BIRZEIT UNIVERSITY

**The Effect of Remittances and Foreign Direct Investment
on Economic Growth in Jordan**

تأثير التحويلات والاستثمار الأجنبي المباشر على النمو الاقتصادي في الأردن

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Abstract

Remittances and Foreign Direct Investment (FDI) inflow into the Jordanian economy have been generally increasing throughout the past 30 years. This study aims to examine the short and long run effects of these inflows, especially on Gross Domestic Product (GDP) growth. The study utilizes the Autoregressive Distributed Lag (ARDL) model to analyze remittances and FDI data in Jordan for the period 1980 to 2014. Through the Augmented Dickey- Fuller, findings showed that GDP growth is stationary at the level and at first difference, whereas remittances and FDI are stationary at first difference. In addition, utilizing Wald Test for checking the availability of long run association, it was concluded that there is co-integration between the variables.

Moreover, results revealed that remittances have a significant positive, yet small impact in the short run and no significant effect in the long run. Furthermore, this study also concluded that FDI affect growth negatively in the short run and positively in the long run.

شهد الاقتصاد الأردني تزايد في تحويلات العاملين من الخارج والاستثمار الأجنبي المباشر خلال الأعوام الثلاثين الأخيرة. تهدف هذه الدراسة إلى البحث في تأثير هذه المتغيرات على المدى القصير والطويل على نمو الناتج المحلي الاجمالي في الأردن للفترة من 1980 إلى 2014 باستخدام نموذج الانحدار الذاتي للإبطاء الموزع (ARDL). ومن خلال تطبيق نموذج ديكي- فولر المعزز، يتبين أن نمو الناتج المحلي الإجمالي ثابت على المستوى والفارق الأول، في حين أن التحويلات والاستثمارات الأجنبية المباشرة ثابتة في الفارق الأول. وبالإضافة إلى ذلك، أظهر اختبار والد الهادف إلى فحص توافر ارتباط على المدى الطويل ، أن هناك تكاملا مشتركا بين المتغيرات.

وعلاوة على ذلك، كشفت النتائج أن لتحويلات العاملين أثر إيجابي صغير على النمو الاقتصادي على المدى القصير في حين عدم وجود تأثير لها على المدى الطويل. إضافة إلى ذلك، أظهرت الدراسة أثرا سلبيا للاستثمار الأجنبي المباشر على المدى القصير وأثرا إيجابيا على المدى الطويل.

Chapter One

Introduction

1-1 Preface

GDP is defined as the value of final goods and services produced in an economy during a given period (Blanchard, 2008), including personal consumption, exports and imports, government expenditures and investments that occur within a specific area. It is considered as a primary and comprehensive indicator of the country's economic health as well as a measure of its standard of living.

Personal remittances are defined as "all current transfers received by resident households from nonresident households" (World Bank, 2016). It consists of "current and capital transfers in cash or in kind and net compensation of employee from persons working abroad for short periods of time" (United Nations Technical Subgroup on Movement of Natural Persons, 2005).

Foreign direct investment (FDI) is "an investment involving a long-term relationship and reflecting a lasting interest and control by a resident entity in one economy in an enterprise resident in an economy other than that of the foreign direct investor" (UNCTAD,2007). In other words, FDI is "a category of cross-border investment by a resident entity in one economy with the objective of

obtaining a lasting interest in an enterprise resident in another economy. Direct investment enterprises may take several forms. In subsidiaries, over 50% of the voting power is held; in associates, between 10% and 50% and quasi-corporations (such as branches) are effectively 100% owned by their foreign parent companies" (OECD, 2002).

Remittances and FDI play a vital role in the economy; remittances can fight poverty, stimulate consumption and investment and decrease labor force (Fayissa and Nsiah, 2008); (Berthomieu and Tykhonko, 2009). Likewise, FDI could increase capital stock and bring technological knowledge and spillover effects on employment and skills. However, FDI may lead to crowd funding effect and negative spillovers (Driffield and Jones, 2013).

In 2014, the inflows of Remittances and FDI yielded 3.8 and 1.8 billion, respectively, to the Jordanian economy which represented 62% and 87% increase in the latest 10 years. Consequently, a relationship can be formed between the inflows of remittances and FDI with GDP growth as the inflows of remittances and FDI in the latest years play a role in the Jordanian economy.

1-2 Problem Statement

This study aims to analyze the effects of remittances and FDI on GDP growth due to the importance of external inflows for the Jordanian economy .It will examine the below questions:

1. How did the GDP change over the period 1980-2014 in Jordan?

2. How did the remittances change over the period 1980-2014 in Jordan?

3. How did the FDI change over the period 1980-2014 in Jordan?

4. What is the impact of remittances on GDP growth?

5. What is the impact of FDI on GDP growth?

1-3 Objectives

This study aims to examine the effect of remittances and FDI on GDP growth in Jordan over the period 1980-2014, then to suggest recommendations that enable the Jordanian economy to utilize the benefits of remittances and FDI for its growth.

1-4 Importance

The importance of the study appears from the huge amount of inflows of remittances and FDI with their effects on the Jordanian economy in the latest years. The Jordanian economy will be more sensitive and vulnerable to events outside it, especially during the regional instability around Jordan and the risk of discontinuity of remittances and FDI. In addition, these funds may be used incorrectly that will not lead to economic growth.

The selection of the Jordanian economy was due to the availability of a large time series data related to remittances and FDI rather than the Palestinian Territory.

1-5 Methodology

In order to examine the effect of remittances and FDI on GDP growth in Jordan, the study uses the Autoregressive Distributed Lag (ARDL), bounds testing method and unit root test to examine the relationship between the variables. In addition, the data for this study were collected from World Bank Data Base, over the period 1980 to 2014 on an annual basis.

1-6 Contents

The study proceeds as follows: Chapter two provides the theoretical background and literature review of the effect of remittances and FDI on GDP growth. Then, chapter three presents an overview of the Jordanian economy and the data analysis. Later on, chapter four presents the methodology. While, the empirical results are discussed in chapter five. Finally, chapter six concludes the paper.

Chapter Two

Theoretical Background and Literature Review

2-1 Theoretical Background

The aim of this study is to examine the effects of workers 'remittances and FDI on the economic growth in Jordan. Throughout the following literature, the effect of Remittances and FDI may be positive or negative.

2-1-1 Remittances

The effect of workers' remittances on economic growth can be observed in the Solow Growth Model (1956), represented by the following equation:

$$Y = AF(K, L) \ldots (1)$$

Where Y, K, L stands for GDP, capital stock and L, respectively (Solow, 1956).

Remittances affect the above economic growth equation through its effect on investment and to what extent remittances are used in investment or consumption ,also it can affect the labor growth rate which is represented by a decrease in the number of workers due to immigration (Fayissa and Nsiah, 2008).

