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Empirical Study: Measuring the Impact of International Finance on Economic Growth in the Egyptian Context

Amina Yacoub[1], Prof. Dr. Taha Kassem[2], Prof. Dr. Ali Abd Elwahab[3]

[1]Marketing Department, Arab Academy for Science and Technology, Alexandria, Egypt
[2]Political Science Department, Arab Academy for Science and Technology, Alexandria, Egypt
[3]Economics Department, Faculty of Economics Studies and Political Science, Alexandria University, Egypt

Correspondence Author: Amina Yacoub, Marketing Department, Arab Academy for Science and Technology, Alexandria, Egypt
E-mail: - aminayacoub80@gmail.com

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Abstract

Our aim of this study was measured the impact of different sources of international funding on economic growth in the Egyptian context based on the quantitative approach. It also aims to identify the relative importance of each source compared to other sources and to other variables that may affect the economic growth. The effect of different sources of international funding on economic growth is measured either the short or long term through this period 1980 to 2018. Therefore, the researcher will be able to figure out the suitable method for improving the performance of these sources, and choosing the optimum source of funding, which in turn will improve the economic growth in the future. This study will discuss the methodology that is adopted by the researcher to endorse the arguments of the study. It also sheds light on the research method that will be applied to test the validity and reliability of correction of the hypothesis through the quantitative method depending on the ARDL (autoregressive distributed Lag) co-integration. It is a technique used in determining the long run relationship between series with different order of integration. The re-parameterized result gives the short-run dynamics and long run relationship of the considered variables. Some of the deficiencies include: identifying the co-integrating vector(s) where there are multiple co-integrating relations; applicability when one co-integrating vector of different order exists.

Keywords: Autoregressive Distributed Lag, External Debts, Gross Capital Formation, External Trade, Employment Rate, Foreign Direct Investment

INTRODUCTION

International financial resources have a significant impact on economic growth, and this study will deal with some forms of international financial resources that affect economic growth; foreign direct investment, aids and grants and loans.

Foreign Direct Investment:

According to (Kimuli, 2012) foreign direct investment has an increasingly important role in developing capital deficient developing countries. This is because it is a stable source of foreign inflows, but it also helps in technological transfer and employment.

They were conforming to Uduak et al. (2014), investment - whether public or private, domestic or foreign – is crucial to the socio-economic transformation of any economy. In the 1970s and 1980s, many developing countries had policies of trade restrictions and capital controls, which were implemented to protect indigenous industries from their foreign counterparts' domineering influence and conserve foreign exchange reserves. The distortion of social and private returns to capital resulted from the user policies, which reduced foreign, direct investment (FDI) flows to the countries. FDI can be divided into few types according to views between investors and recipients (host country). For investors' point of view, there are two types of FDI; horizontal and vertical (Herger and Mccorriston, 2016). Horizontal, vertical, Greenfield, Joint venture, Merge and acquisition.

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A. Greenfield Investment:

A company that wishes to own a foreign subsidiary outright may start from a Greenfield investment by building new facilities or expanding existing facilities. The establishment of industrial plants and facilities at export processing zones (EPZs) are examples of Greenfield investment in Bangladesh (Herger and Mccorriston, 2016).

B. Merger or Acquisition:

A merger or acquisition occurs when a foreign firm purchases the existing assets of a local firm. For example, in 2004, a major global telecommunications firm called Orascom purchased 100% of ShebaTelecom (Pvt.) Ltd. in Bangladesh. This acquisition was used to start a business known as "BanglaLink," a wholly-owned Orascom subsidiary (Herger and Mccorriston, 2016).

C. Joint Venture (JV):

A joint venture can be established in several ways. First, when an international company joins with a local company (or with another international company) to form a corporate entity. Alternatively, the international company could join with the government of the country of investment to form a corporate entity. For example, Grameen Phone (GP) in Bangladesh is a JV formed by Telenor of Norway and Grameen Telecom of Bangladesh.

D. Horizontal FDI:

It refers to the situation where a company invests in the same industry abroad that they are involved in at home (Foreign Direct Investment, 2009). In the JV example described above, Telenor was a significant competitor in the telecommunications market in Norway, prior to entering the Bangladesh telecommunications market by forming a JV with local firm Grameen Telecom.

E) Vertical FDI:

It has two forms:

(1) Backward vertical FDI that involves investing in an industry which provides inputs for the investing firm's domestic production.

(2) Forward vertical FDI that involves investing in an industry which sells the output of the investing firm's domestic production (Foreign Direct Investment, 2009).

Loans

According to Akinwunmi1 & Adekoya (2018), countries all over the world relied on each other on social, political, economic, finance and security grounds and as a result of this self—insufficiency, the countries tend to depend on each other's for survival which is good to know that, majorly, the developing countries are most vulnerable because of their characteristics. Developing countries are countries characterized with less developmental growth, low per capital income, increase in poverty and unemployment rates, high budget deficits, high inflation rate, low savings and investment, underutilization of natural resources, lack of efficient industries and enterprises, lack of capital and technology, backward human resources, the existence of infrastructural gap to mention but a few. All these factors are responsible for the growth decadence that most developing countries are facing, and since they do not have sufficient resources to solve these problems, most of them resort to foreign borrowing for sustainability.

As mentioned by shehu and Aliyu (2014), every government especially the developing countries borrows to achieve dual major macroeconomic goals such as higher investment or higher consumption i.e. education and health or to finance the transitory balance of payment or to finance the transitory balance of payment deficit, to lower nominal interest rates abroad, lack of domestic long term credit or to circumvent hard budget constraint. Thus, economy indulges in borrowing to boost economic growth, reduce poverty, and limit people's suffering from macro-economic instability policies that distort economic incentive or sizeable adverse economic instability policies that distort economically. As a result of this, growth is likely to increase and allow for timely debt payment. When the circle is maintained for some time, growth will positively affect per capita income, a prerequisite for poverty reduction.

