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## The Determinants of Financial Development in Jordan: VECM

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### **Abstract:**

*This study aimed to investigate the determinants of financial development (FD) in Jordan through the period 1990-2018. Johansen cointegration test, VAR and VECM are used in this study. co integration test, and VECM results show that there is a long run relationship between trade openness (OPEN), GDP per capita (GDPPC), foreign direct investment (FDI), tax revenues (TAXR), inflation rate (INF) and financial development (FD) in Jordan. The VECM output show that (OPEN), (GDPPC), and (FDI) are a good determinant for (FD) in Jordan since they have a positive and significant impact. while (TAXR) and (INF) are not determinants for (FD) since they have a negative but not significant impact on (FD). The study suggested that government of Jordan should work to preserve trade openness, increasing GDP per capita and increasing attracting (FDI) due to its positive and significant effects on the (FD) in Jordan.*

**Keywords:** Determinants, financial, Openness, VECM, Jordan

### **1. Introduction**

In the economies of countries, financial development (FD) is considered very significant, since the existence of a sophisticated financial system that works to diversify the means of financing for different economic sector which is reflected positively on economic growth. The more the state has a well-developed financial system, the more in economic improvement.

Countries with developed financial systems offer for them many advantages in the economy where it provides advance information on available investments, and helps to optimize the distribution of financial resources available in the economy, which controls the projects and promotes corporate governance by providing the necessary funding. Also, Financial development helps promote trade, diversification and risk management, and increases savings and exchanges in the economy.

Recent theories suggest that financial development is important for the growth of the economies of countries. Levine and Zervos (1998) show that the improvement of banking system and stock market are led to growth of economy. In this context Auerbach and Siddiki (2004) wrote that the availability of advanced financial systems contributes to increasing the productivity of the resources used and increasing the savings rates in the economy necessary for investment. In this context Pradhan (2010) also wrote financial expansion is now a key symbol of economic progress and prosperity. Financial systems are also considered as the backbone of economic systems.

Jordan, like other developing countries, continuously seeks to develop financial and legal legislation and provide supervisory bodies on the operating of the banking system, Amman Stock Exchange Market and companies, and so are the recent Central Bank of Jordan has adopted the so-called financial inclusion, which seeks to include all the people in banking services in order to promote the banking system in Jordan.

Identifying factors that affect (FD) is an important priority for countries aiming to achieve high and sustained rates of economic growth. Due to the great difference in the circumstances available to countries for financial development. Therefore, we can say that it is necessary to conduct experimental studies on the factors that affect the financial development in Jordan as well as to make appropriate recommendations that will contribute to the (FD) in Jordan.

Financial progress has a great position in the economies of countries. The advanced financial system works to collect savings and redistribute them efficiently to the various economic and service sectors in order to ensure the desired economic development in the countries. In addition to trying to uncover the variables that effectively affect Jordan's (FD), as well as reaching appropriate recommendations that may enhance financial progress in Jordan.

Most of the previous studies dealt with the impact of financial and commercial openness on financial development, while others dealt with a number of variables such as the size of the capital market, economic growth, inflation, population growth rate, the number of people enrolled in higher education, and public spending as determinants of financial development. A number of techniques were used in analysis such as Autoregressive Distributive Lag (ARDL) approach, Panel data analysis, cointegration and causality analysis.

It is clear that the previous published studies fail to consider tax revenues as one of the determinants of financial development. This situation is unacceptable, because tax revenues negatively affect economic performance and therefore financial development. Tax revenue is a reflection of financial policies. So high tax revenue has negative effects on demand

in the economy, as it works to reduce the purchasing power of individuals and thus lower production and low economic growth, high unemployment rates and low demand for different financial tools and services, which contributes to the underdevelopment and decline of financial institutions. The Jordanian economy has witnessed in the last fifteen years, a significant increase in the size of taxes and fees and their types, which negatively affected the economy. Therefore, this study came to fill this research gap.

Based on the above, this study came to test the determinants of financial development in Jordan for the period 1990-2018. The study used a cointegration test, VAR model and VECM. The results show that (OPEN), (GDPPC) and (FDI) are good determinants for (FD). While (TAXR) and (INF) have a negative but not significant impact on (FD). The article is structured as follows: Section 1 introduction, Section 2 Literature review, Section 3 Data and methodology. Section 4 Empirical analysis results and discussion 5 Conclusions and Recommendations.

## 2. Literature Review

Financial development is defined as factors, policies and institutions that work to create highly efficient markets as well as provide financial intermediation that effectively helps in accessing advanced banking services and access to capital in an easy and safe way. (Financial Development Index, 2008). Financial development has three main objectives represented by allowing the restructuring and modernization of the banking sector, the transformation and development of information and communication systems, made the real interest rate positive to ensure positive financial liberalization and the optimal allocation of resources and better diversification of risks (Khalfaoui, 2015).