Remittances could affect economic growth positively through the multiplier effect of its usage for consumption purposes (Fayissa and Nsiah, 2008). Besides,

they could increase investment through driving banks and other financial institutions in home countries to grant loans to businesses as deposits increased (Berthomieu and Tykhonko, 2009). However, remittances could affect the home country's economic growth negatively through its impact on the price level and the exchange rate. In addition, they could lead to a conspicuous consumption and might encourage remittance receivers to get out of labor force (Berthomieu and Tykhonko, 2009).

2-1-2 Foreign Direct Investment

The effect of the FDI on economic growth can also be observed through the Solow Growth Model in 1956. It is represented through the effect of FDI on the capital stock, taking into consideration that foreign-owned production units are more productive than domestic-owned ones (Rivera-Batiz and Romer,1991).

According to OECD (2002), there are several ways that FDI can affect GDP growth in an economy. It can bring up new technologies, affect the structure of human resource, increase competition in the host country and connect with the international economy. Nevertheless, the influence of FDI on GDP will be limited if the economy lacks incentive policies. (GuechHeang and Moolio, 2013). In addition, it will not increase the capital stock if it leads to crowding investment, or if it is applied through mergers and acquisitions in the host country (Driffield and Jones, 2013).

2-1-3 Econometric Model

In this study, we will consider the following model to analyze the effects of remittances and FDI on the gross domestic product (GDP) in Jordan:

$$G\_GDP = GDP (FDI, RMT) \dots (2)$$

$$G\_GDP = \beta_0 + \beta_1 RMT + \beta_2 FDI \dots (3)$$

Where,

G_GDP : Growth of gross domestic product in Jordan at current prices.

RMT : Personal remittances, received at current prices

FDI : Foreign direct investment, net inflows

β_0 : The value of G_GDP when B1=B2=0.

β_1 : The effect of remittances on GDP growth, which might be positive or negative

β_2 : The effect of FDI on GDP Growth, which might be positive or negative.

2-2 Literature Review

Early studies examine the effects of remittances and FDI on the GDP growth. These studies argue different points of view and come up with distinctive results regarding those effects.

2-2-1 Remittances

Chowdhury and Das (2012) examine the relation between remittances and GDP using panel cointegration and pooled mean group (PMG) based on a panel dataset over the period (1985-2009). The study considers 11 developing countries with the highest amounts of remittances including: Bangladesh, Dominican Republic, El Salvador, Gambia, Guatemala, Honduras, Jamaica, Lesotho, Philippines, Senegal and Sri Lanka. Findings show a weak positive relationship between the variables in which remittances are used for consumption purposes or as receiving high proportion of un-official remittances. Similar results are found by Catrinescue et al. (2006).

Anjum and Hussain (2014) study this relation on Pakistan for the period 1973 to 2011 using (GMM). Findings show that there is a significant positive relation between remittances and GDP. Additionally, Goschin (2014) considers 10 countries of Central and Eastern Europe (CEE) over the period 1995 - 2011 using panel estimation method to estimate the effect. The author reveals a significant positive impact of remittances on GDP growth in the ten CEE countries.

Giulliano and Arranz (2005) analyze the relation among a large sample of developing countries through GMM over the period 1975-2003. The authors reveal the relationship between remittances and per capita GDP is significantly positive for countries with week financial system, while they show a less important role of remittances on GDP growth for countries with more developed financial system.

Correspondingly, Barguellil et al. (2013) reveal a positive relationship between remittances and GDP over the period (1990-2006), but this result is applicable only to countries with high percentages of remittances to GDP and not with countries of higher remittances amounts. Also, Fayissa and Nsiah (2008) focus on 37 African countries covering the period from 1980 to 2004. Using GMM, it is shown that remittances increase growth for countries only with less developed financial system.

Abu Siddique et al. (2010) investigate the causal relationship between these variables in Bangladesh, India and Sri Lanka using Granger causality test for the period 1976 to 2006. Findings show causal, non-causal and two-way directional causal effects in these counties respectively. In China and Korea, Jawaid and Raza (2012) focus on the short run effects through autoregressive distributed lag (ARDL), the authors reveal a positive significant relationship in Korea and insignificant impact in China in the short run.

Salahuddin and Gow (2015) focus on the major remittance receivers in Bangladesh, India, Pakistan and Philippines using panel co-integration tests and

pooled mean group (PMG) regression. They reveal a positive significant effect of remittances on GDP in the long run and not significant results in the short run.

Chami et al. (2003) use panel method on 113 countries over the period 1970 - 1998. They conclude a negative relation between remittances and economic growth. Additionally, using GMM, Sobiech (2015) reveals a negative significant effect of remittances on economic growth for developing countries with large financial markets and positive effects for countries with less developed financial markets.

In contrast, Lim and Simmons (2015) study the remittances inflow to the Caribbean community over the period 1990–2012 using panel co-integration tests. Findings reveal no long-run relationship between the remittances and growth.

2-2-2 Foreign Direct Investment

Agrawal (2011), Tintin (2013), GuechHeang and Moolio (2013) study the influence of FDI on economic growth in both developed and developing countries using Ordinary Least Square (OLS) technique, panel least squares and simple regression analysis, respectively. Their results indicate long run positive effects of FDI.

According to Mencinger (2003), this effect is brought through the positive externalities that FDI may induce to compensate insufficient savings. Additionally, Borensztein et al. (1995) find that FDI promotes growth more than domestic investment through acquiring technology.

Nguyen (2017) studies the long run and short run impacts of FDI on economic growth in Vietnam over the period 1986-2015 using ARDL model. Findings show positive significant effects in the long run and non-significant relationship in the short run. Nevertheless, Faeth (2011) concludes that FDI affects GDP growth positively in the long run and negatively in the short run and referred this contradiction to the induced crowding–out effect. Moreover, Akinlo (2004) finds that the FDI affects GDP growth positively after a long period of time through error correction model (ECM). The author attributes this result to directing FDI toward mining instead of manufacturing sector.

Adewuni (2006) considers the effect of FDI on economic growth for 11 African countries over the period 1970-2003 by graphical and regression analysis. Conclusions indicate no relation between the variables. Similar results are obtained by Moura and Forte (2010).

Lyroudi (2004) uses Bayesian analysis to find the relationship over the period 1995 - 1998 for the United States and Western European countries. The author concludes that FDI does not affect economic growth in these countries. This result is consistent with Carcovic and Levive (2002), Javorcik (2004), Haddad and Harrison (1993) and Aga (2014). In contrast, Carcovic and Levine (2002) illustrate a negative impact of FDI on GDP growth by implementing the GMM panel estimator over the period 1960 to 1995 in 72 countries.

2-2-3 Jointly Effect

The joint effect of remittances and FDI on GDP growth is considered by Driffield and Jones (2013) covering from 1984 to 2007 using 3SLS. Results reveal that FDI and remittances are positively related to growth.

