table 4 describes the variables of economic risk model.

Table 4. The summary of the variables in economic risk model

	Obs.	Mean	Std. Dev.	Min.	Max.
FDIGDP	30	5.83	6.2965	-0.6	23.54
GDPPH	30	2375.565	1166.95	1183	4945
GGDP	30	0.1014	0.06886	0.02111	0.28324
AIR	30	4.6391	3.7801	-0.07	16.2
LCAB	30	22.7839	0.6317	21.9797	23.92

Table 4 reports the mean of FDIGDP and other variables such as GGDP, AIR and LCAB are not bad because it is similar with some other countries in the Arab region, like Morocco and Tunisia. For these countries, the World Investment Report (2013) indicates on the mean of Foreign direct investment as a percentage of GDP are 4.0%, 3.4% of GDP respectively.

Table 5 reports summary statistics for data sample in financial risk model.

Table 5. Summary statistics for variables in financial risk model

	Obs.	Mean	Std. Dev.	Min.	Max.
GFDIGDP	30	0.9628	4.8878	-3.75	21.6363
GFDS	30	0.6329	0.83301	-0.56198	2.8231
GFD	30	0.07566	0.37967	-0.31054	1.4945
ERS	30	7.0426	0.10867	6.7	7.09
LCA	30	19.6692	2.04252	14.8644	21.9885
LGDP	30	18.4553	0.62042	17.50563	19.59119

Table 5 shows the summary Statistics for data sample in Financial Risk Model. These results are considered acceptable by comparing similar countries like Morocco or Tunisia.

Table 6 outlines the correlation matrix among the variables for Economic Risk Model.

Table 6. Correlation matrix for variables included in economic risk model

	GDPPH	GGDP	AIR	LCAB
GDPPH	1.000			
GGDP	0.3073	1.000		
AIR	0.2102	0.5617	1.000	
LCAB	0.2487	0.3997	0.2469	1.000

From the results of Table 6 it appears that the annual inflation risks (AIR) and the real annual GDP growth rate (GGDP) is high relatively. The coefficient of variables indicates signs of relatively high correlation between AIR and GGDP. In general, all coefficients of variables seem to be within the acceptable levels.

Table 7 outlines the correlation matrix among the variables for financial Risk Model.

Table 7. Correlation matrix of variables included in financial risk model

	GFDS	GFD	ERS	LCA	LGDP
GFDS	1.000				
GFD	0.0185	1.00			
ERS	-0.3117	0.1718	1.00		
LCA	-0.1854	0.1698	0.3459	1.00	
LGDP	-0.2662	0.3013	0.1753	0.3759	1.00

Table 7 appears that the coefficient of variables between the indicated independent variables in financial risks model are to within the acceptable levels.

3.5 Hypotheses

According to previous discussions we can conclude the following hypotheses:

A) Economic risk

H1: There is a significant and impact between GDPPH and FDI;

H2: There is a significant and impact between RAGDPG and FDI;

H3: There is a significant and impact between AIR and FDI;

H4: There is a significant and impact between LCAB and FDI.

B) Financial risk

H5: There is a significant and impact between GFDS and FDI;

H6: There is a significant and impact between GFD and FDI;

H7: There is a significant and impact between ERS and FDI;

H8: There is a significant and impact between LCA and FDI;

H9: There is effect and significant between LGDP and FDI.

4. Results and Discussion

4.1 Economic Risk

As we are dealing with time series data we need to test the stationary status of the data series. Therefore both augmented Dickey Fuller and Philip Peron unit root tests has been performed with three specifications, with constant and no trend, without trend and no constant and with trend and constant. The results are reported in Table 8. The unit root tests results indicate that all the included variables in the economic risk model are integrated of order zero $I(0)$ or integrated of order one $I(1)$ that is the series of variables are stationary on the level form or the first difference form.