Foreign Aid:

According to Hannan (2020), foreign aid is not new, but its definition and it is being practised today are relatively novel concepts. It can be understood as the transfer of capital, commodities, and other things from a country or international organization to another to benefit the recipient country and its population. Generally, foreign aid is given on economic, development, disaster management and humanitarian ground. In agreement with (Ali Abd El Wahab), it represents the transfer of foreign capital from donor country governments to developing countries. In the case of grants, there is no obligation on the recipient countries to pay the donor countries, while in the case of grants, the payment will be on concessional terms. Aid is considered a desirable source by developing countries, given that they do not have obligations to pay in the future, and since most of these grants and aid are usually conditional, political considerations play a large role. They were not provided regularly; this limits their effectiveness as a source. It is one of the sources of external financing for economic development in developing countries and reduces these countries' dependence on them. Therefore, their contribution to financing economic development operations in developing countries is limited and unstable.

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According to Edward& Karamuriro (2020), the role of foreign aid to economic growth continues to attract considerable attention. Economic growth can be stimulated by aid flows by supplementing domestic savings, thereby increasing investment and capital stock. Gains in poverty reduction and improved standards of living are directly related to healthy economic growth patterns. The effectiveness of aid in growth and poverty reduction enhancement presupposes that viable projects have to be identified and managed and meet the conditions for budgetary support. Increasing the effectiveness of aid requires that developing countries improve the welfare of their most impoverished populations. For this reason, foreign aid must be genuinely focused on development priorities set by developing countries. To enable this to happen, donors and developing countries should establish genuine partnerships, in which they are jointly and mutually responsible for development results. This calls for developing countries to fundamentally shift how they do business and focus on viable projects to benefit from foreign aid inflow.

Description of the Research Model and Identification of Research Variables

The current research model is used for measuring different sources impacts of international funding on economic growth in the Egyptian context. The current research model is based on the quantitative approach and derived from the Extended Solow Growth Model (ESGM), which in turn depends on Cobb-Douglas Aggregate Production Function (C-DAPF), assuming size is constant (Hawaid and Raza, 2012, P.7). The Extended Solow Growth Model was used for several reasons (Bhaskara, et al., 2008, P. 16); one of which is that ESGM considers economic growth as an endogenous variable, while other variables may affect economic growth are considered as exogenous variables. This model can include other exogenous variables, rather than the ones identified by the model, giving the research a chance to include other variables according to the research aim and objectives. Another reason for using ESGM is that it is easy to estimate the model, which makes it easy to estimate the impact of exogenous variables, such as; Foreign Direct Investment, Funding, and Foreign Loans on the exogenous variable; Economic Growth. A third reason for using ESGM is that no other models are considered better than the Extended Solow Growth Model.

The ESGM depends on Cobb-Douglas Aggregate Production Function, presented as follows (Solow, 1956, PP. 65- 96):

$$\boldsymbol{Y_t = A_t K_t^{a} L_t^{(1-a)}} \quad \textit{(1)}$$

Where: Y: is the total production level.
K: capital in the population.
L: labour.
A: is the technology level or the technical knowledge present in the population.
α and (1- α): are the elasticity levels of production concerning capital and labor respectively, where 0 < α < 1, (i.e. α is positive).

Dividing both sides of the equation by the units of labor used, the following equation is observed (Bhaskara et al., 2008, P. 17):

$$\boldsymbol{Y_{lt} = A_t K_{lt}^{a}} \quad \textit{(2)}$$

Where: Y_{lt}: is the average production level per capita.
K_{lt} : is the average capital level per capita.
A_t: is the average level of technology or technical knowledge present in the population.

Equation (2) represents an adequate identification of the Steady State Growth Rate, where it is assumed that technological development is an exogenous variable in the Extended Solow Growth Model. Therefore, it could be claimed that (Bhaskara & Chaitanya, 2009, P. 6):

$$\boldsymbol{A_t = A_0 e^{gT}} \quad \textbf{(3)}$$

A0: The initial credit of the technical knowledge in the population, where this credit increases with a constant value (g) across time (t). Therefore, this steady-state growth rate (SSGR) is equal to this constant value (g). Therefore, it could be claimed that:

$$\boldsymbol{Y_{lt} = A_0 e^{gT} K_{lt}^{a}} \quad \textbf{(4)}$$

Accordingly, the production level's growth rate per labor is equal to (g) in equation (4), which is affected by several factors that affect the Total Factor Productivity across time.

One of these critical factors is considered in the improvements that take place in the human capital related to the educational and health services of the workforce, foreign direct investment, funding, foreign loans, trade openness, organizational and political reform.

This means that equation (4) could be presented in general for equation (5), as follows:

$$\boldsymbol{Y_{lt} = A_0 e^{(g_0 + g_1 x_1 + g_2 x_2 + \ldots)T} K_{lt}^{a}} \quad \textbf{(5)}$$

Accordingly, the factors that affect the total factor production (TFP) are represented in the parameters (g_1, g_2, g_3, ...), while the time effect is presented in the constant value of the intercept (g_0). Despite this, the equation presented does not include all the factors that may affect the TFP because the variables presented in the equation affect each other and have the same direction. Therefore, the researcher focuses on this research on the essential variables concerning TFP because it is difficult to estimate the effect of each variable on TFP accurately, assuming other variables are held constant. One of these crucial factors that could be considered is the international sources of funding. After reviewing literature are shown in chapter two, the researcher

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focuses on variables that are related to the external resources flows and their impact on economic growth, namely; foreign direct investment, funds, foreign loans, trade openness, as well as local investment and employment level which act as a control. Accordingly, Suggested model function for this research could be stated as follows:

$$GDPPG_t = f(FDI_t, AAO_t, EXD_t, GCF_t, EM_t, OPN_t) \quad \textbf{(6)}$$

Also, the suggested research model, after applying some measurement transformations could be stated as:

$$GDPPG_t = \beta_0 + \beta_1 FDI_t + \beta_2 LnAAO_t + \beta_3 LnEXD_t + \beta_4 LnGCF_t + \beta_5 LnEM_t + \beta_6 LnOPN_t + u_t \quad (7)$$

where: **$GDPPG_t$:** is the gross domestic product per capita, which is used as an indicator to the economic growth. The increase of $GDPPG_t$ indicates an increase in economic growth across time.