Additionally, Nwaogu and Ryan (2015) consider the same relationship in 53 African and 34 Latin American and Caribbean countries. Using dynamic spatial model, findings in Africa show that FDI has a positive relation with economic growth and remittances have no effect. In Latin America and the Caribbean, the separate effect of remittances is positive while the joint effect of FDI and remittances are insignificant. Moreover, Wakayama (2011) concludes that remittances and FDI cannot explain GDP per capita growth in countries with high remittances to GDP ratio.

Chapter Three

Overview of the Jordanian Economy

3-1 Introduction

Over recent decades, Jordan pursued notable reforms in the economy. Positively, GDP attained 38.517 billion dollars in 2015 representing 27% increase in 40 years. Whereas, GDP per capita yielded 4940.04 representing a 719% growth over the same period. Nevertheless, the inflation rate had witnessed massive fluctuations over the past 40 years, but it became more stable after 2010 until it reduced to 2.28% in 2015 (World Bank Data Base, 2015). However, the Jordanian economy depended mainly on the business services sector which constituted the largest share of the GDP (72%), whereas the industrial and agricultural sector represented 25.6% and 7.4% of the GDP, respectively (Central Bank of Jordan, 2015).

Over the past decade, the Jordanian government has introduced major improvements on the social protection system, subsidies, infrastructure and tax reforms to enhance the investment environment and the facilitation of doing businesses in Jordan.

3-2 Economic indicators

In 2015, Jordanian GDP and GDP per capita arrive $37,517 million and $4,949, respectively. Household consumption represents 90.6% of the total GDP

while government expenditure, gross capital formation, exports and imports represent 16% ,21.2% 41.4% and 69.2% respectively (UNCTAD database, 2015).

3-3 International Trade

Table (1) shows that Jordan exhibits deficit in its merchandise trade balance over 2005, 2010, 2015 and 2016. Apparently, manufacturing merchandise exports constitute 74% while all food items represent 17% of the total exports in 2015.

Table (1): Merchandise trade balance in millions of $, Jordan,
for the years 2005, 2010 and 2015

Item	2005	2010	2015
Merchandise exports	4 302	7 028	7 833
Merchandise imports	10 498	15 564	20 475
Merchandise trade balance	-6 196	-8 535	-12 642

Source: UNCTAD database, different years

Moreover, Table (2), Jordan exhibits deficit in its service trade balance in 2005 while it exhibits surplus in 2010 and 2015. Taking into consideration that the travel sector represents 66.1% of the total service exports in 2015 (UNCTAD database, 2015).

Table (2): Service trade in millions of US$, Jordan, 2015
for the years 2005, 2010 and 2015

Item	2005	2010	2015
Services exports	2412	2724	6308
Services imports	2542	4419	4496
Services trade balance	-130	1305	1812

Source: UNCTAD database, different years

3-4 Labor Force

In 2014, the total population of Jordan is 7.4 million, including 1.9 million in the labor force. Females represent only 17% of the labor force. Furthermore, unemployment rate constitutes 11.9% in which 21.75% of the unemployed are females and 9.85% are males (World Bank Data Base, 2014).

3-5 External Financial Resources

Jordan is considered an open economy and a member of the World Trade Organization, also it has signed the Free Trade Area Agreement in 2002. Consequently, the Jordanian government has exerted an effort to enhance its investment environment. However, large investors state that there are hidden costs perceived from the bureaucratic system and regulations (Department of State, 2015).

Jordanian immigrants are present in United Arab Emirates (UAE), Saudi Arabia (KSA), Kuwait, United States of America and other Arab and Western countries .While, the largest inflows of remittances are received from Saudi Arabia, United Arab Emirates and United states of America representing 38.7 %, 19% and 10% of the total remittances in 2015 (Reach, 2017).

In 2014, the inflows of remittances reached $3.8 billion into the Jordanian economy representing 62% growth in the latest 10 years and 10.5 % of the GDP in 2014 (World Bank database, 2014).

In 2015, Jordan was considered the fourth largest remittance recipient ($3.8 billion) in the Arab region after Egypt ($20.4 billion), Lebanon ($7.5 billion) and Morocco ($6.7 billion). In addition, Jordan was considered as the third largest remittance recipient in percentage of GDP (10.3 %) after West Bank and Gaza (17.1%), Lebanon (16.2 %) (World Bank Group, 2016).

In 2014, FDI inflows into the Jordanian economy reached approximately $2 billion representing 5.61% of the GDP, 22.35 % of the gross capital formation, $271 per capita and realized a growth of 87% in the latest 10 years (World Bank database, 2014).

Table (3) shows that 40.7% of the FDI inflows is directed toward the real estate sector, followed by the Coal, Oil and Natural Gas sector with a 29.6%. We can notice that industrial machinery and equipment consists of 2.6% of total FDI inflows (Dhaman, 2016).

Table (3): Inward FDI in Jordan by the sectorial distribution
(Jan. 2003 - May 2015)

Sector	Percentage of FDI
Real Estate	40.7%
Coal, Oil and Natural Gas	29.6%
Chemicals	9.1%
Building & construction materials	3.5%
Industrial machinery and equipment	2.6%
	Continued

Metals	2.1%
Hotel & Tourism	2%
Other Sectors	10.4%

Source: Dhaman, Annual Report, 2016

Table (4) presents that the top countries investing in Jordan between January 2003 and May 2015 are United States Emirates and Russia, representing 35.5% and 23.2% on FDI inflows to Jordan respectively (Dhaman, 2016).

Table (4): Top Countries Investing in Jordan
(Jan. 2003 and May 2015)

Country	Percentage of FDI
United States Emirates	35.5%
Russia	23.2%
United States	7%
Saudi Arabia	6%
Bahrain	4.6%
Other Countries	23.7%

Source: Dhaman, Annual Report, 2016.

3-6 Variables of the Study

This study examines the influence of remittances and FDI on GDP using annual data between 1980 and 2014.

3-6-1 Gross Domestic Product (GDP)

Figure (1) provides that the Gross Domestic Product (GDP) is generally increasing over the period 1980-2014. Particularily, the GDP increased by 12%

from 1980 to 1987, then it starts declining until 1990. Afterwards, GDP has increased dramatically.

The decrease in GDP growth between 1987 and 1990 can be justified by the deterioration of the Jordanian dinar exchange rate as the result of the instability of the foreign exchange markets. In 1990, the Jordanian dinar was linked to the US dollar at a rate of 1.41 USD per Dinar. Hence, the deterioration of the Jordanian dinar was stopped and hereafter the GDP started to increase (Warrad, 2012).

