**A causal relationship between foreign direct investment, economic growth and export: Empirical case for Jordan**

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**Abstract**

The aim of this paper is to analyze the relationship between foreign direct investment, economic growth and exports in Jordan. Estimation of effects on economic growth was performed for the period from Q1.2003-Q4.2013. The co-integration method and vector error correction model were applied. The results confirm the existence of long-term causal links between variables studied. The results show a positive impact of export on GDP, rather foreign direct investment has no effect on GDP. On the basis of the research method and by means of available time series, the study reveals that foreign direct investment has negative effect on economic growth of a country was proved.

***Keywords*:** foreign direct investment; economic growth; export; Unit root test: Jordan

**1. Introduction**

The role of exports and foreign direct investment in promoting economic growth has much been recognized. Export and growth of economy openness might lead to the growth of output level and increase of economy growth (Szkorupováa, 2014). Exports are considered as an important source of foreign exchange required most by developing countries to ease their balance of payment problems and reduce unemployment through generation of job opportunities (BABALOLA et al., 2012).FDI is an efficient tool to transfer new technologies, managerial skills, knowledge, and capital flow and so on. On the other hand, exportation is another means to integrate the economy of a country with that of the world and secure economic growth as well enhancing economic advantages (TEMI˙Z and GOKMEN, 2011).

The relationship between foreign direct investment (FDI) and economic growth has motivated a voluminous empirical literature.There are many research studies the impact of foreign direct investments and exports on economic growth. The influence of these variables on economic growth has been studied in many countries using different time periods, as well as econometric approaches and methods.The results of several studies regarding the impact of exports and foreign direct investments on the economic growth of developing countries are diverse (Dritsaki and Stiakakis, 2014).While it is believed that countries that receive more FDI would grow faster, the debate still continues (TEMI˙Z and GOKMEN,2011). This paper is aimed to analyze long-term causal relations between foreign direct investment, exports and economic growth, on the assumption that a long-term link between these variables might exist.

The paper is structured as follows: in section 2, a brief description of Jordan’s economy followed in section 3 with relevant bibliography review, while in Section 4 the data and the econometric methodology are given. In section 5 the empirical results are presented and finally, causal relation model results between selected variables are discussed in section 6.

**2. Jordan’s economy**

Jordan is a small, poorly endowed and aid-dependent lower-middle income country (LMC). Its industrial base is limited and the service sector outweighs other productive sectors and 92% of its land is semi-arid. Widening trade deficit could be narrowed through a change in the growth differential between imports and exports, with import growth slowing markedly and exports growth rising significantly. Increasing exports of manufactured are confronted with the increased competition from more efficient imports, which means that some local industries will not survive. The population growth rate in Jordan that stands at 2.2%( The World Bank, 2015) leads to high employment challenges, and an even higher population growth rate in the region mean that employment opportunities in the region may not be as readily available a few years from now. Although Jordan tried to reduce its deficits through aid from foreign donors and through fluctuating work remittances, its development choices are constrained by its weak natural asset coupled with high unrest situation in the region and high unemployment rates.

**3. Literature review**

There is a series of empirical studies examining foreign direct investment effects on economic growth and export and relations between these variables. Such effects are examined by various approaches among different countries and time series chain. The results of selected relevant studies are cited in this chapter. The relevant literature has provided extensive theoretical justifications about the contribution of foreign direct investment (FDI) and exports to growth. According to theoretical arguments, both domestic and external sources (including FDI) in an economy encourage, through higher technical progress, a higher level of investment in both fixed and human capital and, thus, promote growth, especially in developing countries (Apergis et al., 2008). Certain researchers concluded the existence of long-term causal links between foreign direct investment (FDI), export and economic growth. Empirically, Szkorupováa(2014) and Iqbal et al. (2010) found long-term causal links between FDI, export, economic growth. Dash and Parida (2013) found bi-directional causal relationship between FDI and economic output as well as between services exports and economic output. Chakraborty and Mukherjee (2012) concluded a unidirectional causality from India’s economic growth to FDI and from FDI to domestic investment. Studies that focused on FDI-economic growth relation as Almfraji and Almsafirc (2013) found FDI-Economic Growth relation is a significantly positive relation between the two variables, rather in some cases is negative or even null. In Khan et al. (2012) revealed a weak positive correlation of FDI with economic growth. Alhajhoj (2007) export sector caused a significant effect on the economic growth and a positive influence on other economic activities in the long run.