FDI: is the net foreign direct investment presented in a million dollars using the current prices. The increase in FDI indicates the increase in foreign investments, which in turn increases job opportunities and the exchange of knowledge and technology development. These factors affect economic growth positively, which let the corresponding parameter (β_1) greater than zero.

AAO: is the flow of grants and aids and funds for development, which are obtained as a percentage of the domestic production. The increase in AAO indicates the increase in grants and aids, which increases the economic growth in the positive direction, which let the corresponding parameter (β_2) greater than zero.

EXD: is the external debts as a percentage of the domestic production, which indicates foreign loans. The increase in EXD indicates an increase in foreign loans, which increases the commitments based on such loans. This means that the government should save parts of the foreign cashflows from facing such loans, including its instalments and interest. This in turn, affects the foreign cash flows negatively and economic growth, allowing the corresponding parameter (β_3) less than zero.

GCF: is the formation of capital in the population presented million dollars, which indicates total domestic investments. The increase in GCF indicates an increase in domestic investments, which in turn increases the employment level as well as productivity. Such increase affects the positive direction's economic growth, which let the corresponding parameter (β_4) greater than zero.

EM: is the percentage of employment of the total labor force, which indicates the employment level. The increase in EM indicates an increase in the employment level, which decreases the unemployment rates in the population. This decrease in unemployment increases economic growth, allowing the corresponding parameter (β_5) greater than zero.

OPN: is the percentage of the external trade to the total domestic product, which is an indicator of the trade openness. The increase in OPN indicates an increase in the level of trade openness, which increases the degree of merge with the global economy and the increase in the competition level in the local market. This level of competition increases efficiency and productivity, which affects the economic growth in the positive direction, making the corresponding parameter (β_5) greater than zero.

U: is the random error term, which is supposed to be normally distributed, with mean equal to zero and constant and independent variance.

Tab. 1 shows that descriptive statistical research variables'; GDPPG, FDI, AAO, EXD, GCF, EM, OPN, included ±M, median, min., max., SD, skewness and kurtosis. It could be observed that the skewness values of the research values are almost near to zero, which agree with the normal distribution assumption. This claim could also be confirmed by observing the value of the mean and median for each variable, where it could be noticed that the mean and median for each variable are almost equal. Regarding kurtosis values, it could be observed that they are near to 3 for the research variables, indicating that the distribution is neither flattened nor steep. This means that the data is usually distributed, except for AAO, which have a positive deviation for its corresponding skewness and kurtosis values. Regarding Jarque-Bera test results, it could be claimed that the research variables are normally distributed except for FDI, AAO and GCF.

Table 1: Descriptive Statistical Research Variables'

Variables	GDPPG	FDI	AAO	EXD	GCF	EM	OPN
Mean	2.72	2817.6	3.3	53.6	21215.8	90.7	50.2
Median	2.56	1177.6	1.9	38.2	14002.8	90.6	48.3
Maximum	7.37	11578.1	14.5	131.9	50073.1	94.8	74.5
Minimum	-1.15	-482.7	0.0	13.7	5959.2	86.8	30.2
Std. Dev.	1.98	3287.3	3.3	34.5	13802.0	2.3	11.3
Skewness	0.52	1.2	1.9	0.6	0.8	0.1	0.4
Kurtosis	3.17	3.1	6.8	2.0	2.1	2.0	2.4
Jarque-Bera	1.77	9.3	46.7	3.9	5.7	1.8	1.7
Probability	0.41	0.01	0.00	0.14	0.06	0.40	0.42
Sum	106.21	109885.8	128.3	2088.5	827417.9	3536.3	1956
Sum Sq. Dev.	148.86	411000000	423.9	45142.7	7240000000	206.8	4825
Observations	39	39	39	39	39	39	39

According to the researcher using EViews Statistical Program

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Table 2 showed that, correlation matrix for correlation coefficients among the research variables, which indicates the relationship between the independent and the dependent variables, and the relationship between independent and each other. It could be observed that there is a positive but weak relationship among all sources of international funding and economic growth, except for the relationship between AAO and economic growth which shows a moderate positively (r = 0.36). In contrast, there is the negatively moderate relationship among FDI and each of AAO and EXD, as sources of international funding.

Table 2: Correlation Matrix between the Research Variables

Variables	GDPPG	FDI	AAO	EXD	GCF	EM	OPN
GDPPG	1.00						
FDI	0.17	1.00					
AAO	0.01	-0.49	1.00				
EXD	0.22	-0.53	0.65	1.00			
GCF	-0.26	0.66	-0.61	-0.74	1.00		
EM	0.59	-0.41	0.42	0.78	-0.70	1.00	
OPN	0.50	0.09	0.36	0.31	-0.40	0.39	1.00

Source: The Researcher using EViews Statistical Program

This research uses the time series analysis for data collected from 1980 to 2018. The data was collected from WDI and UNCTAD. Research variables were computed in dollars and the current prices or as a percentage of gross domestic product to keep homogeneity in the research variables measurement. Besides, some variables were transformed into the (Ln) transformation to suit more with the statistical techniques used, but the analysis reporting does not include the (Ln) to simplify the reporting.

Statistical Techniques for Analysis

The modern empirical study depends on the regression models in studying the relationship between the economic research variables, but the regression models merge between short- and long-term relationships. Such models are used when the research variables are co-integrated. The co-integration between the research variables happens when the research variables go to the stationarity state or what is called; Steady-State Equilibrium, in the long run. Therefore, regression models are used in such cases, but unfortunately, this is not the case related to generally series data that weren't stationary, which prevents the researcher from using the traditional regression models' traditional methods, leading to spurious regression models. Accordingly, the traditional tests of F-tests, T-tests, Durbin-Watson test and R-squared do not suit the time series data as it assumes the presence of co-integration between the research variables, which is not present in most of the cases.

One solution to the problem is to consider the first difference for all the research variables, but this solution eliminates the long-term relationships between the research variables (Sultan, 2011, P. 71). Such relationships are essential to economic decision-makers, especially when considering the decisions related to investments, international funding, and economic growth, including long-term relationships by nature (Christopoulos and Tsionas, 2004, P. 5).