Figure (1): GDP- Thounsand in current USD from 1980 to 2014
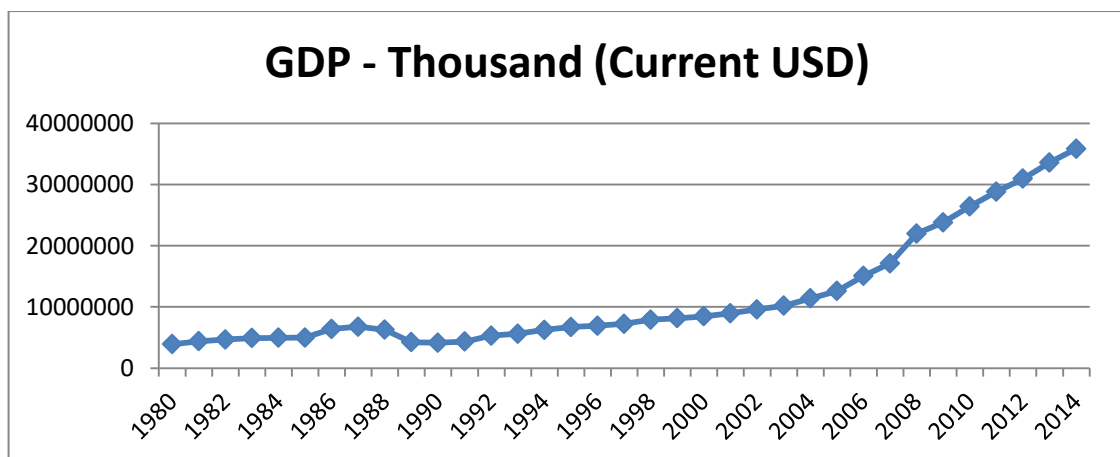
Source: World Bank Database, different years

3-6-2 Remittances

Figure (2) shows that the remittances are generally increasing in the Jordanian economy over the period (1980-2014). It was around 794 Million in 1980 and reached 3.5 billion dollars in 2014 representing 11% annual average growth.

Besides, it has started with a low growth rate and from 1991 the amount of remittances starts rising at a higher rate attaining 10.5 % of GDP in 2014.

Figure (2): Remittances - Thousands in USD from 1980 to 2014
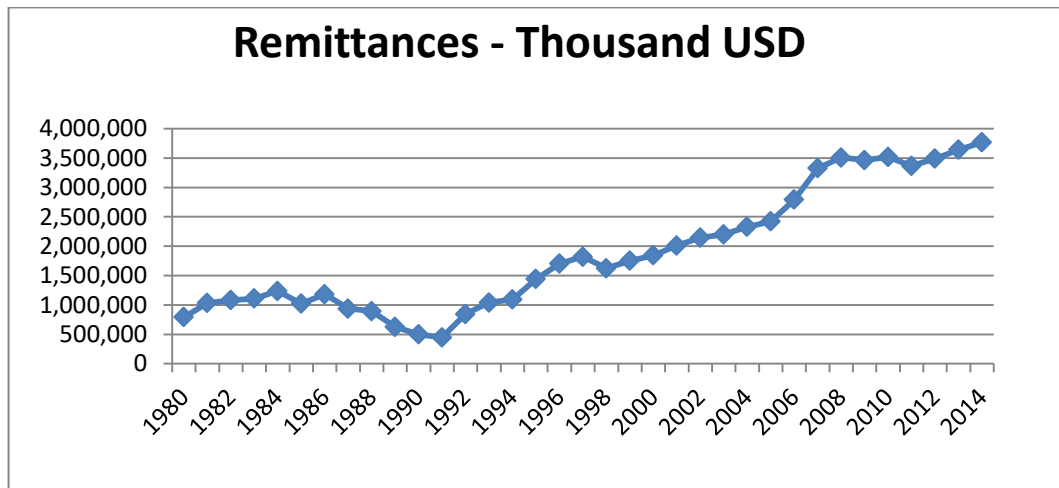
Source: World Bank Database, different years

It is also shown that there was a high drop in remittances at the end of 1980s and the beginning of 1990s. This decrease might be justified by the drop of migrants' salaries in Jordanian Dinars along with the migrants' return from the Gulf countries due to the Gulf war.

However, in the mid of 1990s remittances increased again as Jordanian skilled labor returned back to the Gulf countries.

Moreover, it is noticed that there was another drop in remittances from 2008 to 2009 which can be related to the global financial crisis (Assaf, 2015).

3-6-3 Foreign Direct Investment

Figure (3) shows that FDI has been generally stable over the period (1980 - 1996). Afterward, FDI starts to fluctuate reaching its maximum in 2006. The increase in FDI at the beginning of 2000s is justified by the increase in Jordanian economy's openness and the legislation toward FDI inflows. However, the reduction in 2003 is a result of the Iraqi war. Two years later, we can notice that FDI has increased again due to containing the Iraqi immigrants and to the growing in oil prices in 2003. After 2006, we can notice that FDI has decreased in response to the fluctuation in real estate prices and to the decrease in the liquidity indicators (Obalade, 2014).

Figure (3): FDI, net inflows – USD (1980 to 2014)
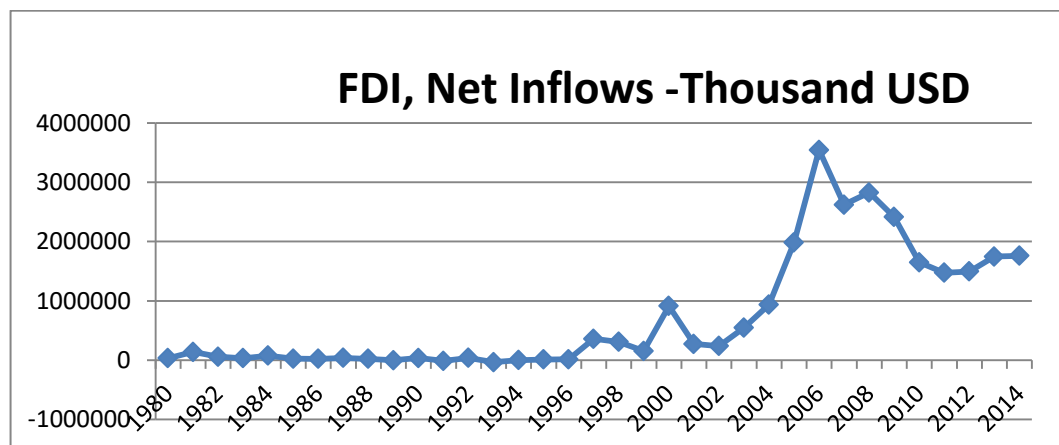
Source: World Bank Database, different years.

Chapter Four

Methodology

4-1 Estimation Strategy

In this study, the Autoregressive Distributed Lag (ARDL) bounds testing procedure introduced by Pesaran et al. (2001) and Pesaran and shin (1999) are used to examine the relationship between the independent variables (Remittances and FDI) and the dependent variable (GDP growth). In addition, based on Newey and West (1994), heteroscedasticity and autocorrelation consistent (HAC) standard errors will be used.

