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CHANGES IN FDI OUTFLOW RESULTING FROM JORDAN'S RESPONSE TO THE SYRIAN CRISIS

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ABSTRACT

This study aimed to investigate the changes in FDI outflow resulting from Jordan's response to the Syrian Crisis. Using time series analysis of selected variables during the period 1980 until 2018 using the ARDL model. The objective achieved the appropriate statistical tests such as data stability and co-integration tests have been used. The variables analysed the growth of FDI outflow GOFDI, the unemployment rate UR, growth of imports GIMP, inflation CPI, population growth POP, education spending LEDU, price oil price volatility OPV, dummy variable for the Syrian crisis DUM, and the error term μt. The dependant variable is the foreign direct investment outflow GOFDI. This study results in a long-term the error correction term for the unemployment model is -1.98. In other words, the economy is adjusting towards long-run equilibrium at a speed of 1.98. Also, the error correction term for the inflation model is -1.11. In other words, the economy is adjusting towards long-run equilibrium at a speed of 1.11. Finally, the error correction term for the imports model is -1.41. In other words, the economy is adjusting towards long-

run equilibrium at a speed of 1.41. The study recommended; that the Jordanian government must provide an appropriate environment for foreign investment and remove the obstacles to investment in general, in order to attract foreign investment capital to invest in the Jordanian economy.

Keywords: foreign direct investment outflow (OFDI); the unemployment rate (UR); the Syrian crisis; ARDL; Jordan.

BACKGROUND OF STUDY

The Jordanian economy is one of the open developing economies. The World Bank (2019) recognises two main constraints faced by Jordan's economy, namely low economic growth and high unemployment rates. In the decade from 2008 to 2018, economic growth has declined from 5.47 percent to 1.94 percent. Meanwhile, unemployment has risen from 12.9 percent in 2011 to 18.6 percent in 2018. Jordan's gross domestic product (GDP) is constrained as it has limited natural resources. Financial support for investment is also lacking, as indicated by the declining government expenditure, from 29.2 percent of GDP in 1980 to 15.4 percent in 2018 (World Bank, 2019). The country also suffers from weak investment capacity and lack of private investment capital. From 1981 to 2018, the gross fixed capital formation of the private sector has declined from 27.8 percent to 15.3 percent of GDP (Chea, 2011; Sy & Rakotondrazaka, 2015; UNCTAD, 2015; World Bank, 2019).

The Jordanian economy, like other Middle Eastern countries, is affected by political changes and economic shocks of the region. This paper highlights the Syrian crisis as one of the most important events affecting the Jordanian economy. The impact of the crisis on the nation's economy cannot be understated, as Jordan houses more than 1.3 million Syrian refugees (Al-Qadi & Lozi, 2017; Leopardi & Trentin, 2022; Ministry of Planning and International Cooperation, n.d.). It has also increased the competition for jobs between Jordanians and Syrians, inflating the unemployment rate from 12.9 percent in 2011 to 18.6 percent in 2018. The consumer price index has risen from 104.16 in 2011 to 124.66 in 2018. Imports increased from $2.13 billion in 2011 to $2.28 billion in 2018 to cover the deficit in essential commodities (Central Bank of Jordan, 2017, 2019; World Bank, 2018). The Syrian crisis also affects FDI outflow in Jordan through its disruption of trade, low investment and tourism, and increasing housing and food prices. The majority of Syrian refugees in Jordan greatly undermine its economy and social fabric (Abdih & Geginat, 2014; Alrababa'h et al., 2021; Alshoubaki & Harris, 2018; Lozi, 2013; World Bank, 2018). The crisis thus produces direct effects on unemployment, imports, and inflation, and indirect effects on FDI outflow.

This paper highlights the Syrian crisis as the most important event to affect the Jordanian economy. This is shown in an unprecedented influx of refugees, disruption of trade, tourism and low investment, and increasing food and housing prices. The large numbers of Syrian refugees in Jordan greatly undermine its economy and social fabric. This crisis has also increased the unemployment rate, inflation rate, and imports (Abdih & Geginat, 2014; Alshoubaki & Harris, 2018; Lozi, 2013; World Bank, 2018).

The crisis has raised the unemployment rate as mentioned before. Most Syrian refugees in Jordan live in its towns and villages, among local communities. Only 17 percent live in the two main refugee camps, Za'atari and Azraq There is increased competition for limited job opportunities between Syrians and Jordanians, and the Syrian refugees are willing to accept jobs, with lower wages (Abdih & Geginat, 2014; Alshoubaki & Harris, 2018; Lozi, 2013; World Bank, 2018). Inflation (consumer price index) has also risen from 104.16 in 2011 to 124.66 in 2018 (Cooperation, 2019),which led to increased demand for goods and services (Abdih & Geginat, 2014; Ajluni & Kawar, 2014; Alshoubaki & Harris, 2018; Lozi, 2013; World Bank, 2018). Moreover, imports rose from $2.13 billion in 2011 to $2.28 billion in 2018 to cover the deficit in essential commodities such as food and energy (oil), simply because their consumers have increased significantly (Abdih & Geginat, 2014; Ajluni & Kawar, 2014; World Bank, 2018).

The Jordanian FDI outflow had an exponential growth starting from the year 2010 (Central Bank of Jordan, 2019; World Bank, 2018). It happened to be the same year that the Syrian crisis began in 2010. Haddad (2018) recommends measuring the impact of the Syrian crisis on the Jordanian economy.

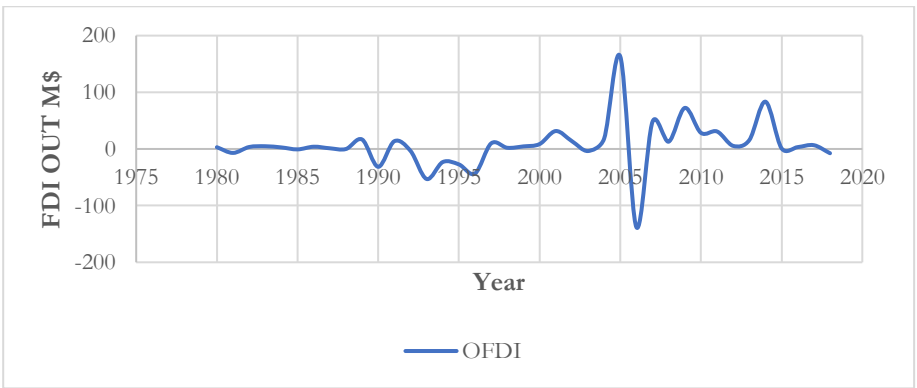

Figure 1: FDI net outflow in Jordanian economy
OFDI: FDI net outflow
Sources: World Bank

In addition, figure 1 shows FDI net outflow of the Jordanian economy for the study period (1980-2018). Furthermore, FDI net outflows have grown dramatically from 3.1 M$ in 1980 to 72 M$ in 2009, with an average FDI net outflow of 3.44 M$ throughout this period (World Bank, 2019). Additionally, while comparing the average of Jordanian FDI net outflows prior to the Syrian crisis, the average of flows from (2000-2009) was 22.6 M$. While the average of flows climbed to 30.7 million dollars after the Syrian conflict during the period (2010-2017) (Central Bank of Jordan, 2019; World Bank, 2018). Moreover, Jordan's FDI outflows are increasing as mention before. And has resulted in a rise in the key difficulties confronting the Jordanian government, including an increase in unemployment and inflation rates, as well as a slow development in Jordan's economic growth.