It could be claimed that, if the time series data for each of the research variables while they were co-integrated, then, residuals were considered as stationary, which means that research variables move together in the same direction. Therefore, the steady-state equilibrium is achieved throughout the long run. Accordingly, the relationship among research variables could be measured without considering the first difference to identify the long-term relationships among research variables and our case; the ECM was used for identifying the relationship among research variables throughout short-run (Vazakidis and Adamopoulos, 2010, P. 581).

Therefore, the co-integration method is used in this research to measure the effect of sources of international funding, foreign direct investments, foreign loans and grants on the economic growth for Egyptian context through the past four decades. The co-integration is applied using several methods as found in literature, but the most common methods used are Engle-Granger two-stage (EG) and Johansen Maximum Likelihood (JML) (Shahbaz et al., 2008 P. 476). These methods needed our research variables and they are considered as inferior methods in case of small sample size. Therefore, the researcher conducts the bound tests using Auto-Regressive Distributed Lag (ARDL) technique, which depends on UECM. This model was derived in 1995 and developed in 2001(Pesaran et al., 2001, P. 16).

ARDL is considered a dynamic regression model, as it includes lag lengths, which allows measuring relationships among research variables, either short or long run using the ordinary least squares method (OLS). Also, ARDL is considered better that each of EG and JML in co-integration testing due to the following reasons (Rahman and Salahuddin, 2000, PP. 10,11; Narayan and Narayan, 2005, P. 429; Koay and Choong 2013, P. 510):

1- ARDL could be used even if there is a difference in the integration order of the research variables.
2- ARDL depends on UECM, which had better statistical properties in manipulating residuals in the short run.
3- ARDL has better results in case of small sample sizes.
4- ARDL allows for entering more lag length until achieving the optimum result.
5- ARDL considers the hierarchical variations in time series data across time.

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Till begin of 1990, static regression dominated for kinds of literature. All variables were stationary, macroeconomic data were proved and non-stationary, OLS estimator doesn't produce reliable, and regression tended to become spurious. Studies were used more variables in their models for obtained those static variables; in this case, more important information in the long-run analysis would be lost.

Co-integration approach was attractive in long run studies (Stock, 1987). There were integration and co-integration restrictions where the model has to overcome to apply for approach. ADF test (Dickey and Fuller, 1979) was used for examining stationarity status for variables. Pesaran, et al. (2001) reported the ARDL approach of co-integration could apply and yields consistent estimate in long-run. ARDL approach permitted the different number of lags to every regressor to capture the framework's data generation process (Feridun, 2009). Monte Carlo result indicated ARDL approach properly even if the model had endogenous regressors and SE for estimated coefficient were standard normally, and standard critical value could using and the diagnostic test could be performed to evaluating statistical performances for different models (Song et al., 2009).

ARDL approach included many steps. 1- Optimal numbers for lags for the variables, used appropriate information's criteria's, (as AIC and SIC). 2- Bounds test involves assessment of UECM for testing for existence in long-run steady states relationship among dependent and explanatory variables. We could assess UECM (p, q, m, n, s, v, u) Equation (2).

$$\Delta GDPPG_t = \sigma_0 + \sum_{i=1}^{p-1} \sigma_{1i} \Delta GDPPG_{t-i} + \sum_{i=0}^{q-1} \sigma_{2i} \Delta FDI_{t-i} + \sum_{i=0}^{m-1} \sigma_{3i} \Delta LNAAO_{t-i} + \sum_{i=0}^{n-1} \sigma_{4i} \Delta LNEXD_{t-i} + \sum_{i=0}^{s-1} \sigma_{5i} \Delta LNGCF_{t-i} + \sum_{i=0}^{v-1} \sigma_{6i} \Delta LNEM_{t-i} + \sum_{i=0}^{u-1} \sigma_{7i} \Delta LNOPN_{t-i} + \rho GDPPG_{t-1} + \theta_1 FDI_{t-1} + \theta_2 LNAAO_{t-1} + \theta_3 LNEXD_{t-1} + \theta_4 LNGCF_{t-1} + \theta_5 LNEM_{t-1} + \theta_6 LNOPN_{t-1} + \epsilon_t \dots\dots\dots\dots\dots\dots\dots\dots (8)$$

p, q, m, n, s, v, u were optimal lags of level for regressors $GDPPG_{t-i}$, FDI_t, $LNAAO_t$, $LNEXD_t$, $LNGCF_t$, $LNEM_t$, and $LNOPN_t$, Δ was first difference operator, and σ_0 is a drift component. Left Equation side (1) was economic growth /capita ($GDPPG_t$). The right side of the equation was an explanatory variable for one lag in level, and in differences with optimal lags. Parameter σ_{si} corresponded for short-run relation, and ρ and θ_s corresponded for long-run relations; ϵ_t was random errors.

Wald or F-statistic using for tested joint significance for lagged levels for variables of UECM, and determined long-run equilibrium under null hypothesis for no co-integration ($H_0: \rho = \theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = \theta_6 = 0$) against alternative a long-run relations ($H_1: \rho \neq \theta_1 \neq \theta_2 \neq \theta_3 \neq \theta_4 \neq \theta_5 \neq \theta_6 \neq 0$) Equation (1) according to t Pesoaran, et al. (2001) while, Pesaran, et al. (2001) computed 2 asymptotic critical values to give levels significantly in including and excluding trend. First assumes type where variables are I (1), and the other assumed all variables were I (0). If Computed Wald or F-statistics exceed an upper critical value, null hypothesis will reject, and underlying variables would be co-integrated. When Wald or F-statistics were below the critical value, null could not be rejecting, and variables would be not co-integrated. Finally, in case, Wald or F-statistic values lied among 2 bounds, test would be inconclusive.

Once long-run relationship had established by bounds test, long-run relations could be estimated as $\beta_j = \frac{-\theta_j}{\rho}$. Since j represents independent variables (Equation (1)), $\beta_j s$ were long-run coefficients of different independent variables.