Discussion of the determinants of financial development stems from the significance of the association between financial development and economic growth, and therefore the interest in this matter going back a long time ago. In 1934, Schumpeter noted the importance of financial systems and said that economies with sophisticated financial systems had high economic growth rates. In 1979, Robinson suggested that countries with high economic growth prospects should have sophisticated financial systems capable of providing the necessary financing to support expected economic growth. So financial development is seen as a prerequisite for financial liberalization and sustainable economic development.

### 2.1. Empirical Evidence

There is a number of studies that examine the determinants of financial development at case and panel data analysis level using different econometrics techniques. Some of these studies are Badeeb and Lean (2017); Yilmaz., Fatma & Isil (2017); Khalfoui (2015); Raza, Shahzadi and Akram (2014); Al-Fayoumii and Abuzayed (2014); Acikgoz., Balcilar, & Saracoglu, (2012); Baltagi, et al., (2009).

Badeeb and Lean (2017) investigate the determinants of (FD) in the Republic of Yemen for the period 1980-2012. They used ARDL approach to examine their study hypotheses, their study results indicate that economic growth, natural resource dependence, trade openness and inflation are the main determinants of financial development in Yemen. and they found that economic growth and trade openness have a positive impact on financial development measured by Banks credit to private sector as a share of GDP, while natural resource and inflation have a negative impact.

Yilmaz., Fatma & Isil (2017) investigated the interaction between openness and (FD) in 9 Central and Eastern European countries during the period 1996-2014. They employed cointegration test of Westerlund and Edgerton (2007) and causality test of Dumitrescu and Hurlin (2012). The results indicate that openness affected (FD) positively in the long term. and the causality test indicates one-way causality running from financial openness to (FD)

Khalfoui (2015) examined the determinants of (FD) in developed and developing countries. panel data is applied on two samples divided among 15 developed and 23 developing countries over a period from 1997 to 2013. the results indicating that M2 as a percentage of GDP, Market capitalization as a percentage of GDP, investment as a percentage of GDP, trade openness as a percentage of GDP and enrollment rate in higher education have a positive and significant impact on (FD) measured by credit to private sector, while the non-performing loans, inflation and the current account deficit have a negative and significant impact on (FD).

Raza, Shahzadi and Akram (2014) examined the determinants of (FD) by using panel data from 1990-2012 for 57 developed and developing countries. They used Fixed effects model, Random Effects Model and Hausman test. the finding indicates that population growth, share of agriculture sector in GDP, Real GDP growth, trade openness as percent of GDP, government spending as percent of GDP and Dem index of democracy had a significant impact on (FD), while net foreign direct investment (FDI) as percent of GDP and RL is index of rule of law do not have a significant impact on (FD).

Al-Fayoumii and Abuzayed (2014) examined the impact of trade openness and capital account on (FD) for 12 Arab countries over the period 1985-2011. They used panel data analysis and GMM, Fixed effects and random effects models. The results indicate that opening Arab countries to both trade and capital account will not necessarily promote (FD).

David, Mlachila and Moheput (2014) examined the trade and capital account openness on (FD) in Sub Saharan African (SSA) countries for the period 1970-2009. The study used panel data analysis. The findings show that the trade openness has positive and statistically significant impact on (FD). While capital account openness has a negative and statistically significant impact on (FD) in Sub Saharan African (SSA) countries.

Acikgoz., Balcilar, & Saracoglu, (2012). investigated the impact of financial and trade openness on (FD) in Turkey. The study used quarterly time series data for the period 1989:1- 2007:2. The empirical findings using the bounds testing indicate that only two (FD) measures out of seven are determined by financial and trade openness.

Baltagi, Demetriades, and Law (2009) they examined the impact of trade and capital account openness on (FD) for developing and industrialized countries, they used dynamic panel estimation techniques to examine their study hypotheses, the finding indicates that both types of openness are statistically significant determinants of (FD).

Law (2009) examines the impact of trade openness and capital flows on (FD) in developing countries using a dynamic panel GMM estimation technique. The results indicated that both trade openness and capital flow have a positive and statistically significant effect on the (FD) in the developing countries under study. The results of the study also indicated that trade openness and capital flow are determinants of (FD) in the developing countries.

This study is an extension to the previous studies to provide empirical evidence about the determinants of financial development in Jordan as a developing country. also, this study used Trade openness, GDP per capita, Inflation, (FDI) in addition to the variable tax revenue as a percentage of GDP since it has not been addressed in previous published studies. Also, used technique of Vector autoregressive VAR and Vector Error Correction model VECM.

### **3. Data and Methodology:**

#### *3.1. Data*

Data on study variables were obtained from the Central Bank of Jordan database, over the period 1990-2018 on annual basis. for the study variables, (FD) measured by banks credit to private sector as a percentage to GDP (FD), trade openness measured by sum of exports and imports as a percentage to GDP (OPEN), GDP per capita (GDPPC), foreign Direct investment as a percentage of GDP (FDI), tax revenues as a percentage to GDP (TAXR) and inflation.(INF) The study used E-Views 9, software packages for the econometric analysis in the study.