A thorough survey of the literature shows that the Syrian crisis is the most important event that affects the Jordanian economy. Therefore, this paper investigates the changes in FDI outflow from Jordan caused by the Syrian crisis.

Olwan and Shiyab (2012) dives into the social, legal, and economic conditions of Syrian refugees in Jordan. They interviewed 105 household heads in the four provinces of Bilqaa, Mafraq, Amman, and Irbid. In addition to interviews, the respondents were also asked to answer a questionnaire. The authors discovered that the Jordanian government faces many challenges brought by the Syrian refugees, who are in dire need of basic necessities such as housing, health, and education. Furthermore, Lozi (2013) attempts to understand the impact of Syrian refugees on the Jordanian economy through the use of preliminary data collected using the questionnaire. The most prominent results show that Syrian refugees positively affect unemployment and food prices. There is no relationship between Syrian refugees and FDI.

In addition, Ajluni and Kawar (2014) examined the impact of the Syrian crisis on the Jordanian labour market. This study is a descriptive study of the effects of the Syrian crisis, which includes the rising youth unemployment rate (structural unemployment), high poverty rate due to the shortage of jobs, low level of wages, and high level of prices of goods and services. The study recommends that the government take into account the right of refugees to live in dignity when considering the solutions to unemployment and improving the livelihoods of Jordanians. Moreover, Fakih and Ibrahim (2015) investigated the impact of Syrian refugees on the Jordanian labour market from January 2012 to December 2013 using the VAR model. They found no statistical impact of the Syrian crisis on the labour market in Jordan. The Granger causality test shows no correlation between the Syrian crisis and the Jordanian labour market.

Finally, Haddad (2018) analysed the impact of the Syrian crisis on the Jordanian trade during the period 2005-2015. The author analysed monthly data and used a dummy variable to reflect the Syrian crisis. The main results are the declination in the Jordanian Syrian trade exchange, which negatively affects Jordanian imports, trade volume, and trade balance, but it does not affect national exports. The study recommends conducting analytical studies and using economic models to examine the impact of the Syrian crisis on all sectors of the Jordanian economy.

This paper differs from the above studies and contributes novel knowledge to the literature by examining the changes in FDI outflow following Jordan's response to the Syrian crisis. Whereas the previous study mostly gives more emphasis on partial effect of the Syrian refugees rather than the economy of Jordan as a country. That is, it examines the indirect effect of the Syrian crisis on FDI outflow through its direct effect on unemployment rate, CPI, and imports.

METHODOLOGY

This section explains the models used to answer the third research question. The tests are carried out using EViews-10. Based on the unit-roots test, ARDL is found to be the best analysis model the relationship between the variables. There are three main reasons for choosing the ARDL estimation. First, the time series is stationary at different levels (I (0) and I (1)). Second, co-integration has been detected in the series, indicating that there exists a long-term and short-run equilibrium relationship between the variables. Third, ARDL model gives an accurate result for a small sample size of data (Alves & da Silveira Bueno, 2003; CINDIK, 2022; Dike, 2018; Engle & Granger, 1987; Kripfganz & Schneider, 2018).

Model Specification

According to (Ajluni & Kawar, 2014; El-Ghali, Berjaoui, & McKnight, 2017; Haddad, 2018), the models are based on the effect of the Syrian crisis on the Jordanian labour market, higher education, and external trade. Unemployment rate, imports, and inflation are identified as the independent variables; population growth and education as the control variables; the Syrian crisis as dummy variable; and FDI outflow as the dependent variable. Three empirical models have been developed:

$$GOFDI = f(UR, CPI, GIMP, POP, LEDU, \text{OPV})$$

$$GOFDI_t = \beta_0 + \beta_1 UR_t + \beta_2 CPI_t + \beta_3 GIMP_t + \beta_4 POP_t + \beta_5 LEDU_t + \beta_6 \text{OPV}_t + \beta_7 UR_t * DUM + \mu_t$$

$$GOFDI_t = \beta_0 + \beta_1 UR_t + \beta_2 CPI_t + \beta_3 GIMP_t + \beta_4 POP_t + \beta_5 LEDU_t + \beta_6 \mathrm{OPV}_t + \beta_7 CPI_t * DUM + \mu_t$$

$$GOFDI_t = \beta_0 + \beta_1 UR_t + \beta_2 CPI_t + \beta_3 GIMP_t + \beta_4 POP_t + \beta_5 LEDU_t + \beta_6 \mathrm{OPV}_t + \beta_7 LIMP_t * DUM + \mu_t$$

Where *GOFDI* is the growth of FDI outflow, B_0 is the constant, *UR* is the unemployment rate, G*IMP* is growth of imports, *CPI* is inflation, *POP* is population growth, L*EDU* is education spending, OPV is price oil price volatility, *DUM* is dummy variable for the Syrian crisis, and μ_t is the error term.

DATA ANALYSIS

Unit Roots Tests (Augmented Dickey-Fuller test)

The stationarity of variables is an important determinant of the validity of a time-series model. A model that fails to fulfil this criterion produce unrealistic and misleading results, that is, they lead to false regressions (spurious regression). There are numerous methods to test the stationarity of variables, the most common of which is the unit root test. If the time series is stationary at the level, it is said to be integrated of order zero, i.e. I(0). If it is stationary at the first difference level, it is integrated of the first order, i.e. I(1), and so forth. The X_t time series is integrated of a certain degree (I) if it is stationary at the difference level (I) (Beare, 2018; Khraief, Shahbaz, Heshmati, & Azam, 2020; Otero & Baum, 2021; Phillips & Perron, 1988). According to Gujarati (2009), in general, the X_t time series is completely static when: Firstly, its arithmetic mean is constant ($E(X_t) = \mu$); Secondly, fixed variation ($var(X_t) = \sigma^2$); Thirdly, the correlation between X_t, $X_t + k$ depends only on *k*, meaning that:

$$Yk = cov(Xt, Xt + k) = E[(Xt - \mu)(Xt + k - \mu)], \qquad k = 1, 2, 3, \dots, T$$

To test the stationarity of time series variables and their degree of integration, the augmented Dickey-Fuller (ADF) test is used. It is one of the most popular tests to detect stationarity and co-integration. This test is based on the following formula (Cheung & Lai, 1995; Otero & Baum, 2021; Paparoditis & Politis, 2018):

$$Yt = \alpha Yt\text{-}1 + Ut\Delta$$
$$Yt = C + \alpha Yt\text{-}1 + Ut\Delta$$
$$Yt = C + \boldsymbol{\beta} t + \alpha Yt\text{-}1 + Ut\Delta$$

If the error terms (*Ut*) of the above formulae are autocorrelated, the DF test corrects them by adding several lagged differences to the equations:

$$Yt = C + \beta t + \lambda Yt\text{-}1 + \sum (t = 1) \hat{} (\varrho\text{-}1) \quad ai\, \Delta Yt + Ut\Delta$$

The Dickey-Fuller test is then called the augmented Dickey-Fuller test. The decision whether to accept the hypothesis is done by comparing the test statistic, DF, with the tabulated critical value. If the absolute DF value is less than the absolute critical value, the null hypothesis is not rejected, indicating that the time series is non-stationary (Cai & Omay, 2022; Cheung & Lai, 1995; Paparoditis & Politis, 2018).