The study by BABALOLA et al. (2012) concluded that real gross domestic product, FDI and real export and the control variables as degree of openness, gross fixed capital formation, inflation rate, real exchange rate, real import and terms of trade interact through a chain of transmission mechanism. For instance, a rise in export increases the degree of openness which may result in technological transfer through FDI and increasing the level of gross fixed capital formation and then stability in the exchange rate and inflation rate. Chowdhury and Mavrotas (2006) found that it is GDP that causes FDI for Chile and not vice versa, rather for Malaysia and Thailand, there is a strong evidence of a bi-directional causality between the two variables. Muhammad et al.(2012) found a long run relationship between openness and economic growth and the study proofs export led growth hypothesis. Other research by Batten and Vinh Vo (2009) showed that FDI has a stronger positive impact on economic growth in countries with a higher level of education attainment, openness to international trade and stock market development, and a lower rate of population growth and lower level of risk for 79 countries. Liu et al. (2009) finds a two-way causal connection between trade, inward FDI, inward merger and acquisitions and growth in nine Asian countries, whereas Dritsaki (2004) found a causal relationship between economic growth, trade and FDI for Greece, where Feridun (2004) found unidirectional Granger causation from [**foreign direct investment**](http://www.scialert.net/asci/result.php?searchin=Keywords&cat=&ascicat=ALL&Submit=Search&keyword=foreign+direct+investment)to economic growth in Cyprus.

Yao (2006) showed that exports and FDI have a strong and positive effect on economic growth and Chang (2005) suggest that FDI inflow also has an obvious positive impact on exports and economic performance. Apergis et al. (2008) tried to reassess the importance of foreign direct investment on economic growth for 27 transition economies. Their results indicated foreign direct investment exhibits a significant relationship with economic growth for transition countries that are characterized by high levels of income and have implemented successful privatization programs. Mello Jr. (1997) argued the ultimate impact of FDI on output growth in the recipient economy depends on the scope for efficiency spillovers to domestic firms, by which FDI leads to increasing returns in domestic production, and increases in the value-added content of FDI-related production in developing countries. The study by TEMI˙Z and GOKMEN (2011) showed a causal relationship between FDI and export. Hermes and Lensink (2003) examined the role the development of financial system plays in enhancing the positive relationship between FDI and economic growth. Their results indicated that 37 countries have a sufficiently developed financial system in order to let FDI contribute positively to economic growth. Another perspective by Nwosa et al. (2011) found causality between financial development, foreign investment and economic growth for Nigeria. Sun (2011) demonstrates that granger causality Test results that China’s economic growth would inevitably cause a rise in FDI and error correction term has a stronger conversely-adjusted effect on the long-term equilibrium relationship between economic growth and FDI. Where Yan et al., (2011) examined the serial correlation ship between FDI and economic growth in Nepal and showed that showed that even though marginal effect seems to be because of presence of auto-correlation, without presence of auto-correlation FDI does not adequately describe the GDP. For Othman et al., (2012) they illustrated the existence of long run relationship between tourism industry, economic growth and  [**FDI**](http://www.scialert.net/asci/result.php?searchin=Keywords&cat=&ascicat=ALL&Submit=Search&keyword=foreign+direct+investment) for 18 major international tourism destinations.