#### *3.2. Study Variables*

##### 3.2.1. Dependent Variable

Financial Development (FD): measured by banks credit to private sector as a percentage to GDP. Bank credit to the private sector as a percentage of GDP represents the general development of private banking markets. This measure is used in this study because it is the most measure used to express (FD) (David, Mlachila and Moheput 2014). This means that the higher the ratio, the greater the financial services provided to the private sector and thus indicate further financial development. while a number of researchers have been used M2 as a percentage to GDP or liquidity liabilities as a percentage to GDP. This variable was used by Khalfofi (2015); Badeeb & Lean (2017); Raza, Shahzadi and Akram (2014).

##### 3.2.2. Independent Variables

There is a big number of variables that affect countries' (FD) (Voghouei, Azali, & Jamali (2011). This study attempts to focus on quantitative determinants that are related to (FD) according to preceding literature

Tax Revenues (TAXR): measured by tax revenues as a percentage of GDP. This variable has been used for its importance, since the tax rates in Jordan have increased significantly in the last ten years, which is probable to have depressing effects on economic growth and consequently on (FD). In this view Tatom & Ott (2007) pointed out that the tax increase will reduce the demand for money, which in turn will reduce the (FD).

Trade Openness (OPEN): measured by exports plus imports as a percentage of GDP. In the light of the financial and commercial liberalization, most of the countries of the world and Jordan have engaged in the opening of trade and financial, which contributed to the (FD). Trade openness is a prerequisite for the real financial development of countries, their argument is that institutional development is insufficient for financial development if it is not accompanied by integration with the rest of the world because the political economy (Rajan and Zingales, 2003). Svaleryd and Vlachos, (2002) proposed that Trade openness increases demand for new financial products, trade finance tools, hedging and risk. A number of scholars such as (Do & Levchenko (2004); Rajan and Zingales, (2003); Huang, (2005); and Baltagi et al., 2009) suggested that the openness of trade is an important variable that has a significant role in improving financial development. This variable was used by Badeeb & Lean (2017); Raza, Shahzadi and Akram (2014); Khalfofi (2015); Law (2009) and others.

Economic Growth (GDPPC): measured by GDP divided by Population number. The increase in (GDPPC) contributes to increase the demand for various financial instruments, and this leads to increase the provision of financial tools and services, which contributes to the (FD) of the economy (Allen and others, 2012). Levine, 2005 Addressing the importance of income as a determinant of (FD) and he proved that income per capita has a positive relationship with financial development. Greenwood & Jovanovic (1990) state that high economic growth rates lead to lower costs of financial intermediation as an outcome of increased competition among financial intermediation institutions, which promotes the increase of funds available for investment. This variable was used by Badeeb and Lean (2017).

Inflation rate (INF): the percentage change in consumer price index. Huybens and Smith (1999) suggested the relationship between inflation and (FD). (Boyd, Levine and Smith, 2001) concluded that high-inflation economies are likely to have small, inefficient and ineffective banks. In the same context (Boyd, Levine and Smith, 2001) wrote that the rise in inflation reduces financial intermediation, and inflation is used as a measure of macroeconomic instability. McKinnon (1991) suggested that price stability is very important for financial intermediation and the high inflation rates limit long-term contracts.

Huybens and Smith (1998) He pointed out that the inconsistency of information resulting from high inflation rates will negatively affect credit and thus the performance of the financial sector. Lower real interest rates resulting from higher inflation will reduce the incentives of the banks to grant credit, which in turn will have a negative impact on the effectiveness of the distribution of resources and available capital as well as on (FD). Padachi, Seetanah and Rojid (2008)

state that inflation had negative and long-term effects on the banking sector. This variable was used by Badeeb and Lean (2017).

Foreign Direct Investment (FDI): measured by foreign direct investment as a percentage of GDP. The contribution of FDI to the economies of its host countries is through bringing advanced technology with him and his contribution to the development of technical, administrative and organizational skills and contribute to economic development and thus (FD) (Barro and Sala-i-Martin (1995), De Jager (2004), and Romer (1990).

The contribution of FDI to the economic growth of countries is through the outputs of modern technology, contribute to the formation of human capital through the provision of the necessary skills, contribute to the integration of trade at the international level and contribute to the creation of a competitive business environment and all this leads to (FD) (Romer, 1990). There is no doubt that the inflow of FDI contributes effectively to the increase in supply of financing for domestic investment in the host country (Belloumi, 2014). Foreign Direct investment flows require countries to afford a convinced level of (FD) (Hermes & Lensink, 2003). This variable was used by Raza, Shahzadi and Akram (2014).