In a T-test, the T-statistic is used to decide whether to accept or reject the null hypothesis. The t-statistic is used when the sample size is small, or the population standard deviation is unknown. It is quite similar to the Z-score in other respects. For instance, the T-statistic determines the population means from a sampling distribution of sample means when the population standard deviation is unknown. When doing hypothesis testing, it is also used in conjunction with a P-value, which indicates the likelihood that the results will have occurred (Cai & Omay, 2022; Cheung & Lai, 1995; Paparoditis & Politis, 2018).

Table 1: ADF Test for Variables of the GOFDI Change Models

Variable	T-statistic	1%	5%	10%	Level	Result
GOFDI	-7.1022	-3.6210	-2.9434	-2.6103	I(0)	Accept
	-9.2210	-3.6210	-2.9434	-2.6103	I(1)	Accept
CPI	0.8787	-3.6210	-2.9434	-2.6103	I(0)	
	-4.5984	-3.6210	-2.9434	-2.6103	I(1)	Accept
GIMP	-5.4466	-3.6155	-2.9411	-2.6090	I(0)	
	-7.7197	-3.6210	-2.9434	-2.6103	I(1)	Accept
UR	-1.8846	-3.6210	-2.9434	-2.6103	I(0)	
	-6.0802	-3.6329	-2.9484	-2.6102	I(1)	Accept
LEDU	-0.1052	-3.6155	-2.9411	-2.6090	I(0)	
	-3.2999	-3.6267	-2.9458	-2.6115	I(1)	Accept
POP	-3.2426	-3.6329	-2.6128	-2.6128	I(0)	Accept
	-1.6649	-3.6318	-2.9511	-2.6143	I(1)	
OPV	-3.9719	-3.6329	-2.6128	-2.6128	I(0)	Accept
	-8.3605	-3.6318	-2.9511	-2.6143	I(1)	Accept

Table 1 shows that the variables of the GOFDI change models are not stationary at the level, except GOFDI, OPV, GIMP, and POP. All variables are stationary at the first difference level at the one percent significance level, except for EDU, which is stationary at the five percent significance level, and POP at five and ten percent. Because the absolute values of the test statistic are greater than the absolute critical values at the first difference level ($p < 0.01, 0.05$), the null hypothesis is rejected. This means that the is stationary at I (1), that is, there is a unit root at the first difference.

Lag Length Selection Test

The lag length is selected using a number of criteria, including the likelihood ratio test (LR), final prediction error criterion (FPE), Hannan-Quinn information criterion (HQC), Akaike information criterion (ATC), and Schwarz information criterion (SIC).The results in show tables (2, 3, and 4) that the selected lag length for models:

$GOFDI_t = B0 + B1UR_t + B2CPI_t + B3GIMP_t + B4POP_t + B5LEDU_t + B6OPV_t + B7UR_t * DUM + \mu t$,

$GOFDI_t = B0 + B1UR_t + B2CPI_t + B3GIMP_t + B4POP_t + B5LEDU_t + B6OPV_t B7CPI_t * DUM + \mu t$, and

$GOFDI_t = B0 + B1UR_t + B2CPI_t + B3GIMP_t + B4POP_t + B5LEDU_t + B6OPV_t + B7LIMP_t * DUM + \mu t$ is three.

Table 2: Lag Length for the Unemployment Model

Lag	LR	FPE	AIC	SC	HQ
0	NA	0.011334	18.22292	18.57481	18.34574
1	332.8221	1.92e-06	9.451728	12.61877	10.55711
2	129.1760	1.32e-07	6.208548	12.19073	8.296490
3	109.0891*	1.58e-09*	-0.153082*	8.644245*	2.917420*

Likelihood ratio test (LR), final prediction error criterion (FPE), Hannan-Quinn information criterion (HQC), Akaike information criterion (ATC), and Schwarz information criterion (SIC)

Table 3: Lag Length for the Inflation Model

Lag	LR	FPE	AIC	SC	HQ
0	NA	6142.610	31.42591	31.77780	31.54873
1	344.4915	0.674426	22.22252	25.38956	23.32790

2	131.2384	0.041546	18.87079	24.85297	20.95873
3	100.0096*	0.001141*	13.33456*	22.13189*	16.40506*

likelihood ratio test (LR), final prediction error criterion (FPE), Hannan-Quinn information criterion (HQC), Akaike information criterion (ATC), and Schwarz information criterion (SIC)

Table 4: Lag Length for the Imports Model

Lag	LR	FPE	AIC	SC	HQ
0	NA	67.69937	26.91798	27.26987	27.04080
1	305.6326	0.031348	19.15381	22.32085	20.25919
2	133.3994	0.001723	15.68834	21.67052	17.77628
3	121.0273*	7.01e-06*	8.241418*	17.03875*	11.31192*

likelihood ratio test (LR), final prediction error criterion (FPE), Hannan-Quinn information criterion (HQC), Akaike information criterion (ATC), and Schwarz information criterion (SIC)

Normality Test

One of the fundamental assumptions in multivariate regression analysis is normality. This assumption refers to the normal distribution of regression residuals (Gio & Caraka, 2019; Van den Bossche, 2011). The normality test is necessary for valid hypothesis testing. There are several methods in which one could describe the distribution of residuals that differs from the normal distribution. This study uses skewness and kurtosis, as they are two of the most popular approaches to describe the shape or distribution of datasets (Gio & Caraka, 2019; Van den Bossche, 2011). The data are considered reasonably normal if the kurtosis values are within the range ±10 and skewness values within the range of ±3 (Gio & Caraka, 2019; Van den Bossche, 2011).