ARDL approach consists of multiple stages: First, we check the stationary status of variables through unit root test which should be stationary at level (I_0) or at first difference (I_1). Second, we determine whether there is a long run relationship between the variables through bound testing. Third, we find the optimum number of lag length for the model based on Akaike Information Criterion (AIC) and Schwarz Criterion (SIC). Fourth, we adjust the model to include error correction term and to find the long run and the short run coefficients. Finally, we check the diagnostic and the stability of the model (Nkoro & Uko, 2016).

The ARDL model has many advantages over other co-integration techniques such as Engle and Granger (1987) and Johanson and Juselius (1990) because it can be applied on either a level or a first difference or on a combination of both variables (Pesaran and Pesaran, 1997), also it is applicable on small samples (Pesaran and Shin, 1999). In addition, ARDL method generates unbiased statistics in case of endogenous variable existence (Narayan, 2005), provides long run and short run relationships and it derives the Error Correction Model (ECM) through linear transformation (Nkoro & Uko, 2016).

4-2 Stationarity

The unit root test examines the stationary status of the time series variables and determines whether the variable has a unit root or not. On one hand, variables that increase over time are considered non-stationary. On the other hand, a variable would be strictly stationary if its correlations or joint distribution are not varying with time or it will be weakly stationary when its mean, variance, covariance do not depend on time. It is called a stationary variable if the variable's mean is time independent (Mahadeva and Robinson, 2004).

Applying regression on non-stationary variables would result in unreliable estimates and biased standard errors also it might concludes a significant relationships even when neither exists (Mahadeva and Robinson, 2004).

Some non-stationary economic variables increase at a constant rate, while others are subject to shocks whose effects are not diminishing with time. Yet, these variables could be converted into stationary variables by de-trending them or taking the first or second difference, respectively (Mahadeva and Robinson, 2004).

There are multiple tests to examine the stationarity status of variables including Phillips–Perron, ADF-GLS, KPSS unit-root techniques and Augmented Dickey–Fuller (ADF). The KPSS method tests the hypothesis that the series is stationary (no unit root). While, Phillips and Perron and ADF tests consider the hypothesis in which variables are non-stationary. However, Phillips and Perron test adds an automatic correction to the Dickey Fuller test which gives the same results as ADF tests, but it provides relatively more complicated computations of the test statistics.

This test is based on the following system of equations:

$$Y_t = \varphi\, Y_{t-1} + U_t \ldots (4)$$

Null Hypotheses (H_0): $\varphi = 1$, series contains a unit root

Alternative Hypotheses (H_1): $\varphi < 1$, series is stationary.

The test is usually conducted through the regression:

$$\Delta Y_t = \gamma\, Y_{t-1} + U_t \ \ldots (5)$$

If $\varphi = 1$, then $\gamma = 0$.

The test can take the below three shapes:

Without intercept or trend	$\Delta Y_t = \varphi Y_{t-1} + U_t$ …. (6)
With intercept but without trend	$\Delta Y_t = \alpha_0 + \varphi Y_{t-1} + U_t$…. (7)
With both intercept and trend	$\Delta Y_t = \alpha_0 + \alpha_1 t + \varphi Y_{t-1} + u_t$…. (8)

The test statistic is:

$$DF_\tau = \frac{\hat{\gamma}}{SE(\hat{\gamma})}$$

The rejection rule for the null hypothesis would be based on the comparison between the test statistic result and the related critical value. If the test statistic is greater than the critical value (by absolute terms) then the null hypothesis is rejected and the variable does not have a unit root. However, if we could not reject the null hypothesis, we cannot say that there is a unit root test and we should continue with another unit root test till we reject H_0:

$H_0: Y_t \sim I_{(2)}$

$H_1: Y_t \sim I_{(1)}$

In order to implement ARDL model, we have to apply unit root test to ensure that all variables are stationary at level or at first difference but not higher (Boutabba, 2014).

4-3 Lags Length

The optimum number of lags should be obtained by comparing Akaike Information Criterion (AIC) and Schwarz Criterion (SIC) then choosing the model

with the lowest AIC and SIC values, thus minimizing the degrees of freedom and select the smallest possible lag length. (Boutabba, 2014).

4-4 Bound Testing and Long Run Association

This test aims to check if the variables has a long-run relationships by examining the null hypothesis that there is no co-integration between the variables. It is conducted through comparing the F-statistic or Wald statistic with the upper level of the critical value bound. If F-statistics is higher than the upper level of the bound, the null hypothesis would be rejected and thus there will be co-integration and vice versa (Boutabba, 2014). However, if the F-statistic lies between the two bounds, the co-integration test would be inconclusive and thus the error correction term would be used for co-integration (Kremers et al., 1992). Nevertheless, if the F-statistic is less than the lower level of the bound, the null hypotheses cannot be rejected (Boutabba, 2014).

This test can be examined by comparing the probability value of F-statistics with 5% level of significance. If the probability is lower than 5%, we can reject the null hypothesis and conclude that there is a long run relationship and vice versa.

4-5 Error Correction Term, Long Run and Short Run Coefficients

The error correction term (ECT) should be added to the model, if there is a long run relationship. When the coefficient of ECT is added, it should be negative and significant then it will be explained as the speed rate of the system adjustment to get back to the long run equilibrium. By adding ECT, the results will include short run relationships (Boutabba, 2014) and will confirm the presence of a long-run equilibrium relationships between economic growth and the independent variables included in the model.

4-6 Diagnostic and Stability

The data we use in ARDL model must be stable and free of serial correlation and heteroscedasticity. Clearly, the stability status of the model could be examined by applying cumulative sum of squares tests CUSUM and testing the null hypothesis which states that all coefficients in the model are stable. If the CUSUM line lies between the critical bounds of 5% significance, the null hypothesis cannot be rejected and thus the model would be considered stable (Brown and Evans,1975). In addition, the normality test examine the null hypothesis that states: the model is normally distributed. Small probability of Jarque-Bera requires rejecting the null hypothesis, thus the model will not be normal.

In order to apply ARDL, we should not have serial correlation and heteroskedasticity problems in the variables. By examining the null hypothesis that there is no serial correlation, we can test the serial correlation existence. If the probability value of Breusch-Godfrey Serial Correlation LM Test is greater than 5%, we cannot reject the null hypothesis, thus there is no serial correlation and vice versa (Baum and Schaffer, 2013).

We can testing heteroskedasticity problem by examining the null hypothesis that there is no heteroskedasticity in the model. If the probability value of Breusch-Pagan-Godfrey exceeds 5%, we cannot reject the null and thus there is no heteroskedasticity problem (Williams, 2015). However, using heteroskedasticity and autocorrelation consistent (HAC) standard introduced by (Newey and West, 1994) will eliminate the problems of heteroskedasticity and autocorrelation.