**Table (1). Summary of the relevant literature**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Author, Year** | **Aim** | **Country studied** | **Time line** | **Methodology** | **Conclusion** |
| Szkorupováa (2014) | Analyzed the relation between FDI, economic growth & export .  | Slovakia | (2001-2010)(10 years) | 1.Co-integration method. 2.Vector error correction model. | Existence of long-term causal links between FDI, export, economic growth. |
| Batten & Vinh Vo (2009) | Studied link between (FDI) & economic growth and if the relationship change under differenteducational, institutional & economic conditions. | 79 countries | (1980–2003)(24 years) | Panel data modelling technique. | FDI has a stronger positive impact on economic growth in countries with a higher level of education attainment, openness to international trade and stock market development, and a lower rate of population growth & lower level of risk. |
| Othman et al. (2012) | Investigated relationship between development of tourism industry economic growth (GDP) & FDI.  | 18 major international tourism destinations | 2007 | Autoregressive distributed lag (ARDL) methodology. | 1Long run relationship between tourism industry, economic growth & [**FDI**](http://www.scialert.net/asci/result.php?searchin=Keywords&cat=&ascicat=ALL&Submit=Search&keyword=foreign+direct+investment)**.** |
| Nwosa et al. (2011) | Examined the causal relationship between financial development, foreign direct investment & economic growth.  | Nigeria | (1970- 2009)(40 yrs) | Augmented Dickey-Fuller (ADF) for unit root test. | Causality between financial development, foreign investment & economic growth.  |
| Iqbal et al. (2010) | Examined causality relationship between FDI, international trade & economic growth.  | Pakistan | 1998-2009(12 yrs) | Integration & cointergration. analysis using VAR model. | Long run relationship among FDI, international trade & economic growth. |
| Chakraborty & Mukherjee (2012) | If any long-run relationship between FDI, domestic investment & economic growth exist, and if so, what is the direction of the relationship. | India | 1996.Q12-2009.Q2(14 yrs) | Unit Root TestCointegration TestCausality Test. | Uunidirectional causality from India’s economic growth to FDI & from FDI to domestic investment. |
| Muhammad et al.(2012) | Evaluate long run relationship of openness policy & economic growth. | Pakistan | 1970-2012(43 Yrs) | 1.Johnson co-integration technique. 2. Error Correction Model.  | There is long run relationship between openness & economic growth.  |
| Dritsaki (2004) | Investigated the relationship between trade, (FDI) & economic growth.  | Greece | 1960-2002(43 Yrs) | Cointegration analysis. | There is a causal relationship between economic growth, trade & FDI.  |
| Almfraji & Almsafirc (2013) | Reviewed studies examining the relationship between FDI & economic growth. | Different | (1994-2012)(19 Yrs) | Literature research. | FDI-Economic Growth relation is significantly positive, rather in some cases is negative or even null. 2.Within the relation, there are several influencing factors such as adequate level of human capital, well-developed financial markets, complementarity between domestic and foreign investment and open trade regimes. |
| Dash & Parida (2013) | Examined the linkages between inward FDI, services trade (export & import) and economic output.  | India | (Q1.1996– Q1.1997) + (Q4-2010–Q42011) | Co-integration & VECM causality test. | The presence of bi-directional causal relationship between FDI & economic output as well as between services exports & economic output.  |
| BABALOLA et al. (2012) | Examined the relationship among exports, (FDI) & economic growth.  | Nigeria | (1960-2009)( 50 Yrs) | Phillips-Peron technique. | At least six cointegrating vectors exist. |
| Sun (2011) | To find a relationship between FDI & economic growth. | China | 2010 | Co-integration. | China’s economic growth would inevitably cause a rise in FDI and the relationship tends to be a one-way causality and error correction term has a stronger conversely-adjusted effect on the long-term equilibrium relationship between economic growth & FDI. |
| Khan et al. (2012) | If there was an economic growth or decline amid a diminishing trend of FDI . | Pakistan | (2001-2010)(10 Yrs) | Multiple regression Model. | Weak positive correlation of FDI with economic growth.  |
| Yan et al. (2011) | Examined the serial correlation ship between FDI & economic growth. | Nepal | (1983-2007)(25Yrs) | 1. Log and non log values using Durbin-Watson Test.
2. Cochrance- log & non log - values using Durbin-Watson Test & Cochrance-Orcutt method .
 | Even though marginal effect seems tobe because of presence of auto-correlation, without presence of auto-correlation FDI does not adequately describe the GDP.  |
| TEMI˙Z & GOKMEN (2011) | To discover relationship betweenFDI & export. | Turkey | (12.1991-10.2010)(20Yrs) | 1.Unit root test, Johansen. 2.Cointegration test. 3.Vector error correction model (VECM), 4.Granger causality test. | A causal relationship between FDI & export. |
| Li & Liu (2005) | If foreign direct investment (FDI) affects economic growth. | 84 countries | (1970–1999) | 1.Single equation. 2.Simultaneous equation system techniques. | Significant endogenous relationship between FDI & economic growth from the mid-1980s onwards.  |
| Chowdhury & Mavrotas (2006) | Examined the direction of causality relationship between FDI & economic growth.  | ChileMalaysiaThailand | (1969-2000)(32 Yrs) | Toda-Yamamoto test for causality to time-series data. | GDP that causes FDI for Chile and not vice versa, For Malaysia & Thailand, there is a strong evidence of a bi-directional causality between the two variables. |
| Liu et al.(2009) | Examined empirically inter-play between exports, imports, FDI & economic growth for 9 Asian economies. | 9 Asian economies | (1970-2002)(33 Yrs) | Multivariate causality tests in the vector error correction model (VECM) framework. | Two-way causal connections between trade, inward FDI,inward merger and acquisitions (M&As) and growth.  |
| Alhajhoj (2007) | Examined long-term relationship between exports & domestic economic growth. | Kingdom of Saudi Arabia | (1970– 2005)(36 Yrs) | 1.Vector Auto-Regression (VAR). 2.Impulse Response Function (IFR). 3.Granger-causality. | Export sector caused a significant effect on economic growth and a positive influence on other economic activities in the long run. |
| Feridun (2004) | Examined the relationship between economic growth as measured by GDP per capita and [**FDI**](http://www.scialert.net/asci/result.php?searchin=Keywords&cat=&ascicat=ALL&Submit=Search&keyword=foreign+direct+investment)**.** | Cyprus | (1977-2002)(26 Yrs) | 1.Granger causality and vector auto regression (VAR). | There is a unidirectional Granger causation from [**FDI**](http://www.scialert.net/asci/result.php?searchin=Keywords&cat=&ascicat=ALL&Submit=Search&keyword=foreign+direct+investment) to economic growth. |
| Mello Jr. (1997) | Surveyed the latest developments in the literature on the impact of inward (FDI) on growth.  | Developing Countries(DC) | (1970-1990)(21 Yrs) | 1.Case studies. 2.Growth Accounting Approach. | Utimate impact of FDI on output growth in the recipient economy depends on the scope for efficiency spillovers to domestic firms, by which FDI leads to increasing returns in domestic production & increases in the value-added content of FDI-related production. |
| Apergis et al. (2008) | Examined the importance of FDI on economic growth. | 27 transition economies | (1991–2004)(14 Yrs) | 1.Panel cointegration.2. Causality tests. | FDI exhibits a significant relationship with economic growth for transition countries that are characterized by high levels of income and have implemented successful privatization programs. |
| Dritsaki (2004) |  Investigated the relationship between Trade, (FDI) & economic growth. | Greece | (1960-2002)(43 Yrs) | 1.Cointegration analysis.2.Granger causality. | There is a causal relationship between Trade, Foreign Direct Investment (FDI) & economic growth.  |
| Yao (2006) | Focused on the effect of exports & (FDI) on economic performance. | 28 Chinese provinces | (1978–2000)(23 Yrs) | 1.Pedroni’s panel unit root test 2.Arellano & Bond’s dynamic panel data estimating technique. | Exports and FDI have a strong and positive effect on economic growth. |
| Chang (2005) | Analyzed dynamic relationships among (FDI), economic growth, unemployment & trade. | Taiwan | (1988-2003)(16 Yrs) | 1.Vector autoregression (VAR) method of variance decomposition. 2.Iimpulse response function. | Economic growth & exports have positive impacts on FDI inflow.  |
| Hermes & Lensink  (2003) | Investigated the role the development of the financial system plays in enhancing the positive relationship between FDI & economic growth. | 67 LDCs | (1970-1995)(26 Yrs) | Voluminous growth regression. | 37 have a sufficiently developed financial system in order to let FDI contribute positively to economic growth. Most of these countries are in Latin America & Asia. |