The second step in ARDL, was estimated ECM include errors of long-run estimation lagged one period, First difference of variables and lags, (Equation, 3).

$$\Delta GDPPG_t = \sigma_0 + \sum_{i=1}^{p-1} \sigma_{1i} \Delta GDPPG_{t-i} + \sum_{i=0}^{q-1} \sigma_{2i} \Delta FDI_{t-i} + \sum_{i=0}^{m-1} \sigma_{3i} \Delta LNAAO_{t-i} + \sum_{i=0}^{n-1} \sigma_{4i} \Delta LNEXD_{t-i} + \sum_{i=0}^{s-1} \sigma_{5i} \Delta LNGCF_{t-i} + \sum_{i=0}^{v-1} \sigma_{6i} \Delta LNEM_{t-1} + \sum_{i=0}^{u-1} \sigma_{6i} \Delta LNOPN_{t-1} + \varphi EC_{t-1} + \cdots\dots\dots\dots\dots\dots \omega_t. (9)$$

where σ_{si} were short-run, and φ was adjustment speed toward long-run steady state equilibrium. Models hadto undergo many statistical checking as autocorrelation, heteroscedasticity and stability to ascertain statistical reliability.

Our model applies for measuring effects of 3 international sources of funding mentioned pre on economic growth in Egypt (1980 to 2018) depending on co-integration method as:

1- Co-integrations analysis among research variables by used ARDL method, which implies that there is a co-integration relationship between endogenous variables, which ensures the achievement of long-term state equilibrium. Co-integration among research variables is tested on 2 stages:

a. The unit root test to determine stationarity level of research variables. Accordingly, the researcher can determine the integration order for each of research variables. In addition, the researcher can determine the optimal lag length for the research variables using AIC method.

b. Testing co-integration, where the dependent variable is the economic growth, while the independent variables are foreign direct investments, foreign loans, grants. In addition, the control variables are total local investments, employment level and trade openness.

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2- Estimation of relationships between the research variables in the long run, after confirming the presence of co-integration. The ARDL technique is applied to estimate the model parameters in the long run.
3- Estimation of the relationships between the research variables in the short run, where the relationships between the research variables are identified in the short run using the error correction model (ECM).

Co-Integration Analysis

The co-integration analysis is conducted as been explained above by applying the unit root test as well as applying the co-integration test.

Unit Root Test for Stationarity

The stationarity level for data understudy was a critical assumption the researcher should verify before estimating the model parameters to ensure the results' accuracy. The stationarity of a research variable is assumed if three properties are satisfied, which are: (1) the data mean value is constant across time, (2) the variance does not change across time, and (3) the autocorrelation eliminates with the increase of its order, which means that the covariance is constant across time.

The stationarity of the data was found to be significant due to the fact that the stationarity level prevents the researcher from obtaining spurious. Also, the effect of shocks on the stationary data is temporary and eliminates across time, as it returns back to its constant mean value across time.

The unit root test uses for identified stationarity level of time series data and at which level of difference data becomes stationary, which in turn identifies the integration order for the research variables. In addition, the ARDL analysis allows measuring the relationships between variables with different integration order, I (0) or I(1). Accordingly, some researchers claim that there is no need to conduct the unit root test in advance, but this claim is not always right, as sometimes the data stationarity is achieved at higher integration orders, which contradicts with the ARDL method assumption of having I(0) or I(1) only.

Table 3 displays the unit root test results for the research variables in its original form as well as the data in its transformed forms of first difference using the Augmented Dickey Fuller (ADF) test.

Table 3: Unit Root Tests According to the Appropriate Deterministic Trend

Variables in levels	Trend Specification	ADF	Variables in differences	Trend Specification	ADF
$GDPPG_t$	Constant	-3.782 (0.007)	-		
FDI_t	Constant +trend	-3.694 (0.036)	-		
$LNAAO_t$	Constant + trend	-4.999 (0.001)	-		
$LNEXD_t$	constant	-1.536 (0.505)	$\Delta LNEXD_t$	none	-3.934 (0.000)
$LNGCF_t$	constant+ trend	-2.724 (0.233)	$\Delta LNGCF_t$	none	-4.212 (0.000)
$LNEM_t$	Constant + trend	-3.719 (0.034)	-		
$LNOPN_t$	Constant	-4.311 (0.002)	-		

ADF unit root test is performed and the results are reported in this table. At the 5% level of significance, the results indicate that $GDPPG_t$, FDI, LNAAO, LNEM, and LNOPN are found to be stationary variables, $I(0)$. The rest of the variables in the model – LNEXD, and LNGCF - are non-stationary in levels, but stationary in first differences, $I(1)$ variables, according to the appropriate specification of each series. However, we proceed by estimating the co-integration relation of the model's variables, since we use the ARDL technique which permits a co-integration relationship to exist irrespective of whether the variables have the same integrating order or not, mostly $I(0)$ and $I(1)$.

The co-integration test and parameters estimates in both; short and long term imply the identification of Optimal Lag Length for the research model's endogenous variables. The Optimal Lag Length is identified using the AIC method, as shown in Table 1 and Figure 1. It could be observed that the optimal lag length is 3, like a maximum number of lags.

Co-integration Test

The co-integration between the research variables is obtained using the Bound test to identify the extent to which the phenomenon of co-integration may be present between the research variables and determine if there is a significant long-term relationship between the research variables or not.

The bound test depends on the analysis of PSS F-Test, through which the F-statistics is computed to test the significance of the parameters for the long-term relationships. Then, the obtained values are compared with the critical values obtained for the tabulated PSS. Suppose the computed F-statistics value is greater than the tabulated critical value. In that case, the null hypothesis

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(H_0) is rejected, which claims that there is an insignificant long-term relationship between the research variables and the alternative hypothesis (H_1) is supported, which claims that there is a significant long-term relationship between the research variables, in case of I (0) or I(1). On the other hand, If the computed F-statistics value is less than the tabulated critical value, the null hypothesis (H_0) is supported, claiming an insignificant long-term relationship between the research variables. Such test results are considered better than traditional tests (Shahbaz et al., 2008, P. 476).