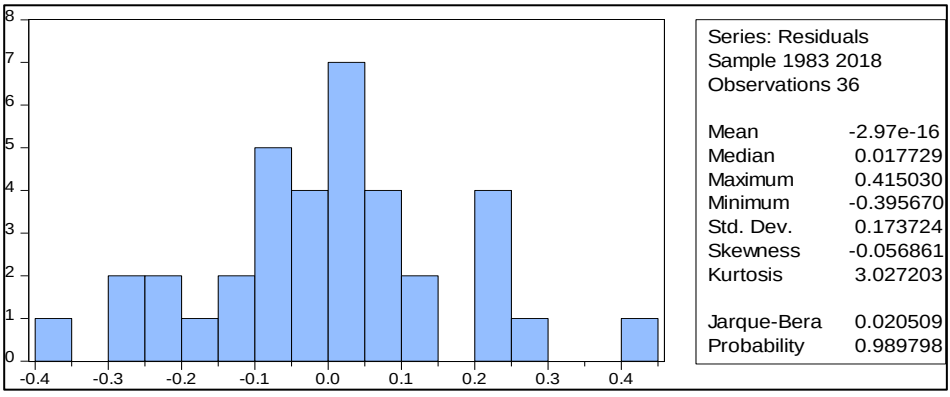

Figure 2: Results of Normality Tests for the UR Model

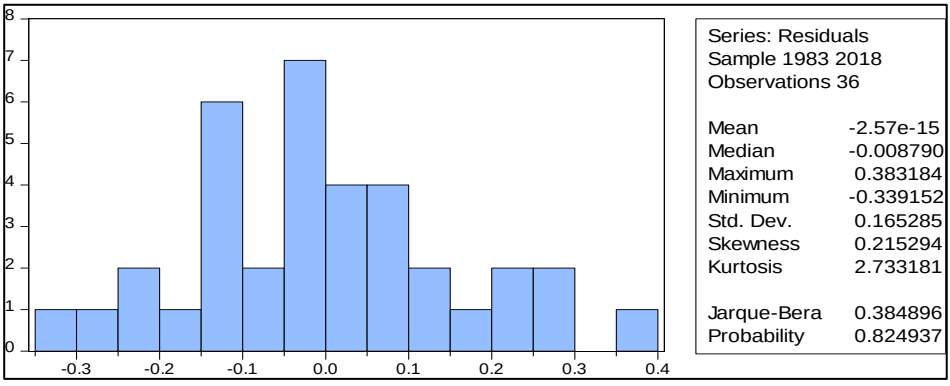

Figure 3: Results of Normality Tests for the IMP Model

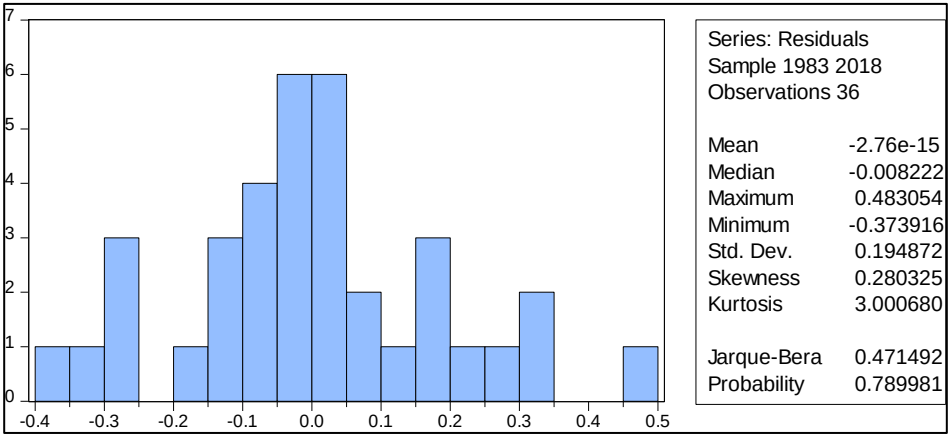

Figure 4: Results of Normality Tests for the CPI Model

Figures 2, 3, and 4 shows that the residuals of the OFDI Change Models are normally distributed. The histogram depicts a bell curve and the p-value of Jarque-Bera is not statistically significant. This strongly supports that the t-statistic and F-statistic are valid.

CUSUM Test

Another important preliminary test outside of stationarity and integration is to examine the structural changes in the behaviour of the models. This is most commonly tested using the CUSUM. The results of this test are shown in the form of recursive residuals of the model. If the residuals remain within the

computed critical limits throughout the observed study period, it means that the parameters of this model are stationary, so the period does not have to be segmented. If the curve goes outside the critical limits, it is necessary to divide the period into sub periods so that the time series becomes stationary (Brown, Durbin, & Evans, 1975; Lee, Ha, Na, & Na, 2003; Westerlund, 2005).