Chapter Five

Empirical Results

5-1 Stationarity

We used the statistical program (Eviews) to test the stationarity status of the three variables over the period (1980-2014).In addition, the unit root test was conducted on these variables using the Augmented Dickey–Fuller (ADF) technique and the Schwarz Info Criterion Lag. The unit root was tested at the level and first difference with including an intercept in the equation and tested at 5 % level of significance.

In the unit root test, we aim to test the null hypothesis (H_0): $\varphi = 1$, which states that the series shall contain a unit root, in contrast to the alternative hypothesis H_1 that there is no unit root (series is stationary).

Table (5): Unit Root Test at Level and at First Difference
(With Intercept Equation)

Variable	At Level		At First Difference	
	Augmented Dickey-Fuller T-statistics	Critical value at 5%	Augmented Dickey-Fuller T-statistics	Critical value at 5%
FDI	-1.182576	-2.951125	-5.398550	-2.954021
Growth-GDP	-4.037535	-2.960411	-6.111005	-2.963972
Remittances	0.337465	-2.954021	-4.232040	-2.954021

Source: EViews Results

From table (5), we conclude that GDP is a stationary variable at level and at first difference because the ADF test statistic is greater than critical value at 5%.Conversely, FDI and remittances cannot be considered as stationary variables at level as the critical value at 5% is greater than the ADF test statistic, hence the null hypothesis cannot be rejected.

However, we can notice that FDI and remittances would be considered as stationary variables at first difference as the ADF test statistic is greater than critical value at 5%, hence the null hypothesis is rejected.

5-2 Lags Length

The optimum number of lags for the dependent and independent variables is 2 and 3, respectively. That was through comparing the Akaike Information Criterion (AIC) and the Schwarz Criterion (SIC).

5-3 Bound Testing and Long Run Association

We applied Wald Test to examine the null hypothesis which states that the coefficients of the long run variables jointly equals zero.

In table (6), we noticed that the probability value of F-statistics equals 0.015. Therefore, the null hypothesis is rejected and the variables in the study have a long run relationships.

Table (6): Bound testing results

Model	F-statistics	Probability	Conclusion
F(G_GDP / RMT FDI)	4.508485	0.0150	Co-integration

Source: Eviews Results

5-4 Coefficients Estimation

After guaranteeing that all variables are I_0 or I_1, finding the optimum number of lags and concluding that there are co-integration between the variables, we should estimate the long run model on the three variables which gave the following results:

Table (7): Long run coefficients

Regressor	Coefficient	Prob.
RMT	-1.05E-10 (8.39E-11)	0.2179
FDI	9.66E-11 (4.84E-11)	0.0545**
C	0.169785 0.107778	0.1250

Note: The asterisks ** is 10% significant level.

In table (7), we noticed that the long run coefficient of remittances is statistically insignificant at 5% which indicates that remittances do not have a long run effect on GDP growth in Jordan. This result is consistent with a previous literature (Barguellil et al. (2013) that was applied on the largest 73 countries receiving remittances. In addition, Giuliano and Arranz's study in 2009 over a large sample concluded that remittances do not have a significant effect on GDP growth in countries whose financial systems are less developed. This non-significant relationship might be related to the underdeveloped financial system in

Jordan in which remittances would substitute credit markets. (Giuliano and Arranz, 2009).

Furthermore, we can notice that FDI can affect GDP growth in the long run at 10% significance level. If FDI increased by 1 billion, GDP growth will increase by (9.66E-11) in the long run. The positive relation is consistent with the literature (Borensztein et. A, 1995) that was applied on 69 developing countries whose results was due to technology brought by FDI. In addition, Nguyen's study in 2017 in Vietnam concluded that it may need a long time for FDI to affect growth. As well, the positive long run relationship in Jordan can be explained by enhancing the skills of labor in the host economy, bringing new technology and connecting with the international world (OECD, 2002).

In the short run model by adding lagged error correction term, the results on table (8) are as following:

Table (8): Short Run Coefficients

Regressor	Coefficient (Standard Error)	Probability
C	-0.047102 (0.039662)	0.2483
D(G_GDP (-1))	1.014369 (0.482667)	0.0478*
D(G_GDP (-2))	0.255969 (0.133681)	0.0692**
D(RMT(-1))	3.99E-10 (1.57E-10)	0.0187*
D(RMT(-2))	-1.80E-10 (1.75E-10)	0.3153
		Continued

|		
D(RMT(-3))	5.43E-10 (3.38E-10)	0.1233
D(FDI (-1))	-2.07E-11 (6.19E-11)	0.7410
D(FDI (-2))	-1.23E-10 (6.54E-11)	0.0731**
D(FDI (-3))	-5.17E-12 (4.65E-11)	0.9126
ECT(-1)	-1.442371 (0.468753)	0.0057*
R-squared	0.388964	
Diagnostic tests (p- Value)		
Serial correlation	0.0666	
heteroskedasticity	0.0906	
Normality	0.00	

Note: The asterisks * is 5% and the ** is 10% significant level, respectively.

In table (8), we can notice that remittances have a significant positive effect, yet GDP growth has a small coefficient in the short run. Obviously, an increase in remittances by 1 billion leads to (3.99E-10)% growth in GDP one year later. This result is consistent with (Jawaid and Raza, 2012) in which the short run effect of remittances on GDP is positive and significant in China and Korea. In addition, our result is in line with (Chowdhury and Das, 2011) where the effect of remittances is small, positive and significant. The authors justified this small coefficient by the fact that remittances mostly go toward consumption in these economies.

In the short run, the small, positive and significant coefficient of remittances in Jordan and the insignificant relationship in the long run is due to spending remittances on consumption instead of investment.