Table 4 shows the bounds test results using the Wald test and by computing the F-statistics and comparing it with the tabulated values to test the null hypothesis versus the alternative hypothesis.

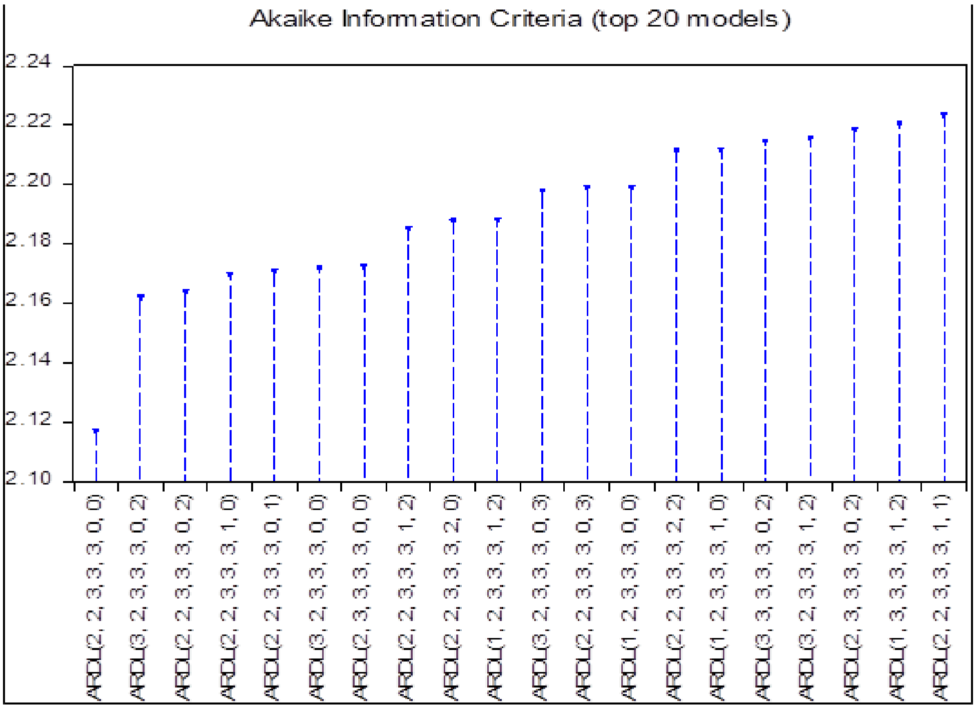

Figure 1: Optimal Lag Length Selection according to AIC. **Source:** The Researcher using EViews Statistical Program

Table 4: The Results of F-Statistics for Co-Integration Relationship

Critical value	Significance level		F-Statistic
	1%	**5%**	
Minimum value I (0)	**3.15**	**2.45**	**15.193**
Maximum value I (1)	**4.43**	**3.61**	

Note: The critical value of F is calculated at 6 independent variables Constant without time trend is included in the model.
Source: The Researcher using EViews Statistical Program.

Critical values are obtained from Pesaran, et al., (2001), "Bounds testing approaches to the analysis of level relationships", ***Journal of Applied Econometrics***, Vol. 16, Iss. 3, Table CI (iii), PP. 300

The null hypothesis of no co-integration is rejected at the 1% level of significance, indicating that there is a co-integration relation among economic per capita growth and its essential determinants (FDI, LNAAO, LNEXD, LNGCF, LNEM, LNOPN) at the 1% level of significance. Therefore, we can proceed by estimating the long-run relationships between these variables.

Relationship between the Research Variables in the Long Run

After confirming co-integration between the research variables using the bound tests, as shown above, the long-term relationship between the research variables is tested using ARDL. Therefore, the model for the long-term effects could be stated as follows:

$$GDPPG_t = \beta_0 + \sum_{i=1}^{p} \beta_{1i}\, GDPPG_{t-i} + \sum_{i=0}^{q} \beta_{2i}\, FDI_{t-i} + \sum_{i=0}^{s} \beta_{3i}\, LnAAO_{t-i} + \sum_{i=0}^{m} \beta_{4i}\, LnEXD_{t-i} + \sum_{i=0}^{n} \beta_{5i}\, LnGCF_{t-i} + \sum_{i=0}^{n} \beta_{6i}\, LnEM_{t-i} + \sum_{i=0}^{n} \beta_{7i}\, LnOPN_{t-i} + U_t \quad \ldots\ldots(10)$$

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Where p, q, s, m, n represent the optimal number of the lag length that had been determined using AIC. Also, $\beta_1, \beta_2, .. \beta_7$ are the parameters required to be estimated in the long term and present the elasticity between the independent variables and the dependent variable; economic growth.

Applying general to specific approach (Hendry, 1995) for the analysis using the ordinary least squares method, where the researcher eliminates the variables showing the insignificant effect on the dependent variable, starting by the least significance and then re-estimating the parameters after deleting the insignificant variables till the researcher reaches the optimum model that includes the significant variables only (Dutta and Ahmed, 2004, P. 610). Applying the normalization process, if required, the researcher obtained the estimated values of parameters by finding out the values of the independent variables through observing the dependent variable values, where it could be claimed that $GDP_t = GDP_{t-1}$. Table 5 illustrates the research variables and their significance.

Table 5: Long-Run Results of ARDL (2,2,3,3,0,0) Co-Integration Approach

Independent Variable	Coefficient	T-statistics	P-value
FDI_t	-0.0003	-2.658	0.017
$LNAAO_t$	2.222	4.068	0.001
$LNEXD_t$	-3.340	-4.896	0.000
$LNGCF_t$	2.784	2.575	0.020
$LNEM_t$	69.210	6.850	0.000
$LNOPN_t$	5.368	4.695	0.000
R^2		0.943	
Adj. R^2		0.874	

Source: The Researcher using EViews Statistical Program.
***, **, * indicate significance at the 1%, 5% and 10% levels respectively. Note: B-G LM test, B-P-G heteroscadasticity, JB, and RESET are respective Breusch-Godfrey Lagrange Multiplier statistics for residual autocorrelation, Breusch-Pagan-Godfrey test of heteroscedasticity, Jarque-Bera of non-normality test and Regression Equation Specification Error Test.