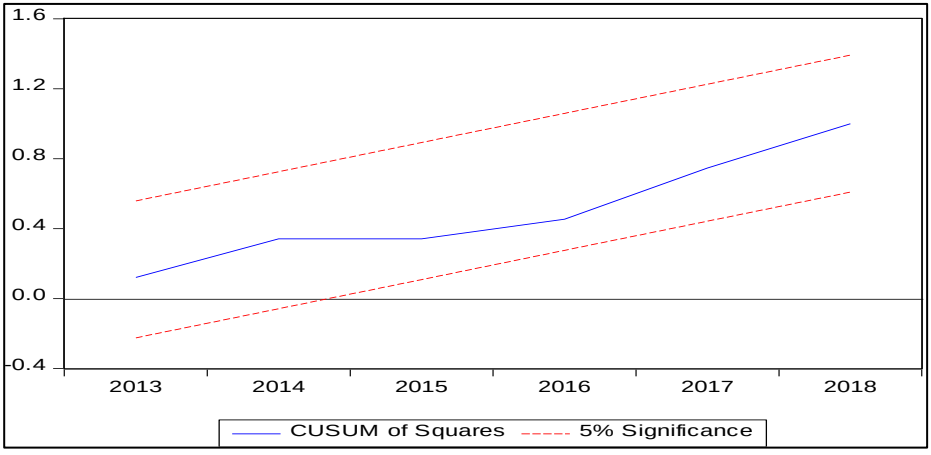

Figure5: CUSUM for the UR Model

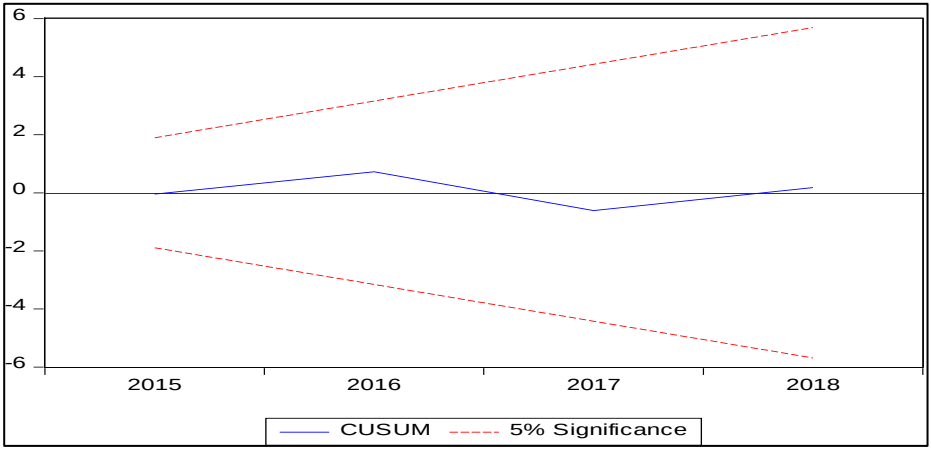

Figure 6: CUSUM for the IMP Model

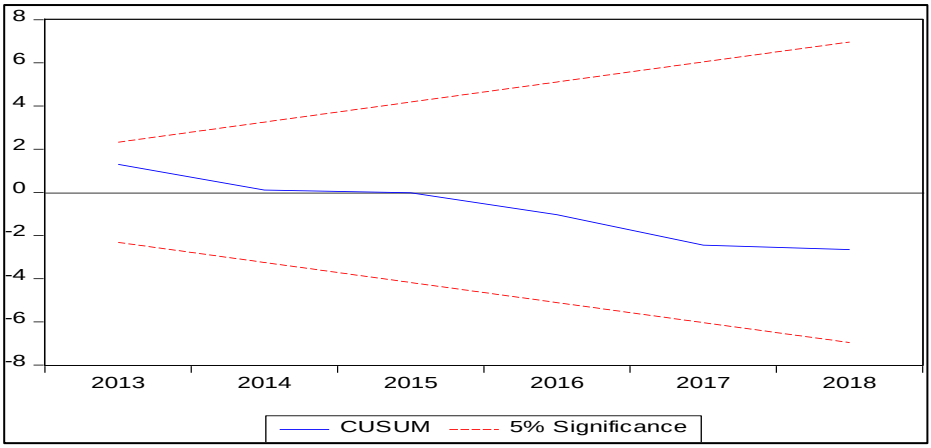

Figure 7: CUSUM for the CPI Model

ARDL Model

ARDL has been used for decades to model the relationship between economic variables using a single-equation time-series. Its popularity is also because the integration of non-static variables is equivalent to the error correction (EC) process, and that the ARDL model has a reconfiguration process in the form of EC (Alves & da Silveira Bueno, 2003; Dike, 2018; Engle & Granger, 1987; Kripfganz & Schneider, 2018). The long-run or short-run co-integrating relationship can be tested based on the representation of error correction. A bounds testing procedure is available to draw conclusive inference without knowing whether the variables are integrated of order zero or one (I(0) or I(1) (Alves & da Silveira Bueno, 2003; Cai & Omay, 2022; Dike, 2018; Engle & Granger, 1987; Kripfganz & Schneider, 2018).

Bounds Test

Time series that is not stationary at level becomes static after taking the first difference level. This lowers the possibility of a significant long-run equilibrium correlation between the variables. As a solution, the ARDL method uses the bound test proposed by Pesaran and Smith (2001) to determine whether the variables are co-integrated (Mulok, Kogid, Lily, & Asid, 2016; Pesaran, Shin, & Smith, 2001; Sowah & Kirikkaleli, 2022).

Table 5: Bounds Testing for the GOFDI Change Models

Models	*f*	1%		5%		10%		Result
		I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	
GOFDI = *f*(UR,	12.01	2.88	3.99	2.27	3.28	1.99	2.94	Cointegration

CPI, GIMP, OPV, POP, LEDU, UR*DUM)								
GOFDI = *f*(UR, CPI, GIMP, OPV, POP, LEDU, CPI*DUM)	10.04	2.88	3.99	2.27	3.28	1.99	2.94	Cointegration
GOFDI = *f*(UR, CPI, GIMP, OPV, POP, LEDU, GIMP*DUM)	10.75	2.88	3.99	2.27	3.28	1.99	2.94	Cointegration

Table 5 shows the bounds testing results, which indicate that some variables in the previous models have long-term relationships. These are confirmed by comparing the calculated *f* value with the boundaries. Therefore, the null hypothesis (no co-integration) can be rejected, indicating that there are co-integrating relationships at all levels of significance.

Estimating Long-run Elasticity

Since the variables are co-integrated, it means that they have long-term equilibrium relationships. The long-term elasticity of these variables is estimated using the ARDL model. Table 6 shows the estimated long-run coefficients of the variables of the unemployment model. The ARDL model uses lag lengths defined by the EVIEWS 10 software (1, 1, 3, 3, 0, 3, 3, 1). The R^2 amounts to 0.80, which means that on average, the independent variables account for 80 percent of variance in GOFDI in Jordan. The results also indicate that UR, CPI, LIMP, POP, LEDU, and UR*DUM are statistically significant determinants of GOFDI, and OPV is not.

Table 6: ARDL Estimation of the Unemployment Model

Variables	Coefficient	SE	t-statistic	Prob.
GIMP	0.021358	0.006928	3.082935	0.0087
CPI	0.092306	0.027390	3.370085	0.0050
LEDU	-2.929901	0.939281	-3.119303	0.0081
OPV	0.001227	0.005548	0.221205	0.8284
POP	0.214277	0.106805	2.006242	0.0661
UR	-19.35661	4.497520	-4.303840	0.0009
UR*DUM	-9.743613	3.758750	-2.592248	0.0223
C	13.38878	4.199508	3.188178	0.0071
R-squared	0.804630	**Mean DV**	0.005914	
Adjusted R-squared	0.474003	**SD DV**	0.393034	

S.E. of regression	0.285051	**AIC**	0.586909
Sum squared resid.	1.056301	**SIC**	1.598602
Log likelihood	12.43564	**HQC**	0.940017
F-statistic	2.433652	**Durbin-Watson**	2.733760
Prob(F-statistic)	0.000000		

Dependent Variable: GOFDI
Akaike info criterion (AIC), ARDL (1, 1, 3, 3, 0, 3, 3, 1)
DV: dependent variable; AIC: Akaike information criterion; SIC: Schwarz information criterion; HQC: Hannan-Quinn information criterion; SE: stander error: SD: stander deviation

Since the variables are measured in logs, all coefficients represent long-run elasticity between independent and dependent variables. The results in Table 5.28 shows that the effect of unemployment on GOFDI in Jordan is straightforward: A one percent increase in the unemployment rate leads to a decrease in GOFDI by 19.35 percent. Additionally, unemployment during the Syrian crisis is also a negative determinant of GOFDI. A one percent increase in LUR*DUM leads to a 9.74 percent decrease in GOFDI. Amidst the Syrian crisis, a one percent increases in the unemployment rate decrease GOFDI in Jordan by a total of 29.09 percent, ceteris paribus. The long-run unemployment model can be written as:

*GOFDI =13.3+ 0.092*CPI -2.92*LEDU + 0.021*GIMP +0.21*POP -19.74*UR + 0.001*OPV -9.74*UR*DUM*

Table 7: ARDL Estimation of the Inflation Model

Variables	Coefficient	SE	t-statistic	Prob.
GIMP	0.018684	0.007417	2.518872	0.0236
CPI	0.063209	0.023824	2.653191	0.0181
LEDU	-2.273783	0.940988	-2.416377	0.0289
OPV	0.006303	0.005161	1.221382	0.2408
POP	0.071848	0.065274	1.100716	0.2884
UR	-14.40903	4.064439	-3.545147	0.0029
CPI*DUM	-0.004629	0.002636	-1.756168	0.0995
C	10.98186	4.407235	2.491780	0.0249

R-squared	0.754168	**Mean DV**	0.005914
Adjusted R-squared	0.426393	**SD DV**	0.393034
S.E. of regression	0.297672	**AIC**	0.705549
Sum squared resid.	1.329129	**SIC**	1.629268
Log likelihood	8.300124	**HQC**	1.027951
F-statistic	2.300869	**Durbin-Watson**	2.508297
Prob(F-statistic)	0.000000		

Dependent Variable: GOFDI
Akaike info criterion (AIC), ARDL (1, 1, 2, 3, 0, 3, 3, 0)
DV: dependent variable; AIC: Akaike information criterion; SIC: Schwarz information criterion; HQC: Hannan-Quinn information criterion; SE: stander error: SD: stander deviation

Table 7 shows the estimated long-run coefficients of the variables of the inflation model. The ARDL model uses lag lengths defined by the EVIEWS 10 software (1, 1, 2, 3, 0, 3, 3, 0). The R^2 amounts to 0.75, which means that on average, the independent variables account for 75 percent of variance in GOFDI in Jordan. The results also indicate that UR, GIMP, CPI, LEDU, and CPI*DUM are statistically significant, while POP, and LOPV are not statistically significant.

