

Foreign Aid and Economic Growth in Egypt: A Cointegration Analysis

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ABSTRACT: There is a current and growing debate on the effectiveness of foreign aid, especially in Egypt, as the country is going through a critical period in its transition to democracy. The obvious question is to what extent foreign aid to Egypt will be effective in promoting economic growth. By using Johansen Cointegration test and Vector Error Correction Model (VECM), the paper finds a negative and significant impact of foreign aid on economic growth in the long and short run. It is highly suggested that Egypt must rely upon the indigenous resources to promote development rather depending on external factors.

Keywords: Economic Growth; Foreign Aid; Johansen Cointegration Test; Vector Error Correction Model; Egypt

JEL Classifications: F3; F35; 01

1. Introduction

In the area of development economics, economists and policy analysts have always considered the impact of foreign aid, in addition to domestic resources, on economic growth in developing economies. Several recent studies, typified by the work of Burnside and Dollar (2000), and Collier and Dollar (2002), argue that aid assists growth but only in a good policy environments, others suggest that aid is found to be effective but with diminishing returns (see for example, Hansen and Trap, 2000, 2001; Dalgaard and Hansen, 2001; Lensink and White, 2001; Hudson and Mosley, 2001; Clemens et al., 2004; Dalgaard et al., 2004) (See Ang, 2010:197).

One recent attempt to quantify the effect of foreign aid on economic growth in Egypt is found in Bassam (2008), the author examines the long-run relationship between per capita real foreign aid and per capita real GDP for Jordan (1965-2005), and Egypt (1960-2005) and by using a newly developed approach to cointegration by Pesaran et al. (2001), the empirical results find that in the case of Jordan, there is a long-run relationship exists between the variables, while there is no evidence to support that a long-run relationship exists in the case of Egypt. Also the study by using the Granger causality test, it supports that there is a long-run causality from foreign aid to GDP in the case of Jordan. However, in the case of Egypt, the results show no support of Granger causality between foreign aid and GDP.

This research will contribute to the literature in the following respect. First, most of the research in the literature has dealt with the relationship between foreign aid and economic growth in developing countries in general with little emphasis on the Arab region in particular Egypt, there is a current and growing debate on the effectiveness of foreign aid, as the country is going through a critical period in its transition to democracy and the economic performance in Egypt has been poor since the revolution began in January 2011.

Second, this study uses cointegration and error correction modeling that have been used widely in applied econometrics as compared to basic ordinary least squares (OLS) regression method which did not investigate the properties of time series, and therefore suffers from misleading and fallacious results.

Third, by not using cross-section data, as other previous studies have, it will make the results and the findings easier to apply in the case of Egypt. Therefore, the findings will provide the policymakers with a better guideline to formulate their policies, specifically on how to best use foreign aid to enhance economic growth and development in their country.

This study aims to estimate the impact of foreign aid on economic growth in Egypt applied on a more recent annual data. The study will use the real per capita gross domestic product as a measure of economic growth and the net Official Development Assistance (ODA) as a measure for foreign aid for the period 1970-2010. Data has been collected from the World Bank Data Base.

In order to avoid the problems of non-normality of distribution associated with cross-country studies, and heteroscedasticity, and the specification problems arising from simultaneity, we will use Johansen's cointegration analysis to test the impact of foreign aid on economic growth in Egypt. Our empirical analysis is composed of three parts. Firstly, we test for the existence of unit roots for each series using the Augmented Dickey- Fuller (ADF), Secondly Johansen's Cointegration test is used to determine the rank of cointegration vector and calculate the normalized long-run equilibrium equation for Egypt; and lastly we estimate the vector error correction mode to analyze the short run dynamic model that identifies adjustment to the long run equilibrium relationship. The econometric software used is Eviews 5.0.

The results in general point that aid doesn't support growth in Egypt; it has a short and long run negative and significant impact on growth. The negative result is associated with the poor policy environment and the use of aid in financing imports which might lead to discouragement of exports and liberalization of trade. The paper will proceed as follows, section two will provide a literature review on aid-growth relationship, section three deals with the Egyptian context, section four deals with the estimation of the model used in the study, and finally section five provides summary and conclusions of the study.

2. Literature Review

The imperative of aid – growth relationship can be traced back to two prevalent models, the two gap model (Chenery and Strout, 1966), and the poverty trap model (Nelson, 1956), (see McMillan, 2011:159). The Gap model popularized by Chenery and Strout (1966) remains the most influential in projecting the macroeconomic impact of foreign aid (Asongue, 2012:4). In this model, developing countries face shortages in savings and export earnings to meet the necessary level of investment to achieve the desired level of economic growth. If a country is unable to fill this gap through its domestic sources, an inflow of foreign aid is needed to move the country's economic growth upwards.