### 3.3. Methodology

This study based in its methodology on the methodologies of Raza, Shahzadi and Akram (2014) and Baltagi, Demetriades, and Law (2009) With some modifications to the variables and technology used to suit the available data and study the case of Jordan. This study used the Unit root test, Cointegration test, Vector Autoregressive (VAR) model and Vector Error Correction Model (VECM). Since a vector error correction model is the restricted form of VAR model for variables which are cointegrated (Griffiths, Hill, and Lim, 2008) and OLS. To estimate the determinants of (FD). Based on the empirical evidence mentioned in the literature review, the general model used in the study depends on the following function:

$$FD = F(\text{OPEN}, \text{GDPPC}, \text{FDI}, \text{TAXR}, \text{INF}) \dots\dots\dots(1)$$

Where FD is the financial development measured by banks credit to private sector as a percentage to GDP, OPEN is the trade openness, GDPPC is the GDP per capita, FDI is the foreign direct investment, TAXR is the tax revenue, INF is the inflation rate. According to Johansen Cointegration Test results the study variables are cointegrated, therefore the study used

vector error correction model. The final form of the Vector Error-Correction Model (VECM) was selected according to the proposed approach by (Maddala, 1992; Antonios, 2010).

### The Model

$$\begin{aligned} \Delta FD_t = & \beta_0 + \sum_{i=0}^n \beta_1 \Delta FD_{t-i} + \sum_{i=0}^n \beta_2 \Delta OPEN_{t-i} + \sum_{i=0}^n \beta_3 \Delta GDPPC_{t-i} + \sum_{i=0}^n \beta_4 \Delta FDI_{t-i} \\ & + \sum_{i=0}^n \beta_5 \Delta TAXR_{t-i} + \sum_{i=0}^n \beta_6 \Delta INF_{t-i} + \beta_7 EC_{t-1} + Ut \dots\dots\dots(2) \end{aligned}$$

Where  $\Delta$  is the first difference  $t$ , time,  $EC_{t-1}$  is the error correction term lagged one period,  $\beta_7$  is the long-run coefficient of the error correction term,  $U_t$  is the error term. FD is the financial development, OPEN is the trade openness, GDPPC is the GDP per capita, FDI is the foreign direct investment, TAXR is the tax revenue, INF is the inflation rate,  $t$ : time.  $\beta_0$ , intercept (constant), and  $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ : Coefficients,  $U$ , error term.

#### 3.3.1. Study Objectives

The study aims to achieve the following objectives:

- Examine the impact of trade openness on (FD).
- Examine the impact of GDP per capita on (FD).
- Examine the impact of tax revenue on (FD).
- Examine the impact of FDI on (FD).
- Examine the impact of inflation on (FD).

#### 3.3.2. Study Hypotheses

The study examines the following hypotheses:

- Trade openness has a significant impact on (FD) in Jordan.
- GDP per capita has a significant impact on (FD) in Jordan.
- Tax revenue has a significant impact on (FD) in Jordan.
- FDI has a significant impact on (FD) in Jordan.
- Inflation has a significant impact on (FD) in Jordan.

## 4. Empirical Analysis Results and Discussion

### 4.1. Descriptive Statistics Results

Table (1) shows the descriptive statistics (Mean, Median, Maximum, Minimum and Standard Deviation) of (FD), trade openness (OPEN), GDP per capita (GDPPC), foreign direct investment (FDI), tax revenue (TAXR) and inflation rate (INF).

	FD	OPEN	GDPPC	FDI	TAXR	INF
Mean	0.683287	0.984652	1832.033	0.130391	0.126543	0.035299
Median	0.679424	0.788503	1445.542	0.078616	0.122304	0.030772
Maximum	0.856931	5.864757	2957.52	0.654897	0.158589	0.152896
Minimum	0.506099	0.637236	932.2345	0.000734	0.089514	-0.02429
Std. Dev.	0.077457	0.948296	784.2787	0.163699	0.018243	0.038668

Table 1: Descriptive Statistics Results

### 4.2. Unit Root Tests Results

The stability of time series is a prerequisite for using data in regression because the instability of time series leads to spurious results. Granger and Newbold (1974) who coined the term spurious regression to describe regression results. This study used both Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP). To test the stability of time series of study variables. we test for unit root test at level and (none, trend, trend and intercept) for study variables.

Table (2) shows the results of ADF and PP for the levels and first differences of the annually time series data for the period 1990-2018 for the variables (FD), trade openness (OPEN), GDP per capita (GDPPC), foreign direct investment (FDI), tax revenue (TAXR), inflation rate (INF). The stationary test of the variables was investigated using the Augmented Dickey-Fuller (1979, ADF) and Phillips-Perron (1988, PP) tests. The results indicate that all the series for the variables financial development (FD), GDP per capita (GDPPC), foreign direct investment (FDI), tax revenue (TAXR), inflation rate (INF) are stationary at their first difference, which indicating that they are integrated of order one I(1); while trade openness (OPEN), series is stationary at level I(0). we take the first difference of trade openness to be sure all variable is integrated at the same degree to run VECM.