Since the variables are measured in logs, all coefficients represent long-run elasticity between independent and dependent variables. The results show in Table 7 that the effect of inflation on GOFDI in Jordan is straightforward: A one percent increase in inflation leads to a 0.063 percent increase in GOFDI. However, when it is paired with the Syrian crisis dummy (CPI*DUM), a one percent decrease leads to a 0.0046 percent decrease in GOFDI. Amidst the Syrian crisis, therefore, a one percent increases in inflation rate increase GOFDI in Jordan by a total of 0.058 percent, ceteris paribus. The long-run inflation model can be written as:

*GOFDI = 10.98+ 0.063*CPI -2.27*LEDU + 0.018*GIMP +0.071*POP 14.40*UR -0.006*LOPV +0.0046*CPI*DUM*

Table 8: ARDL Estimation of the Imports Model

Variables	Coefficient	SE	t-statistic	Prob.
GIMP	0.027765	0.008683	3.197727	0.0085
CPI	0.015841	0.021246	0.745608	0.4715
LEDU	-1.174155	0.961974	-1.220568	0.2478
OPV	0.066248	0.021797	3.039315	0.0113
POP	-0.220605	0.075478	-2.922770	0.0139
UR	-8.369892	3.396621	-2.464182	0.0314
IMP*DUM	0.120049	0.047300	2.538059	0.0276
C	7.053237	4.731153	1.490807	0.1641
R-squared	0.823150	**Mean DV**	0.005914	
Adjusted R-squared	0.437296	**SD DV**	0.393034	
S.E. of regression	0.294829	**AIC**	0.598424	
Sum squared resid.	0.956167	**SIC**	1.698090	
Log likelihood	14.22837	**HQC**	0.982237	
F-statistic	2.133321	**Durbin-Watson**	2.924071	
Prob(F-statistic)	0.000000			

Dependent Variable: GOFDI
Akaike info criterion (AIC), ARDL (1, 1, 0, 3, 3, 3, 3, 3)
DV: dependent variable; AIC: Akaike information criterion; SIC: Schwarz information criterion; HQC: Hannan-Quinn information criterion; SE: stander error: SD: stander deviation

Table 8 shows the estimated long-run coefficients of the variables of the imports model. The ARDL model use slag lengths defined by the EVIEWS 10 software (1, 1, 0, 3, 3, 3, 3, 3). The R^2 amounts to 0.82, which means that on average, the independent variables account for 82 percent of variance in GOFDI in Jordan. The results also indicate that UR, LIMP, LIMP*DUM, POP, and OPV are statistically significant, while LEDU, and CPI are not statistically significant.

Since the variables are measured in logs, all coefficients represent long-run elasticity between independent and dependent variables. The result in

shows that the effect of import on GOFDI in Jordan is straightforward: A one percent increase in import leads to a 0.027 percent

increase in GOFDI. However, when it is paired with the Syrian crisis dummy (GIMP*DUM), a one percent increase leads to a 0.12 percent increase in GOFDI. Amidst the Syrian crisis, a one percent increases in import rate increases GOFDI in Jordan by a total of 0.147 percent, ceteris paribus. The long-run inflation model can be written as:

*GOFDI =7.05 + 0.015*CPI -1.17*LEDU + 0.027*GIMP -0.22*POP -8.36*UR + 0.066*VPO + 0.12*IMP*DUM*

There are not many explanations for the long-term coefficients because the variables have shown co-integration and long-run elasticity. Nonetheless, long -term elasticity is estimated to follow the error correction coefficient (Coint Eq (-1)). Table 9 shows the long -run elasticity estimations of the unemployment model. The error correction term (ECT) in the long run is negative. Its absolute value indicates the percentage of disequilibrium in GOFDI in the previous period that is corrected at a later period towards long-run equilibrium. In this case, the error correction term for the unemployment model is -1.78. In other words, the economy is adjusting towards long-run equilibrium at a speed of 1.78.

Table 9: Long-run Elasticity Estimations of the Unemployment Model

Variable	*Coefficient*	*SE*	*T-statistic*	*Prob.*
D(GIMP)	0.008135	0.003385	2.403005	0.0319
D(CPI)	0.063446	0.018501	3.429379	0.0045
D(CPI(-1))	-0.126160	0.022053	-5.720835	0.0001
D(CPI(-2))	-0.112239	0.019195	-5.847412	0.0001
D(LEDU)	-1.183702	0.493259	-2.399758	0.0321
D(LEDU(-1))	3.815849	0.612134	6.233681	0.0000
D(LEDU(-2))	2.945308	0.652254	4.515581	0.0006
D(POP)	-1.407010	0.490027	-2.871290	0.0131
D(POP(-1))	3.742976	0.968291	3.865549	0.0019
D(POP(-2))	-3.826370	0.647957	-5.905280	0.0001
D(UR)	-8.429912	2.287462	-3.685268	0.0027
D(UR(-1))	31.19118	3.115981	10.01007	0.0000
D(UR(-2))	20.72974	3.019443	6.865419	0.0000
D(UR*DUM)	-12.09538	2.038169	-5.934434	0.0000
CointEq(-1)*	-1.781462	0.134777	-13.21784	0.0000

SE: stander error: CointEq: Error correction Equation

Table shows the long -run elasticity estimations of the inflation model. The error correction term (ECT) in the long run is negative. Its absolute value indicates the percentage of disequilibrium in GOFDI in the previous period that is corrected at a later period towards long-run equilibrium. In this case, the error correction term for the inflation model is -1.64. In other words, the economy is adjusting towards long-run equilibrium at a speed of 1.64.

Table 10: Long-run Elasticity Estimations of the Inflation Model

VARIABLE	COEFFICIENT	STD. ERROR	T-STATISTIC	PROB.
D(GIMP)	0.006821	0.003547	1.923039	0.0737
D(LEDU)	-0.925750	0.513956	-1.801224	0.0918
D(LEDU(-1))	3.231218	0.620384	5.208419	0.0001
D(LEDU(-2))	2.380053	0.652650	3.646754	0.0024
D(POP)	-0.802331	0.481848	-1.665112	0.1166
D(POP(-1))	2.720928	0.953607	2.853302	0.0121
D(POP(-2))	-2.824734	0.626636	-4.507774	0.0004
D(UR)	-9.036324	2.439895	-3.703570	0.0021
D(UR(-1))	16.99664	2.581097	6.585048	0.0000
D(UR(-2))	10.88963	2.729058	3.990253	0.0012
D(CPI)	0.024565	0.018896	1.299985	0.2132
D(CPI(-1))	-0.076907	0.021238	-3.621148	0.0025
COINTEQ(-1)*	-1.643722	0.134919	-12.18306	0.0000

SE: stander error: CointEq: Error correction Equation

Table shows the long-run elasticity estimations of the imports model. The error correction term (ECT) in the long run is negative. Its absolute value indicates the percentage of disequilibrium in GOFDI in the previous period that is corrected at a later period towards long-run equilibrium. In this case, the error correction term for the imports model is -1.75. In other words, the economy is adjusting towards long-run equilibrium at a speed of 1.75.