The model has suffered from severe criticisms since its inception by Harms and Lutz (2004), they pointed out that the gap model assumes that investment is the only factor in increasing output, ignoring the other determinants of growth such as education, and Research & Development (R&D). The earliest poverty trap model was used by Nelson (1956), this model assumed that growth is affected by poverty traps caused by low productivity capacity, high population, and weak savings. Nelson pointed out that foreign aid will increase income and capital, which can help to free an economy from the low- level equilibrium trap (p.904). This model also has its limitations, Harms and Lutz (2004) pointed out that the role of good governance and private capital is downplayed in the poverty trap model and that aid has a very low impact on poverty reduction.

The vast majority of the aid effectiveness literature has evaluated foreign aid by examining its impact on economic growth and on poverty reduction by association. There are four main findings from this literature. First, there is an extensive body of recent international research that suggests a positive impact of aid on growth in recipient countries in early studies like Papenek (1973) and Levy (1988) found that aid had absolute positive linear relationship with growth, as it increases growth by augmenting savings, financing investments, and adding to capital stock. Second, In the 1990s researchers agree that aid can spur growth but its effectiveness decreases as the level of aid infused into the economy decreases. In other words, aid has diminishing returns, (see for example Durbarry et al., 1998; Dalgaard and Hansen, 2001; Hadjimichael et al., 1995; Hansen and Trap, 2000 and 2001; Lensink and White, 2001; Hudson and Mosley, 2001; Clemens et al. 2004; and Dalgaard et al., 2004).

Such studies find that foreign aid is effective at spurring economic growth up to a certain threshold of aid, and its impact diminishes or becomes smaller. The absorptive capacity constraints could be due to the huge administrative burden, management and reporting requirements. These studies also show that aid volatility can have adverse impact on the absorptive capacity when high levels of aid reduce the export competitiveness of developing countries. Thirdly, foreign aid works better in some countries or environments than in others, some researches examine the impact of aid on different types of economic growth (See Feeny and Bazoumana, 2009), they found that foreign aid

works best on agricultural growth rather than industrial growth. Others find it works best in recipients with good economic policies (Burnside and Dollar, 2000; Collier and Dollar, 2002; Collier and Hoeffler, 2004).

Political stability and good governance are found to be other important factors (Guillaumont and Chauvet, 2001; Svensson, 2000). Other researchers link aid effectiveness with the actual occurrence of external shocks such as adverse trade shocks (Collier and Dehn, 2001), while Dalgaard et al., (2004) looked at geographical factors. Fourthly, the type of foreign aid is likely to be important for the impact on economic growth and poverty reduction such as the study provided by Clemens et al. (2004), they disaggregated aid into short- impact and long impact aid variables, and concluded that the positive impact of short impact aid on growth is found to be about two or three times larger than in studies using aggregate aid. Others like Ram (2003) provided evidence that bilateral aid rather than multilateral aid has a positive impact on economic growth. Feeny (2006) found that aid grants rather than aid loans have positive impact on economic growth.

3. Egyptian Perspective

Economically, Egypt has gradually shifted from a socialist system to a market economy since the 1970s and realized high economic growth since the mid-2000s. Before the revolution, Egypt enjoyed solid rates of economic growth, in the range of 6-7 percent between 2003 and 2009, real GDP grew by 4.7 percent in 2009 and by 5.3 percent in 2010 (World Bank Data). While poverty levels remained high, the incidence of extreme poverty is low, but with 43.9 percent of the population living on less than \$2 PPP a day, Egypt faces significant challenges in translating growth into poverty reduction (USAID, 2008: 7).

It is almost two years now since the revolution began in January 2011, such a momentous development, that is expected to transform Egypt to become a transparent, accountable, and socially and economically prosperous country, has not only challenges but also opportunities (African Development Bank, 2012: 1). In June 2012, Egyptians successfully concluded Presidential elections and are working towards drawing a new Constitution. A successful settlement on the political front is a fundamental pre-requisite for a sustainable and equitable growth that would create jobs for its many unemployed youth. Although Egypt's economic growth prior to the revolution was impressive, unemployment officially remained high at almost 9 percent in the fourth quarter of 2010, youth unemployment was much higher, the Central Agency for Public Mobilization and Statistics (CAMPAS) reported in February 2012 that unemployment rate had climbed to 12.4% during the fourth quarter of 2011, compared to 11.9 percent in the third quarter of 2011.

Economic performance in Egypt has been poor since the revolution; GDP has declined by almost 4 percent and manufacturing by 12 percent, revenue from tourism has collapsed, exports of goods and services that contribute about 25 percent of GDP, contracted by 4.7 percent during the first half of 2011/2012 (African Development Bank, 2012: 2), putting pressure on the balance of payments, which in turn has sparked a slide in foreign reserves, official reserves have fallen by \$9 billion during the first half of 2011 (See Saif, 2011: 3), and by \$15.1 billion at the end of March 2012, compared to \$36 billion in December 2010 as reported by the Central Bank of Egypt 2011/2012.