Variable	ADF Statistics	5%ADF Critical	Prob	PP Statistics	5% PP Critical	Prob	Order of Integration	Not Stationary
FD	0.828433	-1.95502	0.8841	1.263478	-1.95338	0.9436	I(0)	Not stationary
FD	-4.47733	-1.95502	0.0001	-3.76458	-1.95386	0.0005	I(1)	Stationary
Open	-2.86339	-1.95338	0.0058	-2.89334	-1.95338	0.0054	I(0)	Stationary
Open	-24.6917	-1.95386	0.0000	-8.9419	-1.95386	0.0000	I(1)	Stationary
GDPPC	1.250159	-1.95386	0.9421	1.761389	-1.95338	0.9783	I(0)	Not stationary
GDPPC	-2.60141	-1.95386	0.0114	-2.49093	-1.95386	0.0148	I(1)	Stationary
FDI	0.134195	-1.95338	0.717	0.134195	-1.95338	0.717	I(0)	Not stationary
FDI	-4.76543	-1.95386	0.0000	-4.76543	-1.95386	0.0000	I(1)	Stationary
TAXR	0.142614	-1.95338	0.7196	0.142614	-1.95338	0.7196	I(0)	Not stationary
TAXR	-5.34816	-1.95386	0.0000	-5.34816	-1.95386	0.0000	I(1)	Stationary
INF	0.669398	-1.95338	0.7258	0.531457	-1.95338	0.8125	I(0)	Not stationary
INF	-4.5789	-2.97626	0.0012	-2.46601	-1.95386	0.0158	I(1)	Stationary

Table 2: ADF, PP Unit Root Tests Results

### 4.3. Lag Order Selection Criteria Results

The optimal lag is necessary to perform Cointegration test, VAR Model and VECM. The study was used VAR Lag Order Selection Criteria to select the appropriate lag length and the results Table (3) indicated that (LR, FPE, AIC, SC and HQ) criteria indicated that one lag is the appropriate lag length.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-28.475	NA	0.002066	-2.331482	-2.475464	-2.374295
1	47.18932	128.9096*	1.49E-05*	-2.606616*	-2.030689*	-2.435363*
2	52.08386	7.25117	2.08E-05	-2.30251	-1.29464	-2.00282
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Table 3: VAR Lag Order Selection Criteria

#### 4.4. Johansen Cointegration Test Results

We use VAR model if the variables are stationary at the level, while, if the variables are not stationary at level and cointegrated, we use restricted Vector Autoregressive (VAR) model that is Vector Error Correction Model (VECM) (Al-Shiab, 2008). In this study, the co-integration test developed by Johansen(1991) was used to the study variables to see whether they are co-integrated or not. The Johansen cointegration test determines the number of long-term relationships between variables, and It offers two tests, the Trace test and the Maximum Eigenvalue test. The results of Trace and Maximum Eigenvalue tests in Tables (4 and 5) respectively indicate a one Cointegration equation between the study variables at the (0.05) level., This indicates a long-term relationship between the study variables.

Hypothesized No. of CE(S)	Eigenvalue	Trace Statistics	0.05/Critical Value	Prob.**
None *	0.617833	37.54243	29.79707	0.0053
At most 1	0.311946	11.57122	15.49471	0.1787
At most 2	0.053208	1.476244	3.841466	0.2244
At most 3	0.523288	28.61406	29.79707	0.068
At most 4	0.206662	8.611276	15.49471	0.4026
At most 5	0.083717	2.360615	3.841466	0.1244

Table 4: Unrestricted Cointegration Rank Test (Trace)  
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Hypothesized No. of CE (S)	Eigen Value	Max-Eigen Statistics	Critical 0.05 Value	Prob.**
None *	0.617833	25.97121	21.13162	0.0096
At most 1	0.311946	10.09497	14.2646	0.2058
At most 2	0.053208	1.476244	3.841466	0.2244
At most 3	0.523288	20.00278	21.13162	0.0713
At most 4	0.206662	6.250661	14.2646	0.5813
At most 5	0.083717	2.360615	3.841466	0.1244

Table 5: Unrestricted Cointegration Rank Test (Maximum Eigen Value)  
Max-Eigenvalue Test Indicates 1 Co Integrating Eqn(S) At The 0.05 Level

\* Denotes Rejection of the Hypothesis at the 0.05 Level

\*\*Mackinnon-Haug-Michelis (1999) P-Values

#### 4.5. Vector Error correction Model (VECM) Results:

According to stationary tests ADF and PP and Cointegration tests (Trace and maximum Eigenvalue) it showed that the study variable was stable at the first difference and have one Cointegration equation, thus the study used Vector Error Correction model (VECM).