Table 11: Long-run Elasticity Estimations of the Imports Model

Variable	Coefficient	SE	t-statistic	Prob.
D(GIMP)	0.015707	0.003885	4.043108	0.0019
D(LEDU)	0.191991	0.426463	0.450195	0.6613
D(LEDU(-1))	3.771991	0.485833	7.763972	0.0000
D(LEDU(-2))	3.126038	0.539776	5.791365	0.0001
D(OPV)	0.012451	0.005497	2.264821	0.0447

D(OPV(-1))	-0.073961	0.009115	-8.114517	0.0000
D(OPV(-2))	-0.039645	0.007484	-5.297018	0.0003
D(POP)	-2.312447	0.552808	-4.183093	0.0015
D(POP(-1))	3.982456	0.980033	4.063592	0.0019
D(POP(-2))	-3.042259	0.602351	-5.050642	0.0004
D(UR)	-5.018903	2.245398	-2.235196	0.0471
D(UR(-1))	18.85747	2.269366	8.309575	0.0000
D(UR(-2))	15.86695	2.631973	6.028540	0.0001
D(GIMP*DUM)	-0.020200	0.020025	-1.008757	0.3348
D(GIMP*DUM(-1))	-0.192465	0.028455	-6.763868	0.0000
D(GIMP*DUM(-2))	-0.076932	0.020416	-3.768201	0.0031
CointEq(-1)*	-1.753935	0.140366	-12.49540	0.0000

SE: stander error: CointEq: Error correction Equation

Estimating Short run

Table 12: Short-run Relationship for the Unemployment Model

Variable	Test statistic	Value	Probability
GIMP	F-statistic	5.470619	0.0189
	Chi-square	10.94124	0.0042
UR	F-statistic	4.183108	0.0215
	Chi-square	16.73243	0.0022
CPI	F-statistic	3.061153	0.0556
	Chi-square	12.24461	0.0156
POP	F-statistic	3.127398	0.0524
	Chi-square	12.50959	0.0139
LEDU	F-statistic	2.680280	0.0790
	Chi-square	10.72112	0.0299
UR*DUM	F-statistic	3.257571	0.0713
	Chi-square	6.515143	0.0385
OPV	F-statistic	0.049638	0.8272
	Chi-square	0.049638	0.8237

shows there is a short-term relationship between UR, GIMP, CPI, POP, LEDU, and UR*DUM ceteris paribus, as the probability of the chi-square is less than five percent. But there is no short-term causality relationship with

OPV (ceteris paribus) because the chi-square probability is more than five percent.

Table 13: Short-run Relationship for Inflation Model

Variable	Test statistic	Value	Probability
GIMP	F-statistic	3.872913	0.0440
	Chi-square	7.745826	0.0208
UR	F-statistic	3.271520	0.0407
	Chi-square	13.08608	0.0109
CPI	F-statistic	3.003324	0.0636
	Chi-square	9.009973	0.0292
POP	F-statistic	2.884265	0.0591
	Chi-square	11.53706	0.0211
LEDU	F-statistic	1.880363	0.1663
	Chi-square	7.521451	0.1108
CPI*DUM	F-statistic	2.895428	0.1095
	Chi-square	2.895428	0.0888
OPV	F-statistic	1.574786	0.2287
	Chi-square	1.574786	0.2095

shows there is a short-term relationship between UR, GIMP, CPI, and POP ceteris paribus, as the probability of the chi-square is less than five percent. But there is no short-term causality relationship between OPV, and CPI*DUM (ceteris paribus) because the chi-square probability is more than five percent.

Table 14: Short-run Relationship for Imports Model

Variable	Test statistic	Value	Probability
GIMP	F-statistic	5.384741	0.0234
	Chi-square	10.76948	0.0046
UR	F-statistic	3.640296	0.0400
	Chi-square	14.56119	0.0057
CPI	F-statistic	0.549127	0.4742
	Chi-square	0.549127	0.4587
POP	F-statistic	4.834106	0.0170
	Chi-square	19.33642	0.0007
LEDU	F-statistic	2.064295	0.1544
	Chi-square	8.257180	0.0826
GIMP*DUM	F-statistic	2.461264	0.1069
	Chi-square	9.845056	0.0431
OPV	F-statistic	3.643743	0.0481

	Chi-square	10.93123	0.0121

shows there is a short-term relationship between UR, GIMP, CPI, and POP ceteris paribus, as the probability of the chi-square is less than five percent. But there is no short-term causality relationship between OPV, and CPI*DUM (ceteris paribus) because the chi-square probability is more than five percent. shows there is a short-term relationship between GIMP, UR, POP, OPV and GIMP*DUM, ceteris paribus, as the probability of the chi-square is less than five percent. But there is no short-term causality relationship between CPI and LEDU (ceteris paribus) because the chi-square probability is more than five percent.

Diagnostic Tests

In addition to the previous tests, diagnostic tests like serial correlation and heteroskedasticity tests are also important to ensure the model is free of standard problems.

shows that the probability values for *F* are greater than five percent for both models. Therefore, the null hypothesis is not rejected, which means that serial correlation and heteroskedasticity are not found in both models.

Table 15: Results of Diagnostic Tests for the Unemployment, Inflation, and Imports Model

Equations	Test	Test statistic	Prob.
GOFDI = *f*(UR, CPI, GIMP, OPV, POP, LEDU, UR*DUM)	Serial correlation	F- Cal.= 2.3557	0.1314
	Heteroskedasticity	F- Cal.= 1.9815	0.1020
GOFDI = *f*(UR, CPI, GIMP, OPV, POP, LEDU, CPI*DUM)	Serial correlation	F- Cal.= 1.9924	0.1653
	Heteroskedasticity	F- Cal.= 1.3431	0.2831
GOFDI = *f*(UR, CPI, GIMP, OPV, POP, LEDU, GIMP*DUM)	Serial correlation	F- Cal= 3.5100	0.1211
	Heteroskedasticity	F- Cal.= 1. 9951	0.5293

Robustness Checking

For robustness checking, several alternative procedures have been considered in this study; (i) estimating the SVAR model; (ii) model with external debt; and (iii)

model without external debt. Overall, the unemployment rate model, inflation model, and import model are robust with this restriction. Moreover, the external debt was used as a control variable for this model. As an indicator of the economic openness of the Jordanian economy.