**3.Data and Methodology**

The economic relationship that going to be studied is given below.

***GDP*=*f*(*FDI*,*EXP*)**

Individualvariablesinanequationare:

• GDP= grossdomesticproduct

• FDI= foreigndirectinvestment

• EXP= export

The model is tested on quarterly data for the period of Q1.2003–Q4.2013.Gross domestic product and export are seasonally clear.Seasonally clear series is marked with“sa” at the end of the time series’ title. Both these series, undergone seasonal adjustment because some observe fluctuation occur at the same time each years. Then, individual data weretrans formed by the natural logarithm before the testing to reduce variability.Individual time seriestrans formed bylogarithm are marked with a capital etter“L” before the each time series’title. The time series plots are presented in Figure 1 and descriptive statistics are given in Table 2.



**Figure 1. Time Series Plots**

**Table 2. Descriptive Statistics**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **LEXP\_sa** | **LGDP\_sa** | **LFDI** |
| Mean |  9.648 |  8.207 |  5.655 |
| Median |  9.439 |  8.317 |  5.678 |
| Standard deviation |  0.626 |  0.360 |  0.656 |
| Skewness |  0.463 | -0.379 | -0.814 |
| Kurtosis |  1.811 |  1.902 |  4.153 |
| Observations |  44 |  44 |  44 |

It can be seen from Figure 1 that LEXP\_sa and LFDI series fluctuate up and down while LGDP\_sa shows an increasing trend. In addition, Table 2 indicates the distribution of all the series deviates from standard normal.

**Unitroottest**

Results of ADF test are shown inTable 3. The table contains data showing the value of tested non-stationary time series at their levels and at first differences.The assumption for further test and research of long term relationships between specified variables is met since all time series are stationary at the first differences which is at the same level.