From Table (6) we have Cointegration equation and error correction since the first difference of financial development D(FD), the first difference of trade openness D(open), the first difference of GDP per capita D(GDPPC), the first difference of foreign direct investment D(FDI), the first difference of tax revenue D(TAXR) and the first difference of inflation D(INF) are dependent variables. While the first lag, of the dependent variables are independent variables. This is because when we use VECM model we will have number of models equals the number of all variables in the study (FD, OPEN, GDPPC, TAXR, FDI and INF). The output of the VECM gives us the coefficient, standard error and t statistics for each independent variable but it does not give us the probability so we cannot decide which of them is significant or not.

<b>Cointegrating Eq:</b>	<b>CointEq1</b>					
FD(-1)	1					
OPEN(-1)	0.02905					
	-0.00458					
	[6.35012]					
GDPPC(-1)	4.41E-05					
	-1.90E-05					
	[ 2.26804]					
FDI(-1)	0.44976					
	-0.04699					
	[9.57189]					
TAXR(-1)	-1.2867					
	-0.22184					
	[-5.80020]					
INF(-1)	-0.00299					
	-0.00065					
	[-4.58520]					
C	-0.27664					
<b>Error Correction:</b>	<b>D(FD)</b>	<b>D(OPEN)</b>	<b>D(GDPPC)</b>	<b>D(FDI)</b>	<b>D(TAXR)</b>	<b>D(INF)</b>
CointEq1	-0.84789	17.99278	1120.116	-0.44211	0.046662	42.02353
	-0.08237	-6.46575	-626.786	-0.7429	-0.07954	-12.077
	[-10.2937]	[ 2.78279]	[ 1.78708]	[-0.59512]	[ 0.58667]	[ 3.47964]
D(FD(-1))	0.65107	-13.28	123.0918	0.12146	0.072652	0.832704
	-0.09642	-7.56839	-733.676	-0.86959	-0.0931	-14.1366
	[ 6.75270]	[-1.75467]	[ 0.16777]	[ 0.13968]	[ 0.78037]	[ 0.05890]
D(OPEN(-1))	0.01879	-0.29451	17.12907	-0.0108	-0.00048	0.666649
	-0.00241	-0.1889	-18.3123	-0.0217	-0.00232	-0.35284
	[7.80919]	[-1.55904]	[ 0.93539]	[-0.49741]	[-0.20580]	[ 1.88937]
D(GDPPC(-1))	0.000133	-0.00313	0.385903	3.58E-05	-1.58E-05	-0.00341
	-3.00E-05	-0.00239	-0.23163	-0.00027	-2.90E-05	-0.00446
	[ 4.36606]	[-1.31065]	[ 1.66600]	[ 0.13032]	[-0.53863]	[-0.76459]
D(FDI(-1))	0.34919	7.317816	469.931	-0.16229	-0.00146	19.4304
	-0.0425	-3.33576	-323.367	-0.38327	-0.04103	-6.23067
	[8.21712]	[ 2.19375]	[ 1.45324]	[-0.42342]	[-0.03564]	[ 3.11851]
D(TAXR(-1))	-0.029385	18.7362	-1112.59	0.04691	-0.04278	-18.051
	-0.22293	-17.4992	-1696.36	-2.01061	-0.21526	-32.6857
	[- 0.13181]	[ 1.07069]	[-0.65587]	[ 0.02333]	[-0.19876]	[-0.55226]
D(INF(-1))	-0.00224	-0.10015	-9.33224	-0.01406	0.00057	-0.0201
	-0.00134	-0.10558	-10.2345	-0.01213	-0.0013	-0.1972
	[-1.66695]	[-0.94864]	[-0.91184]	[-1.15923]	[ 0.43884]	[-0.10190]
C	0.004853	0.43009	60.84338	0.061263	6.12E-06	2.598786
	-0.00474	-0.37228	-36.0886	-0.04277	-0.00458	-0.69536
	[ 1.02320]	[ 1.15529]	[ 1.68594]	[ 1.43225]	[ 0.00134]	[ 3.73732]
R-squared	0.891006	0.493141	0.388909	0.129613	0.132473	0.493603
Adj. R-squared	0.85085	0.306403	0.163771	-0.19106	-0.18714	0.307036
Sum sq. resids	0.004104	25.2868	237626.9	0.333823	0.003826	88.22144
S.E. equation	0.014697	1.15364	111.8333	0.132551	0.014191	2.154816
F-statistic	22.18875	2.640824	1.727422	0.404196	0.414476	2.645711

Table 6: Vector Error Correction Estimation, Standard Errors in ( ) and T-Statistics in [ ]

Therefore, we take the system of models and only estimate the model related to (FD) as shown below, by using Ordinary Least Square (OLS), to get the probability for each independent variable. Since the purpose of the study is limited to test the impact of determinants of (FD). Therefore, here we focused only on the following model:

$$D(FD) = C(1)*( FD (-1) - 0.0290525139351*OPEN(-1) + 4.41003352475e-05*GDPPC(-1) - 0.449758582179*FDI(-1) - 1.28670148616*TAX(-1) - 0.00299177133038*INF(-1) - 0.276634676718 ) + C(2)*D(FD(-1)) + C(3)*D(OPEN(-1)) + C(4)*D(GDPPC(-1)) + C(5)*D(FDI(-1)) + C(6)*D(TAXR(-1)) + C(7)*D(INF(-1)) + C(8) .....(3)$$

Where D(FD) : The dependent variable.