Table 9 shows the Empirical Results of the Economics Risk Model of Foreign Direct Investment over the period (1982–2012). The Durbin Watson d-statistics report a test of the serial correlation existence. The test indicates no evidence of positive autocorrelation neither negative autocorrelation problems in our sample of this model, as the d-statistic is above $dU_{.05}$ and $(4-d)$ is above $dU_{.05}$.

In addition we need to make sure that our regression model does not have multicollinearity problem. To achieve this we employ the variance inflation factor (VIF) which provides an index of how much the coefficients variance increased because of multicollinearity. The VIF results reported to the right of each coefficient in Table 8. The values of the VIF indicate that there is evidence of high correlation between GDPPH and LCAB and other included variables. Therefore, we dropped GDPPH and the VIF values of specification (2) regression provide no evidence of multicollinearity problem.

Table 8. Unit root tests

Test Models	Augmented Dickey-Fuller (ADF)			Phillips-Perron (PP)		
	FDIGDP	d.FDIGDP	Result	FDIGDP	d.FDIGDP	Result
No trend	-1.711	-4.583*	I(1)	-1.750	-4.584*	I(1)
No constant	-1.15	-4.696*	I(1)	-1.150	-4.699*	I(1)
With trend	-1.659	-4.610*	I(1)	-1.817	-4.617*	I(1)
	GDPPH	d.GDPPH	Result	GDPPH	d.GDPPH	Result
No trend	3.296	-2.941**	I(1)	2.861	-2.962**	I(1)
No constant	6.041	-2.719**	I(1)	5.054	-2.539**	I(1)
With trend	0.060	-4.017*	I(1)	-0.112	-4.110*	I(1)
	GGDP	d.GGDP	Result	GGDP	d.GGDP	Result
No trend	-4.231*	-9.061*	I(0)	-4.271*	-10.095*	I(0)
No constant	-1.777*	-9.231*	I(0)	-3.624*	-10.350*	I(0)
With trend	-4.310*	-8.836*	I(0)	-4.328*	-9.961*	I(0)
	LCAB	d.LCAB	Result	LCAB	d.LCAB	Result
No trend	0.726	-4.444*	I(1)	0.926	-4.448*	I(1)
No constant	3.347	-2.934*	I(1)	3.689	-2.892**	I(1)
With trend	-1.697	-4.498*	I(1)	-1.659	-4.508*	I(1)
	AIR	d.AIR	Result	AIR	d.AIR	Result
No trend	-5.547*	-8.066*	I(0)	-5.761*	-8.890*	I(0)
No constant	-3.356*	-8.215*	I(0)	-3.283*	-9.057*	I(0)
With trend	-5.527*	-8.239*	I(0)	-5.532*	-8.985*	I(0)

The Specifications analyses are:

Specifications (1):

$$FDIGDP_t = \alpha_0 + \alpha_1 GDPPH_t + \alpha_2 GGDP_t + \alpha_3 AIR_t + \alpha_4 LCAB_t + \varepsilon_t$$

Specifications (2):

$$FDIGDP_t = \alpha_0 + \alpha_1 GGDP_t + \alpha_3 AIR_t + \alpha_4 LCAB_t + \varepsilon_t$$

Where Specifications (1) include all variables of in test, Specifications (2) excludes GDPPH as a remedy to multicollinearity problem.

The chi2 statistic reports the Breusch-Pagan test for heteroskedasticity, the null hypothesis is (H0: constant variance), this test suggest that we cannot reject the null hypothesis and there is no evidence of heteroskedasticity problem.

Empirical results (Table 9) show that GGDP and AIR significantly affect the (FDIGDP), as expected in the hypotheses 1 and 3 in the Economics Risk Model of Foreign Direct Investment.

These results are similar to findings from each Khrawish and Siam (2010), Nayyira and Sundas (2014), and Alavinasab (2014), GGDP seems to be statistically in significant as expected in the hypotheses 2 in the Economics Risk Model of Foreign Direct Investment. These results are similar to those results that are obtained by Chan and Gemayel (2004), Singh and Jun (1995), Nonnenberg and Mendonca. LCAP has positive and significant as expected in the hypotheses 4 in the Economics Risk Model of Foreign Direct Investment. These results are the same of results which obtained by Misbah (2013).