Table 16: Unemployment rate model without external debt

Variance Decomposition of OFDI:

Period	S.E.	OFDI	IMP	CPI	OPV	POP	UR	URDUM
1	0.106656	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.111514	95.54850	0.302959	1.145272	0.334584	0.152791	0.674079	1.841820
3	0.113595	92.31609	0.320418	1.329794	1.947092	0.308712	0.663557	3.114333
4	0.115623	91.47282	0.579448	1.475235	2.334248	0.447958	0.665206	3.025081
5	0.116901	89.60777	0.705149	2.367646	2.673340	0.456039	0.813019	3.377041
6	0.117794	88.50273	0.830530	2.791167	3.066681	0.455337	0.895419	3.458136
7	0.118299	87.75117	0.890353	3.177847	3.079071	0.489661	1.097548	3.514353
8	0.118478	87.49846	0.923803	3.176061	3.109357	0.601643	1.178091	3.512586
9	0.118774	87.08144	1.007819	3.208251	3.097714	0.840940	1.266701	3.497140
10	0.119289	86.40079	1.096899	3.429015	3.089440	1.173145	1.331566	3.479141

Table 17: Unemployment rate model with external debt

Variance Decomposition of OFDI:

Period	S.E.	OFDI	IMP	CPI	OPV	POP	UR	URDUM	LEXP
1	0.104158	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.113718	87.15949	0.173402	0.629204	0.103254	0.190929	0.159573	1.973082	9.611064
3	0.117171	82.39183	0.282165	1.461558	1.766418	0.326698	1.031202	3.237425	9.502705
4	0.120159	82.35694	0.681471	1.471204	1.877293	0.343488	1.093080	3.138726	9.037802
5	0.121169	81.08211	0.830983	1.543412	1.848959	0.355877	1.306745	3.275940	9.755971
6	0.122548	79.27249	0.812543	2.006631	2.518717	0.398515	2.051653	3.204916	9.734536
7	0.123737	78.05536	0.818101	2.012095	2.772117	0.592290	2.579520	3.189539	9.980973
8	0.124491	77.19603	0.809403	2.143788	3.046234	0.803540	2.980664	3.156980	9.863362
9	0.124950	76.83400	0.849786	2.130651	3.023914	1.062320	3.134690	3.134576	9.830066

10	0.125222	76.53784	0.854636	2.121981	3.010848	1.256030	3.230847	3.136516	9.851299

Table 18: Inflation rate model without external debt

Period	S.E.	OFDI	IMP	CPI	OPV	POP	UR	CPIDUM
1	0.105885	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.110840	96.26035	0.293757	0.742824	0.016785	0.105794	0.428525	2.151964
3	0.112883	92.88418	0.383533	1.264872	1.126874	0.236897	0.413429	3.690218
4	0.115374	90.53369	0.783906	1.459150	2.270667	0.495646	0.534868	3.922071
5	0.116701	88.53973	0.930113	2.607545	2.488076	0.494597	0.985216	3.954724
6	0.117839	87.89674	1.188041	2.944341	2.542418	0.490224	1.000910	3.937328
7	0.118359	87.26543	1.236708	3.343453	2.557918	0.554053	1.127860	3.914576
8	0.118512	87.04876	1.241304	3.335524	2.561555	0.733739	1.155401	3.923713
9	0.118935	86.44703	1.381275	3.448180	2.656404	1.018423	1.151914	3.896773
10	0.119627	85.55884	1.476492	3.788496	2.764492	1.355204	1.142522	3.913953

Table19: Inflation rate model with external debt

Variance Decomposition of OFDI:

Period	S.E.	OFDI	IMP	CPI	OPV	POP	UR	CPIDUM	LEXP
1	0.102719	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.113307	86.26477	0.222047	0.242846	0.018250	0.042366	0.045580	2.935067	10.22908
3	0.116826	81.24793	0.300037	1.440706	1.486744	0.079154	0.829712	4.632474	9.983242
4	0.119798	79.88730	0.854995	1.515367	2.213100	0.163486	1.297622	4.570029	9.498102
5	0.121193	78.05918	1.048493	1.573383	2.200011	0.203275	2.118456	4.468754	10.32845
6	0.122683	76.37066	1.023658	2.121689	2.442888	0.254053	2.965822	4.459471	10.36176
7	0.123853	74.97372	1.021159	2.088748	2.501453	0.522204	3.374794	4.397422	11.12050
8	0.124402	74.35179	1.014387	2.181130	2.641466	0.822852	3.581835	4.359336	11.04721
9	0.124869	74.11357	1.101983	2.172330	2.636970	1.090579	3.568203	4.334696	10.98167
10	0.125145	73.87098	1.127361	2.189892	2.644333	1.212793	3.556560	4.320638	11.07744

Table 20: Import model without external debt

Period	S.E.	GGDP	GIMP	CPI	OPV	POP	UR	IMP*DUM
1	0.108245	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.112841	96.17029	0.584100	0.050291	0.651247	0.000564	0.532448	2.011057
3	0.114212	93.87635	0.617236	0.253593	1.924039	0.078860	0.990366	2.259561
4	0.117491	91.85990	1.669693	0.241284	2.121767	0.560827	0.967812	2.578719
5	0.119382	90.85724	1.670815	1.155553	2.273592	0.592127	0.947230	2.503439
6	0.120368	90.01349	1.985690	1.634018	2.333355	0.590862	0.960973	2.481616
7	0.120716	89.50964	2.067894	1.794581	2.339354	0.773954	0.981666	2.532910
8	0.121020	89.06101	2.109778	1.797567	2.327701	1.102375	0.977181	2.624387
9	0.121573	88.33473	2.169918	1.973234	2.436989	1.458512	0.970677	2.655938
10	0.122189	87.59184	2.169186	2.358445	2.577264	1.709349	0.964416	2.629501

Table 21: Import model with external debt

Variance Decomposition of OFDI:

Period	S.E.	GDP	IMP	CPI	OPV	POP	UR	IMPDUM	LEXP
1	0.105588	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.116194	87.35610	0.331720	0.017763	0.410396	0.000469	0.607118	1.745480	9.530951
3	0.117489	85.44211	0.334758	0.671053	1.428349	0.005408	0.653853	2.141853	9.322613
4	0.122972	83.14174	2.283788	1.284716	1.348015	0.241919	0.815127	2.373267	8.511428
5	0.124290	82.56211	2.324666	1.275064	1.326332	0.236820	0.846248	2.323199	9.105556
6	0.125540	81.27137	2.467188	1.549763	1.439041	0.259648	1.184949	2.277166	9.550879
7	0.126273	80.43703	2.527789	1.543269	1.515456	0.512684	1.336056	2.406139	9.721579
8	0.127019	79.59465	2.563498	1.532704	1.568662	0.899647	1.446710	2.784156	9.609968
9	0.127555	79.10090	2.597282	1.574104	1.583463	1.188979	1.451497	2.969041	9.534741
10	0.127818	78.78104	2.588194	1.599294	1.596078	1.280280	1.445546	2.966979	9.742590

CONCLUSION

This study aimed to investigate the changes in FDI outflow resulting from Jordan's response to the Syrian Crisis. Using time series analysis of selected variables during the period 1980 until 2018 using the ARDL model. The objective achieved the appropriate statistical tests such as data stability and co-integration tests have been used. The variables analyzed the growth of FDI outflow GOFDI, the unemployment rate UR, growth of imports GIMP, inflation rate CPI, population growth POP, education spending LEDU, price oil price volatility OPV, dummy variable for the Syrian crisis DUM, and the error term μt. The dependent variable is the foreign direct investment outflow (GOFDI). The results of the model show that, the error correction term for the unemployment model is -1.98. In other words, the economy is adjusting towards long-run equilibrium at a speed of 1.98. Secondly, the error correction term for the inflation model is -1.11. In other words, the economy is adjusting towards long-run equilibrium at a speed of 1.11. Finally, the error correction term for the imports model is -1.41. In other words, the economy is adjusting towards long-run equilibrium at a speed of 1.41. The study recommended; that the Jordanian government must provide an appropriate environment for foreign investment and remove the obstacles to investment in general, in order to attract foreign investment capital to invest in the Jordanian economy.

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