D(FD(-1)), D(OPEN(-1)), D(GDPPC(-1)), D(FDI(-1)), D(TAXR(-1)) and D(INF(-1)) are independent variables. C(1) the coefficient of cointegration, C(2),C(3),C(4), C(5), C(6), C(7), are coefficients, and C(8) constant.

From Tables (6,7) C(1) is the coefficient of the cointegration equation (error correction term). To accept the result of the model, the coefficient signal must be negative and the coefficient should be statistically significant which indicates that there is a long run causality running from independent variables to (FD). From Tables (6,7) we can see that the sign of the coefficient C(1) of cointegration equation is negative and significant, with probability level of 1% percent. So, there is a long run causality running from independent variables to(FD). Moreover, we check that by using Wald test since the test statistic of Chi-square is (105.9612) and the probability of it is 1% percent which means there is a long run causality running from independent variables to financial development (FD). The coefficient of the cointegration (ECM (-1))is - 0.84789with probability of 1%. This suggests that short-term imbalances are adjusted in the long run by a speed of 84.7% per year. This means that imbalance adjustment takes more than one year to be corrected.

	Coefficient	Std. Error	t-Statistics	Prob.
C(1)	-0.84789	0.082369	-10.2938	0
C(2)	0.65107	0.096416	6.7527	0
C(3)	0.01879	0.002407	7.80919	0
C(4)	0.000133	3.04E-05	4.366056	0.0003
C(5)	0.34919	0.042495	8.21713	0
C(6)	-0.029385	0.222928	-0.131813	0.8965
C(7)	-0.00224	0.001345	-1.66695	0.1119
C(8)	0.004853	0.004743	1.023198	0.3191
R-Squared	0.891006			
Adjusted R-squared	0.85085			

Table 7: D (FD) Is the Dependent Variable

The openness positively and significantly affects (FD) in Jordan in short run, since the coefficient of C(3) for D(open(-1)) is (0.01879) with significant level 1% percent. This means if the trade openness increased by one unit the (FD) will increase by (0.01879) unit in the short run, other factors remain constant. This is because increasing trade openness contributes to increasing demand for financial instruments and services and thus leads to (FD). Do & Levchenko (2004) wrote that trade openness contributes to the increase in demand for financial services and thus leads to financial development. Also, Svaleryd and Vlachos (2002) wrote that trade openness generates demand for financial products, including trade finance instruments. This result steady with the results of the studies of Badeeb and Lean (2017); Khalfoui (2015); Raza, Shahzadi and Akram (2014); Baltagi, Demetriades, and Law (2009).

GDP per capita has a significant and positive impact on the (FD) in Jordan in the short term. The coefficient of C(4) for D(GDPPC(-1)) is 0.000133 and significant level 1% percent this indicates that if the GDP per capita increased by one unit (FD) will increase by 0.000133 unit in the short run other factors remain constant. This is because the increase in (GDPPC) leads to an increase in demand for a variety of financial instruments and services, which enhances (FD). Allen and others (2012) attributed this to an increasing per capita GDP allows for increased provision of financial services and this spur financial development. Greenwood & Jovanovic (1990) suggested that high economic growth rates reduce the cost of transactions and financial intermediation and the result of that is increased competitiveness in the financial sector and enhanced (FD). Levine (2005) wrote that income per capita is an important increasing (FD). Jaffee and Levonian (2001) suggested that the improved of per capita GDP indicates improved living standards and quality of human capital and is essential for (FD). The result is steady with the result of Badeeb and Lean (2017); and Raza, Shahzadi and Akram (2014).

Foreign direct investment (FDI) has a positive and significant impact on (FD) in Jordan in the short run. Since the coefficient of C(5) for D(FDI(-1)) is (0.34919) and significant level of 1% percent this indicates if the (FDI) increased by one unit (FD) in Jordan will increase by (0.34919). This is because the fact that the increase in the flow of (FDI) leads to an increase in demand for financial instruments and various financial services. That contribute to improving the financial development of the country. Belloumi (2014) suggested that the FDI flows to host countries play a significant role in increasing funds for investment and increasing the money supply. (Hermes & Lensink, 2003) Wrote that to ensure the flow of (FDI) into the country needs a specific level of (FD). The result of this study is not going with results of Khalfoui (2015).