Table 9. Empirical results of the economics risk model of foreign direct investment

	Specifications (1)		Specifications (2)	
	coefficients	VIF	coefficients	VIF
GDPPH	-0.01058 (-4.87*)	10.70	---	---
GGDP	6.6557 (0.45)	1.74	24.212 (2.12**)	1.63
AIR	-0.7132 (-1.87**)	1.47	-0.0283 (-1.93**)	1.46
LCAB	24.6883 (5.85*)	11.51	24.6944 (6.66*)	1.19
CONST.	-531.595 (-5.85*)	---	-531.689 (-6.65*)	---
R ²	0.7459		0.7447	
F - Statistics	12.48*		18.47*	
Durbin-Watson	1.85141		1.87394	
Chi ²	3.75 (0.4411)		5.55 (0.1875)	
No. of obs.	30		30	

Note. * States significance at 1% level of significance, ** states significance at 5% level of significance, *** states significance at 10% level of significance.

4.2 Financial Risk

The first step is to check the stationary of our data series, as we are dealing with time series data. Therefore both augmented Dickey Fuller and Philip Peron unit root tests has been performed with three specifications, with constant and no trend, without trend and no constant and with trend and constant. The results are reported in Table 10. The unit root tests results indicate that all the included variables in the economic risk model are integrated of order zero I(0) or integrated of order one I(1) that is the series of variables are stationary on the level form or the first difference form.

Table 10. Unit root tests

Test Models	Augmented Dickey-Fuller (ADF)			Phillips-Perron (PP)		
	FDIGDP	d.FDIGDP	Result	FDIGDP	d.FDIGDP	Result
No trend	-1.711	-4.583*	I(1)	-1.750	-4.584*	I(1)
No constant	-1.15	-4.696*	I(1)	-1.150	-4.699*	I(1)
With trend	-1.659	-4.610*	I(1)	-1.817	-4.617*	I(1)
	GFD	d.GFD	Result	GFD	d.GFD	Result
No trend	-4.628*	-7.246*	I(0)	-4.637*	-8.258*	I(0)
No constant	-4.557*	-7.376*	I(0)	-4.559*	-8.306*	I(0)
With trend	-5.000*	-7.002*	I(0)	-5.044*	-8.018*	I(0)
	GFDS	d.GFDS	Result	GFDS	d.GFDS	Result
No trend	-1.789	-5.948*	I(1)	-1.811	-5.857*	I(1)
No constant	-2.178	-5.495*	I(1)	-2.360	-5.408*	I(1)

With trend	-2.785	-6.448*	I(1)	-2.650	-6.368*	I(1)
	LCA	d.LCA	Result	LCA	d.LCA	Result
No trend	-3.015**	-4.983*	I(0)	-3.825*	-5.059*	I(0)
No constant	-1.207	-4.677*	I(1)	1.377	-4.709*	I(1)
With trend	-2.659	-5.629*	I(1)	-2.651	-6.000*	I(1)
	ERS	d.ERS	Result	ERS	d.ERS	Result
No trend	-5.348*	-4.728*	I(0)	-7.950*	-8.555*	I(0)
No constant	1.727	-3.653**	I(1)	1.368	-4.469*	I(1)
With trend	-3.739**	-4.311**	I(0)	-5.275*	-5.036*	I(0)
	LGDP	d.LGDP	Result	LGDP	d.LGDP	Result
No trend	1.021	-4.181*	I(1)	0.966	-4.226*	I(1)
No constant	7.403	-3.663**	I(1)	6.976	-3.903*	I(1)
With trend	-0.758	-4.285*	I(1)	-0.879	-4.301*	I(1)

Table 11 shows the empirical results of the financial risk model of foreign direct investment over the period (1682–2012).