Relationship between the Research Variables in the Short Run

The last step in the analysis for estimating the model parameters for the short-term relationships using the ECM. This approach is applied by considering the error estimated from the long-term model in the new model of the short-term model, while considering the lag length in addition to the first difference of all the research variables. Therefore, the ECM could be presented in Equation 11, as shown below:

$$\Delta GDPPG_t = \sigma_0 + \sum_{i=1}^{p-1} \sigma_{1i} \Delta GDPPG_{t-i} + \sum_{i=0}^{q-1} \sigma_{2i} \Delta FDI_{t-i} + \sum_{i=0}^{m-1} \sigma_{3i} \Delta LNAAO_{t-i} + \sum_{i=0}^{n-1} \sigma_{4i} \Delta LNEXD_{t-i} + \sum_{i=0}^{s-1} \sigma_{5i} \Delta LNGCF_{t-i} + \sum_{i=0}^{v-1} \sigma_{6i} \Delta LNEM_{t-1} + \sum_{i=0}^{u-1} \sigma_{6i} \Delta LNOPN_{t-1} + \varphi EC_{t-1} + \cdots \ldots \ldots \ldots \ldots \omega_t. \quad (11)$$

where:

Table 6: Short-Run Results of ARDL (2,2,3,3,0,0) Co-Integration Approach

VARIABLES	Coefficient	T-state	P-value
Constant	-455.665	-12.102	0.000
$\Delta GDPPG_{t-1}$	-0.160	-2.334	0.033
ΔFDI_t	0.0002	2.354	0.032
ΔFDI_{t-1}	0.001	7.978	0.000
$\Delta LNAAO_t$	0.255	2.164	0.046
$\Delta LNAAO_{t-1}$	-2.910	-10.962	0.000
$\Delta LNAAO_{t-2}$	-1.393	-4.979	0.000
$\Delta LNEXD_t$	-2.389	-3.270	0.005
$\Delta LNEXD_{t-1}$	4.467	5.746	0.000
$\Delta LNEXD_{t-2}$	5.073	5.267	0.000
$\Delta LNGCF_t$	2.521	2.599	0.019
$\Delta LNGCF_{t-1}$	2.331	2.149	0.047
$\Delta LNGCF_{t-2}$	5.290	5.533	0.000
φ_{t-1-1}	-1.317	-12.093	0.000
R^2		0.957	

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Adj. R^2	0.932

Testing the Model Fit

Table 7: Results of the Statistical Tests of the Research Model

Test Type	Test Name	Statistics	Value	P-value
Autocorrelation Test	Breusch-Godfrey LM test	F-statistics	3.112	0.076
Heteroscedasticity Test	BPG hetero	Chi-Square	28.046	0.083
Normality Test	Jarque-Bera (JB)	F-statistics	5.770	0.056
Ramsey RESET test	RESET	F-statistics	0.014	0.907

CONCLUSION

This study's main idea was to examine the impact of Foreign Direct Investment and international financing recourses on Economic growth of Egypt. In the literature review, we discussed briefly previous empirical studies based on the thesis's subject to support or not the findings of our empirical analysis. In this study, the effect of Foreign Direct Investment and international financing resources on economic growth in Egypt is investigated from 1980 to 2018. Different FDI and international financing resources are used to determine the effect of each specific aspect of FDI and international financing resources on economic growth separately. The International financing recourses, FDI, Loans and Grants, Foreign Aids. The ARDL co-integration approach is applied to estimate the long run and the short-run relations simultaneously and determine the speed of adjustment toward the steady-state equilibrium. From the results discussed in the previous section, several conclusions can be drawn:

1- **FDI** has a significant negative effect on Economic Growth, which can be since most of the cashflows to Egypt through the last decades was associated with the privatization process of organizations in Egypt for the projects of the public sector. Most of the cashflows were directed to purchase the projects exposed for sale rather than being directed to establishing new productive projects that can increase the country's economic growth, which leads to a negative effect on economic growth. The estimated parameter indicates that one million dollars increase in the foreign direct investments causes a decrease in economic growth by 0.3% at a 5% significance level. This result contradicts what the researcher expects according to the literature review, but it could be justified by the absence of the basic requirements to achieve the positive effect expected in the Egyptian context.
2- **AAO** has a significant positive effect on Economic Growth. The estimated parameter indicates that 1% increase in the AAO causes an increase in economic growth by 0.02% at a 5% significance level. This result shows the importance of the grants and aids for the development process in the Egyptian context through the last four decades due to the decrease that happens in the accompanied commitments with such grants and aids.
3- **EXD** has a significant negative effect on Economic Growth, which can be because of the increase in external debts and the increase in its commitments cause several problems and achieve the required results of the economic reform program. This, of course, poses several restrictions on Egypt's economic development, leading to a negative effect on economic growth. The estimated parameter indicates that 1% increase in the external debts causes a decrease in the economic growth by 0.03% at a 1% significance level.
4- **GCF** has a significant positive effect on Economic Growth, where the increase in investments causes an increase in the employment level as well as an increase in the performance and efficiency of production. This in turn, increases the support of development processes and economic growth. The estimated parameter indicates that 1% increase in the GCF causes an increase in economic growth by 0.028% at a 5% significance level.
5- **EM** has a significant positive effect on Economic Growth. It is the most significant variable and has the highest effect on economic growth than other variables included in the model. This is referred to the fact that the increase in employment level causes an increase in the labor force utilization, which helps in supporting economic growth. The estimated parameter indicates that 1% increase in the EM causes an increase in the economic growth by 0.693% at a 1% significance level.
6- **OPN** has a significant positive effect on Economic Growth, where an increase in trade openness causes an increase in the competition in the local market, which causes an increase in the resources utilization of the country and increases economic growth and development. The estimated parameter indicates that 1% increase in the OPN causes an increase in the economic growth by 0.0537% at a 1% significance level.