Tax revenues has any impact on (FD) in Jordan the short run. Since the coefficient of C(6) for D(TAXR(-1)) is (-0.029385) and significant level of 0.8965. The negative relationship is due to that the higher tax revenues are curbing the financial sector and thus slowing (FD). Tatom and Ott (2006) wrote that increased tax rates reduce demand for money and curb financial institutions.



Inflation (INF) has any impact on (FD) in Jordan in the short run. Since the coefficient of C(7) for D(INF(-1) is (-0.00224) and significant level of 0.1119. This is referrers to that inflation rates have not been high enough to impact in a significant level. while the negative relationship is due to that inflation depresses the demand for financial intermediation, which leads to a decline in (FD). Boyd, Levine, and Smith (2001) wrote high inflation confines the capability of the financial system to allocate financial resources effectively, thereby reducing (FD). This result is consistent with the result of Badeeb and Lean (2017).

From Tables (6 and 7) the impact of the (FD) 1st difference and first lag of (FD) D(FD)-1 has a positive and significant impact on (FD) in Jordan, the D(FD)-1 coefficient is 0.65107 and the probability is 1% percent. This means that the preceding values of (FD) contribute positively and effectively to increase (FD) in Jordan.

In addition, we used Wald test to check whether jointly trade openness (open) D(OPEN(-1), GDP per capita D(GDPPC(-1), foreign direct investment D(FDI(-1), tax revenues D(TAX(-1), inflation D(INF(-1), have a short-term causal relationship from it to D(FD). This finding suggests a short-term causal relationship since the Wald test statistic value of Chi-square is 129.8172 and the probability of it is 1% percent.

From tables (5, 6) the results show that  $R^2$  and adjusted  $R^2$  are 0.891006 and 0.85085 respectively which indicate that the independent variables can explain 92.2% from the changes in GDPG.

#### 4.6. Residual Diagnostics Test for the Model

Model reliability has been tested to ensure that the model meets the requirements of a good regression model. The diagnostic tests result in tables (8,9,10), Breusch-Godfrey Serial Correlation LM Test, Heteroskedasticity Test: Breusch-Pagan-Godfrey and Jarque-Bera. These results indicate that the model passed the tests of self-correlation, heterogeneity and normal distribution where their significant values is more than 5%.

F-statistic	1.028942	Prob. F(1,18)	
Obs*R-squared	1.459957	Prob. Chi-Square(1)	0.2269

Table 8: Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.512897	Prob. F(12,14)	0.8734
Obs*R-squared	8.245134	Prob. Chi-Square(12)	0.7657
Scaled explained SS	3.057278	Prob. Chi-Square(12)	0.9951

Table 9: Heteroskedasticity Test: Breusch-Pagan-Godfrey

Jarque-Bera	0.599024
Probability	0.741180

Table 10: Normality Test

### 5. Conclusions and Policy Implication:

The study concludes that Trade openness (OPEN) has a positive and significant impact on (FD) in Jordan. This is because the fact that the increase in trade openness leads to an increase demand for financial instruments and services, which stimulates financial development. So, in general the regression results show that the trade openness (OPEN) is deemed as a good determinant for (FD). Economic growth (GDPPC) has a positive and significant impact on (FD) in Jordan. This is because the increase in economic growth rates leads to an increase in demand for various financial instruments and this undoubtedly encourages financial institutions to provide all the sophisticated financial instruments required which promotes (FD). Increased rates of economic growth also lead to an abundance of funds and lower costs of financial intermediation among financial institution and this promotes (FD). So, the results indicate that economic growth (GDPPC) is considered as a good determinant for (FD) in Jordan. Foreign Direct investment (FDI) has a positive and significant impact on (FD) in Jordan., This is because to that the Foreign direct investment contributes to the provision of funds, and modern technology, increase production and economic growth, in addition to that it needs to and advanced financial instruments and services, This contributes to improving the level of (FD) for countries that welcome (FDI). So, the results show that economic growth measured by GD per capita (GDPPC) is considered as a good determinant for (FD) in Jordan. While Tax revenues (TAXR) and inflation (INF) have a negative but not important impact on (FD) in Jordan. This is attribute to these variables did not grow enough to affect significantly on financial development. so, the results show that Tax revenues (TAXR) and inflation (INF) are not a good determinant of (FD) in Jordan. In addition, the results of Cointegration test and VECM results show that Trade openness (OPEN), GDP per capita (GDPPC), Foreign direct investment (FDI), tax revenues (TAXR) and inflation (INF) has a long run relationship with (FD) in Jordan.

### 6. Recommendations

The Jordanian government should work to preserve trade openness, increasing GDP per capita and increasing attracting foreign direct investment due to its positive and significant effects on the financial development in Jordan. The Jordanian government should follow economic and financial policies that ensure low inflation rates and low tax rates to

avoid their adverse effects on the financial development in Jordan. Further studies on the determinants of (FD) are proposed using more variables that have not been used.

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