Figure (4) clarifies the remittances allocation in Jordan by the higher consumption to remittances ratio (C / RMT) rather than investment to remittances ratio (I / RMT) over the period of 1980- 2014.
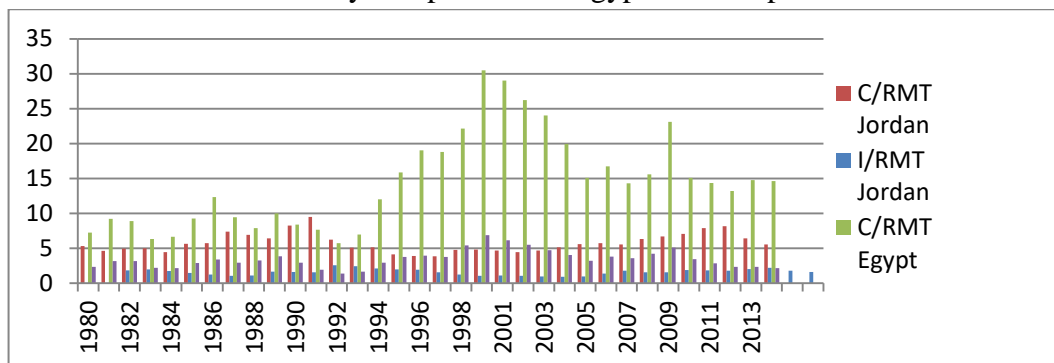
Figure (4): Consumption and investment to Remittances Ratios in Jordanian economy from the period 1980-2014
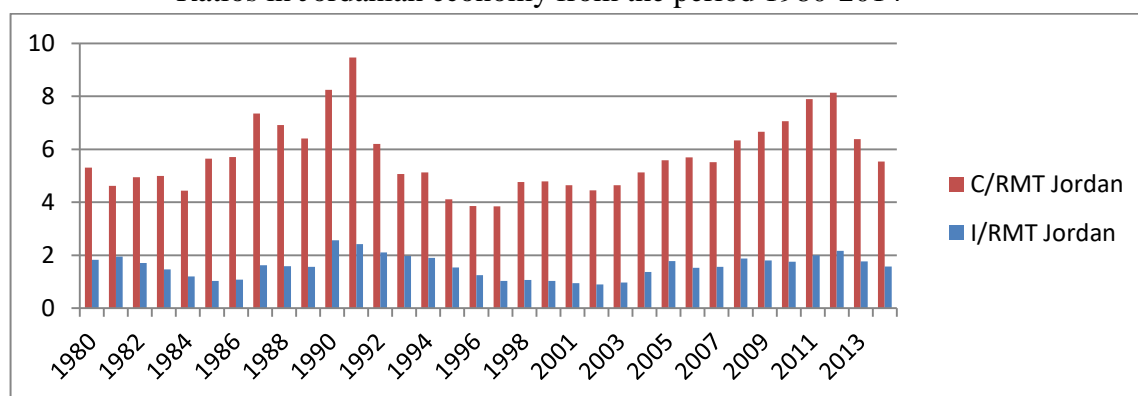
Source: World Bank Database, different years

Similarly, Figures (5) and (6) confirm that C/RMT ratio is generally greater than I/RMT in both Egypt and Germany. By calculating the average of C/RMT and I/RMT ratios of Egypt over Jordanian ratios over the period 1980 to 2014. It is concluded that Egyptian ratios are 2.72 and 2.5 times of Jordanian ones while German economy's ratios are 57.2 and 62.27 times of Jordan. These results reveal that similar to Jordanian economy, Egyptian and German remittances generally go to consumption. As shown in the table. This result may indicate a short run effect of remittances on GDP growth in these countries as well as Jordan.
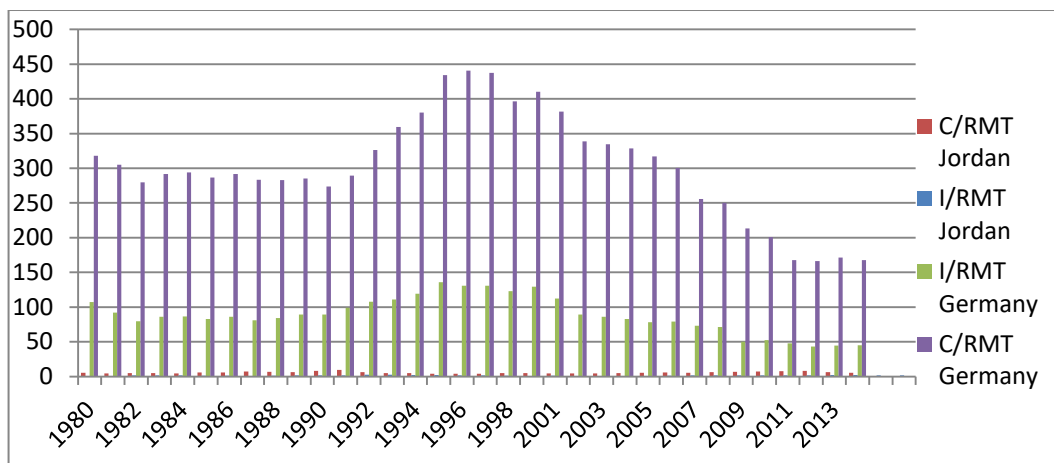
Figure (5): Consumption and investment to remittances ratios
In Jordanian economy compared with Egypt over the period 1980-2014

Source: World bank database, different years

Figure (6): Consumption and investment to remittances ratios

In Jordanian economy compared with Germany over the period 1980-2014

Source: World Bank database, different years

The result shows that FDI affects GDP growth negatively in the short run at 10% significance level. If FDI increases by $1 billion, GDP growth will decrease by (1.23E-10) in the short run. The negative effects of FDI to GDP growth is consistent with Carcovic and Levine (2002) and (GuechHeang and Moolio, 2013) who justify the negative effect of FDI by negative spillovers effects on the

domestic employment, skills, technology and other resources in addition to the crowding-out effect (Driffield and Jones, 2013).

Moreover, the contradiction of long run and short run estimates is also consistent with (Faeth, 2011) who refers this discrepancy to the crowding–out effect. In addition, (Akinlo, 2004) who finds that the FDI affects positively GDP growth in the long run through directing FDI towards mining instead of consumption sector. Besides, Nguyen (2017) concludes that FDI can influence economic growth only in the long run. Accordingly, in Jordanian economy a small share of the FDI inflows are allocated to the manufacturing sector comparing to other sectors like the real estate and mining sectors that are considered the main beneficiaries of FDI (World Bank, 2012).

Table (8) shows that the coefficient of the ECT is negative and statistically significant at 5%, thus it fulfills the condition of applying ARDL model. In addition, ECT represents the speed rate of adjustment to get back to long run equilibrium and confirms the presence of a long-run equilibrium association between economic growth, remittances and FDI.

5-5 Diagnostic and Stability

The diagnostic tests presented in table (8) make sure that the model has the desired econometric results. First, there is no heteroscedasticity as probability

value of Breusch-Pagan-Godfrey exceeds 5%; therefore, we cannot reject the null hypothesis. Second, there is no autocorrelation in the residuals of the model as the probability value of Breusch-Godfrey /Serial Correlation LM Test is greater than 5%; therefore, we cannot reject the null hypothesis. Third, the normality condition is violated because the small probability of Jarque-Bera requires rejecting the null hypothesis.

By applying cumulative sum of squares tests CUSUM on the model, we can notice that the CUSUM line lies between the critical bounds of 5% in Figure (7). Therefore, the null hypothesis (all model's coefficients are stable) cannot be rejected and the model would be considered stable (Brown and Evans, 1975).