It could be claimed that the results mentioned above agree with the hypotheses developed from the literature regarding the effect of the explanatory variables on Economic Growth, despite the variation in the relative importance of each of these variables concerning the Economic Growth, except for the effect of FDI on Economic Growth, which was justified by the poor organizational orientation in the utilization of such resources in the Egyptian context through the past decades. It could also be noticed that R-squared for the research model was 0.87, which means that a percentage of 87% of the variation in Economic Growth could be explained by the research variables included in the model.

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The results shown above implies the fact that funding of growth in Egypt should depend on the local resources, while external sources show a negative effect on the economic growth in case of FDI and EXD, which are related with different commitments and payments that have to be done and affect the economic growth negatively. On the other hand, the grants and aids have a positive effect on Economic growth, but they are restricted to political concerns and they are not regular and not controlled, which make them not that effective.

REFERENCES

Akinwunmi.A.A & Adekoya.R.B., (2018) *Assessment of the Impact of External Borrowing on the Economic Growth of the Developing Countries-NigerianExperience* Asian Business Research; Vol. 3, No.

Bhaskara R. B., Artur T., Chaitanya V. K., (2008), Growth Effects of a Comprehensive measure of Globalization with Country Specific Time Series Data, Munich Personal RePEc Archive (MPRA), Online at: http://mpra.ub.uni-muenchen.

Bhaskara R. B., Chaitanya V. K., (2009), Growth Effects of Globalization in the Low Income African Countries: A Systems GMM Panel Data Approach, Munich Personal REPEC Archive (MPRA), Online at http://mpra.ub.uni-muenchen.de/.

Bhattarai K., (2008), Economic Theory and Models: Derivations, Computations and Applications for Policy Analyses, First Published, Serials Publication, New Delhi, India.

Christopoulos D. K. & Tsionas E. G., (2004), "Financial Development and Economic Growth: Evidence from Panel Unit Root and Co Integration Tests", Journal of Development Economics, Vol. 73, PP. 55–74, www.elsevier.com/locate/econbase.

Dutta D. & Ahmed N., (2004), "An Aggregate Import Demand Function for India: A Cointegration Analysis", Applied Economics Letters, Vol. 11, No. 10, PP. 607-613 http://www.tandfonline.com.

Edwards. S.,(1992).*Trade orientation, distortions and growth in developing countries*. Journal of Development Economics 39: 31– 57.

Hannan.A.,(2020) *No Free Lunches' and Their Efficacy: Analyzing the Role of Foreign Aid in US Foreign Policy* International Journal of Trend in Scientific Research and Development (IJTSRD) Volume 4 Issue 5.

Hannan.A.,(2020) *No Free Lunches' and Their Efficacy: Analyzing the Role of Foreign Aid in US Foreign Policy* International Journal of Trend in Scientific Research and Development (IJTSRD) Volume 4 Issue 5.

Hawaid S. T. & Raza S. A., (2012), "Workers' Remittances and Economic Growth in China and Korea: An Empirical Analysis", MPRA Paper No. 39003, Online at http://mpra.ub.uni-muenchen.de/.

Hendry D. F., (1995), Dynamic Econometrics: Advanced Text in Econometrics, Oxford, UK: Oxford University Press.

Herger, N., & McCorriston, S., (2016). *Horizontal, vertical and conglomerate cross-border acquisitions.* IMF Economic Review, 64(2), 319-353. Retrieved from SSRN

Hussain, F., and Kimuli, C.K., (2012). *Determinants of Foreign Direct Investment Flows to Developing countries.* SBP Research Bulletin 8(1) :13-31.

Kalyoncu H., (2007), "An Aggregate Import Demand Function for Turkey: A Co integration Analysis", MPRA Paper, No. 4260, Online at http://mpra.ub.uni-muenchen.

Muhammed O. Z., Fatima P. I. & Omade S. I., (2011), "Co-integration Analysis of Foreign Direct Investment Inflow and Development in Nigeria", Developing Country Studies, Vol. 1, No. 1, PP. 56-66, www.iiste.org.

Narayan P. K. & Narayan S., (2005), "Estimating Income and Price Elasticities of Imports for Fiji in A Co integration Framework", Economic Modeling, Vol. 22, Iss. 3, PP. 423-438, http://www.sciencedirect.com.

Pesaran M. H., Shin Y. & Smith R. J., (2001) "Bounds Testing Approaches to the Analysis of Level Relationships", Journal of Applied Econometrics, Vol. 16, Iss. 3, PP. 289-326, http://onlinelibrary.wiley.com/.

Rahman M. M. & Salahuddin M., (2000), The determinants of economic growth in Pakistan: Does stock market development play a major role?, http://eprints.usq.edu.au/.

Shahbaz M., Ahmad K. & Chaudhary A. R., (2008), "Economic Growth and Its Determinants in Pakistan", The Pakistan Development Review, Vol. 47, No. 4, Part II, PP. 471–486, http://www.pide.org.

Shehu, U., & Aliyu, M. (2014). External Debt and Economic Growth: Evidence from Nigeria.Journalof Economics andSustainable Development,5(18).

Solow R., (1956), A Contribution to the Theory of Economic Growth, Quarterly Journal of Economics, Vol. 70, No. 1,PP 65-94, JSTOR, http://www.jstor.org.

Sultan Z. A., (2011), "Foreign Exchange Reserves and India's Import Demand: A Co integration and Vector Error Correction Analysis", International Journal of Business and Management, Vol. 6, No. 7, PP 69-76, www.ccsenet.org/ijbm.

Uduak S. Akpan ,a, Salisu R. Isihaka , Simplice A. Asongub 2014 Determinants of Foreign Direct Investment in Fast-Growing Economies: AStudy of BRICS and MINT African Governance and Development Institute WP/

UNCTAD, (2020), UNCTADstat, http://www.unctad.org/en/Pages/Home.aspx.

Vazakidis A. & Adamopoulos A., (2010), "A Causal Relationship Between Financial Market Development and Economic Growth", American Journal of Applied Sciences, Vol. 7, PP. 575-583, http://scipub.org.

World Bank, (2020), World Development Indicators (WDI), online at: http://data.worldbank.org/.