**Table3. ADF Unitroot tests**

|  |  |  |
| --- | --- | --- |
|  | **Level** | **1st differences** |
|  | **Lagged** | **Test statistic ADF** | **Lagged** | **Test statistic ADF** |
| **LEXP\_sa** | 9 | 0.498 | 9 | -5.328\*\* |
| **LGDP\_sa** | 9 | -1.835 | 9 | -3.739\*\* |
| **LFDI** | 9 | 0.404 | 9 | -6.301\*\* |

Note: \*\* denotesignificanceat the5% level.

**Long term relationship test between FDI,GDP and EXP**

The dependent variable is gross domestic product and the independent variables are foreign direct investment and export.The Johansen test going to be executed in order to examine the existence of long term and short term relationship. The Johansen test is based on two test statistics,the Trace statistic and Max-eigen statistic.Cointegration test results are shown in Table 4. It was found that the existence of long-term relationship was established between the variables and the cointegration link was found.

**Table 4. Johansen co-integration test**

|  |  |  |
| --- | --- | --- |
| **H0** | **Trace statistics** | **Max-eigen statistic** |
|  | 36.708\*\* | 20.438 |
|  | 16.269\*\* | 13.175 |
|  | 3.094 | 3.094 |

Note: \*\* denotesignificanceat5% level.

Cointegration equation has the following form:



The above equation shows that if theFDI increasesby1% then there is adecrease in gross domestic products of 0.039% and if EXP increases by1 % thereisan increasein gross domestic products of 0.535%.

**4.Vector error correction model**

The Johansen test indicated that there is long term dependence between the three variables.However,Johansen test is leaving aside the possibility of the short-term fluctuations between the two examined variables.The vector error correction model(VECM)isused for detection of these fluctuations during cointegration. The vector error correction model has the following form:



Where lagged represents a certain number of delays explaining variables. The optimal number of delays is determined byAkaikein formation criteria and the chosen value are 2. means the first difference of the variable,is the estimated residual components of the long-term relationship,determined from cointegration testis the rate of return to long-term balance and *Vt* is a random component of white noise. Appropriate adjustmentof the model was tested by several tests of residual components.Specifically,it was a test of autocorrelation, test of normality and heteroscedasticity test. Based on Table 6, testing ruled out the existence of all three events and confirmed that the model is properly chosen. The result of a vector error correction model is presented in Table 5:

**Table5.Vector error correction model**

|  |  |
| --- | --- |
| **Variables** | **D(LGDP\_sa)** |
| CointEq1 | -0.0103 |
| D(LGDP\_SA(-1)) | 0.0068 |
| D(LGDP\_SA(-2)) | 0.0151 |
| D(LFDI(-1)) | 0.0129 |
| D(LFDI(-2)) | 0.0098 |
| D(LEXP\_SA(-1)) | -0.0284 |
| D(LEXP\_SA(-2)) | -0.0112 |

**Table 6. The results of diagnostic tests**

|  |  |  |
| --- | --- | --- |
|  | **H0** | **Statstice** |
| VEC Residual Serial Correlation LM Test  | No serial correlation at lag order h  |

|  |
| --- |
| 7.905 |

 |
| VEC Residual Heteroskedasticity Test | Residuals are homoskedastic  | 83.282 |
| VEC Residual Normality Test | Residuals are multivariate normal  | 11.319 |

In case of Jordan and GDP dependent,the results of adjusted coefficient are low which is 1% of short term deviations from the balance condition areadjusted by changes in the model dependent variable with the lag length of two quarters.

**5. Conclusion**

The purpose of the paper was to investigate the impact of foreigndirectinvestment and exports on economic growth in Jordan for using quarterly data from 2001-2013. Firstly, in order to achieve a more reliable result, growth domestic product and export were seasonally adjusted. Next, the three series are tested using the ADF test and it revealed that all series are stationary at first differences. The analysis continues using the Johensen test to explore the existence of the long term or short term relationship among the variables. Results indicate long run term relationship exist among the variables. Cointegration equation had shown an opposite results where negative relationship between foreign direct investment andgross domestic product while positive relationship between export and gross domestic product. This finding proves thatfor Jordan, export rather than foreign direct investment encourages economic growth.Finally, as all the variables are stationary at the same level and the Johansen test displayed cointegration among the variables, the analysis proceeds using a vector error correction model.The outcome of the model uncovers that approximate 1% rate of convergence to long-term equilibrium relation to formation of short-term shocks. This result indicates the rate of convergence to long-term equilibrium is very slow.

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