Figure (7): Plot of CUSUM Curve
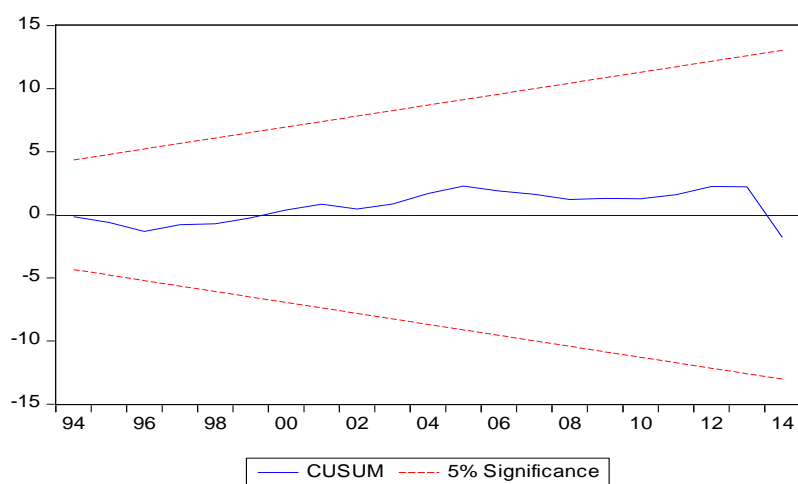
Source: Eviews Results

Chapter 6

Conclusion and Recommendations

6-1 Conclusion

This study examines the effect of inflows of remittances and FDI on GDP growth in Jordan over the period 1980 - 2014 using ARDL method.

Augmented Dickey- Fuller test shows that GDP growth is stationary at level and at first difference; whereas, remittances and FDI are stationary at first difference. In addition, we find that there is a co-integration between the variables in the long run based on Wald Test. Therefore, there is a capability to apply ARDL Model.

Moreover, results reveal a small positive significant coefficient of remittances in the short run and insignificant impact in the long run. These results could be justified by the underdevelopment financial system and directing larger portion of remittances toward consumption rather than investment in Jordan (Chowdhury and Das, 2011).

Besides, it is found that FDI positively affects GDP growth in the long run and negatively in the short run. The contradiction of long run and short run estimates can be interpreted in the crowding–out effect and directing FDI toward non-manufacturing sectors.

Finally, it is found that the coefficient of ECT is significant and negative, representing the speed rate of the system adjustment to get back to long run equilibrium.

6-2 Recommendations

According to our results, we recommend the following:

In order to attract and get the benefits from the inflows of remittances, Jordan may have to:

1- Provide facilitations for large remittance receivers and encourage them toward investments.

2- Provide credit facilitations to small remittance receivers to encourage them to invest and build their own business.

3- Conduct research on how remittances can better contribute to the Jordanian economy and educate recipients.

Moreover, to attract and utilize the benefits from the inflows of FDI, Jordan may have to:

1- Attract companies which are compliment with domestic market companies in order to lessen the crowding out effect. In addition, Jordan has to focus on developing manufacturing sector instead on real estate and mining sectors through legislation and providing tax exemptions.

2- Legislate laws and regulations that enforce utilizing domestic labor and raw materials in order to maximize the spillover effects, such as setting a minimum percentage of employing domestic labor or using raw material in foreign companies.

3- Formulate more policies to enhance education, health, technology, trade openness and competition structure in order to integrate in the international market with sufficient economic growth and good employment rate.

4- Strengthen financial system, promote saving and facilitate credits facilitations.

5- Create efficient taxing system to encourage investment in domestic market.

6- Provide different sectorial taxing system to encourage investment in the marginalized sectors.

7- Strengthen the law and governance against corruption, financial reporting, intellectual property rights and the non-discrimination in legislation.

8- Stabilize financial market, economy and political circumstances, given the nearby instability.

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Appendix

Eviews Results
Equation:
Growth of GDP = C+ Remittances+ FDI

1- <u>Long Run coefficients</u>

Dependent Variable: G_JORDAN
Method: Least Squares
Date: 05/26/17   Time: 15:42
Sample: 1980 2014
Included observations: 35
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed
    bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.169785	0.107778	1.575317	0.1250
REMITTANCES	-1.05E-10	8.39E-11	-1.256883	0.2179
FDI_IN_MILLION	9.66E-11	4.84E-11	1.996211	0.0545

R-squared	0.083224	Mean dependent var		0.042004
Adjusted R-squared	0.025926	S.D. dependent var		0.207371
S.E. of regression	0.204665	Akaike info criterion		-0.253070
Sum squared resid	1.340405	Schwarz criterion		-0.119755
Log likelihood	7.428731	Hannan-Quinn criter.		-0.207050
F-statistic	1.452465	Durbin-Watson stat		1.226610
Prob(F-statistic)	0.249007	Wald F-statistic		3.686911
Prob(Wald F-statistic)	0.036231			

2- <u>Short Run coefficients</u>

Equation:
d(g_jordan) c d(g_jordan(-1)) d(g_jordan(-2)) d(remittances(-1)) d(remittances(-2)) d(remittances(-3)) d(fdi_in_million(-1)) d(fdi_in_million(-2)) d(fdi_in_million(-3)) ect_gl(-1)

Dependent Variable: D(G_JORDAN)
Method: Least Squares
Date: 05/26/17   Time: 14:13
Sample (adjusted): 1984 2014
Included observations: 31 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed
    bandwidth = 4.0000)

Variable	Coefficient	Std. Error t-Statistic	Prob.
C	-0.047102	0.039662-1.187580	0.2483
D(G_JORDAN(-1))	1.014369	0.482667 2.101592	0.0478
D(G_JORDAN(-2))	0.255969	0.133681 1.914770	0.0692
D(REMITTANCES(-1))	3.99E-10	1.57E-10 2.547710	0.0187
D(REMITTANCES(-2))	-1.80E-10	1.75E-10-1.028700	0.3153
D(REMITTANCES(-3))	5.43E-10	3.38E-10 1.605521	0.1233
D(FDI_IN_MILLION(-1))	-2.07E-11	6.19E-11-0.334892	0.7410
D(FDI_IN_MILLION(-2))	-1.23E-10	6.54E-11-1.886661	0.0731
D(FDI_IN_MILLION(-3))	-5.17E-12	4.65E-11-0.111134	0.9126
ECT_GL(-1)	-1.442371	0.468753-3.077040	0.0057

R-squared	0.388964	Mean dependent var	-0.032562
Adjusted R-squared	0.127091	S.D. dependent var	0.228629
S.E. of regression	0.213607	Akaike info criterion	0.006340
Sum squared resid	0.958188	Schwarz criterion	0.468917
Log likelihood	9.901727	Hannan-Quinn criter.	0.157129
F-statistic	1.485315	Durbin-Watson stat	1.425689
Prob(F-statistic)	0.217100	Wald F-statistic	9.243862
Prob(Wald F-statistic)	0.000015		