Table 11. Empirical results of the economics risk model of foreign direct investment

	specifications (1)	VIF	Specifications (2)	VIF
GFD	2.5492 (0.63)	1.82	1.4678 (0.39)	1.86
GFDS	-3.2248 (-0.62)	4.68	-0.5904 (-0.12)	4.54
ERS	27.683 (0.80)	1.62	74.09*** (1.84)	2.57
LCA	0.9569 (0.95)	2.90	2.2157*** (1.95)	4.39
LGDP	-8.939 (-1.41)	3.99	16.22*** (1.82)	4.55
TIME	---	---	-2.6741*** (-1.90)	---
CONST.	-46.35 (-0.16)	---	-832.067*** (-1.89)	---
R²		0.2187		0.3883
F – Statistics		0.78		7.10*
Durbin - Watson		1.9379		2.0247
Chi²		3.28 (0.6587)		0.5287 (0.5287)
No. of obs.		30		30

Note. * States significance at 1% level of significance, ** states significance at 5% level of significance, *** states significance at 10% level of significance.

The second step of this examination is to check the impact of financial risks on the usage of GFDIGD (Table 11). Two specifications are used.

Specifications (1):

$$GFDIGDP_t = \alpha_0 + \alpha_1 GFDSt + \alpha_2 GFD_t + \alpha_3 ERS_t + \alpha_4 LCA_t + \alpha_5 LGDP_t + \varepsilon_t$$

Specifications (2):

$$GFDIGDP_t = \alpha_0 + \alpha_1 GFDSt + \alpha_2 GFD_t + \alpha_3 ERS_t + \alpha_4 LCA_t + \alpha_5 LGDP_t + \alpha_6 TIME + \varepsilon_t$$

Specification (1) includes the original suggested model; Specifications (2) include a trend variable which is included as a data correlation factor, by which we separate the trend effect out of the variables themselves.

Table 11 shows the Empirical Results of the Economics Risk Model of Foreign Direct Investment over the period (1982–2012). The Durbin Watson d-statistics report a test of the serial correlation existence. The test indicates no evidence of positive autocorrelation neither negative autocorrelation problems in our sample of this model, as the d-statistic is above dU_{.05} and (4-d) is above dU_{.05}.

In addition we need to make sure that our regression model does not have multicollinearity problem. To achieve this we employ the variance inflation factor (VIF) which provides an index of how much the coefficients variance increased because of multicollinearity. The VIF results reported to the right of each coefficient in Table 11. The values of the VIF indicate that there is evidence of high correlation between GPPH and LCAB and other included variables. Therefore, we dropped GPPH and the VIF values of specification (2) regression provide no evidence of multicollinearity problem.

The chi2 statistic reports the Breusch-Pagan test for heteroskedasticity, the null hypothesis is (H0: constant variance), this test suggest that we cannot reject the null hypothesis and there is no evidence of heteroskedasticity problem.

Finally, we notice that these results fit with the findings of Khrawish and Siam (2010), Nayyra and Sundas (2014), and Alavinasab (2014).

5. Conclusion

This study applies two models to examine and analyze the effect of the economic and financial risks on foreign direct investment in Jordan during the period (1982–2012) by using the Multivariate Data Analysis (MVA).

These models are: Economic Risks and financial risks. We selected these models because FDI flows in general are affected by economic risks and financial risks, Also, all variables which consists from these models are contributed to encourage FDI, and it includes many factors which worked to reduce the risks and increase the returns like Macroeconomic stability, Adequate legislation regulation and safeguarding investment, Access to markets, Good infrastructure, Low tariffs and tax and Competitive labor cost.

Also, this study found that there is an effect and significant between all independent variable and FDI of the economics risks model and it is shown that there is an effect and significant between all independent variable and FDI of the financial risks model. Finally the researcher suggests several factors that would increase the Jordanian investments, the important factors are: giving investors some advantages such as tax exemptions, improving domestic infrastructure, adequate legislation, regulation and safeguard and acceleration the treatment of investors.

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