Investments showed little vigor of rebound after contracting by an annual average of 4.2 percent during the post revolution period, from April 2011 to December 2011. The contraction of investments continued during the period July-December 2011/2012, when gross capital formation declined by 3.5 percent (African Development Bank, 2012: 2). The Central Bank of Egypt (CBE) has continued to manage a gradual depreciation of the Egyptian pound since foreign currency inflows slowed down after the revolution. As the exchange rate (EGP per US\$) slowly declined to EGP 6.04 at the end of March 2012, and EGP 6.13 at the beginning of December 2012, compared EGP 5.96 a year ago. This domestic currency depreciation exacerbated imported inflation, by March 2012; the annual inflation rate reached 9 percent compared to 7.1 percent in October 2011, as pointed out by the CBE, the higher price level was mainly due to anticipated rise in international food prices, local supply bottlenecks, and distortions in the distribution channels.

In the light of this poor economic performance and Egypt's financial conditions after the revolution, the Egyptian government faces a lot of challenges to meet the continuing demands of Egyptians specially low income groups for higher wages, and more social justice. The budget deficit continues to be a thorn in the government's side and a top priority. The finance ministry opined that an

increase in public sector salaries and a fall in tax revenues due to deteriorating economic activity during the 18 months of political upheaval contributed to the budget deficit. The ministry's reports showed that the current budget deficit was about 8% of GDP, which the government intends to bring down by 1% in the next two years. Meanwhile, the government is seeking to cut its expenditure on fuel subsidies. The government is considering cuts to gasoline subsidies and the introduction of a coupon or a smart card system so that the subsidies reach only the poor.

Spending in excess of revenue requires the state to borrow from either domestic or foreign sources. Until recently, the government has been borrowing from the domestic market. Domestic debt in 2011 registered an increase of 19.6 percent over 2010 in absolute figures and 1.7 percent relative to GDP (Saif, 2011: 3), borrowing from the domestic market at a higher rate combined with other numerous restrictions, will tighten liquidity and hinder investment. During the summer of 2011, the military turned down loans from international financial institutions such as the International Monetary Fund (IMF) and the World Bank, citing discomfort over external borrowing. The World Bank has pledged up to \$1 billion in each of the next two years if the government meets certain economic reform conditions, the Bank also may provide \$2.5 billion in loans for development projects, Egypt was also negotiating a loan deal worth \$4.8 billion with the IMF and seeking additional funding of \$1 billion from the World Bank and the African Development Bank (Sharp, 2012: 11). The report said that United States is looking to forgive debt worth \$1 billion; Meanwhile Qatar, Turkey, Saudi Arabia, and the European Union have together pledged billions of dollars in budget support. The G8 countries also have promised loans through development banks and have said after their latest meeting that they are willing to provide \$5 billion for Egypt and through 2013 (Sharp, 2012: 12).

Despite all of these offers of aid from countries and international organizations, Egypt did not get but a few of them, in December 2012, the IMF declined in giving the loan to the Egyptian government because of floundering political administration, and the government decided to re-consultations for taking the loan from the fund to support the government budget deficit. The government will try to begin the consultations by showing that it is recently finalizing an economic reform program, which would soon be open for public discussion. In the light of this difficult period which the country is going through, and the lack of economic resources, the paper examines to what extent such foreign aid¹ to Egypt will be effective in increasing economic growth and overcome the challenges faced by it.

4. Data Description and Model Specification

This study uses annual data for analyzing the impact of foreign aid on economic growth. The study will use the real per capita gross domestic product as a measure of economic growth and Net Official Development Assistance as a measure of foreign aid for the period 1970-2010. Data has been collected from the World Bank Data Base.

4.1. Model Specification

To analyze the relationship between economic growth and foreign growth in Egypt, the study will include two other variables the gross capital formation, and the trade openness, as a great proportion of the literature which focuses on estimating the macro economic benefits of aid has been used them in their econometric models. Trade openness has been extensively used recently as a measure for good governance (See for example Mallik, 2008). Various forms have been tested and the most appropriate form for the variables is specified as a log function:

$$\ln \text{RGDPPC}_t = \beta_0 + \beta_1 \ln \text{ODAT}_t + \beta_2 \ln \text{EXT}_t + \beta_3 \ln \text{GCF}_t + \mu_t \quad (1)$$

Where

$\ln \text{RGDPPC}_t$ = Natural log of real gross domestic product per capita (in United States Dollars) year t.

$\ln \text{ODAT}_t$ = Natural log of the Net ODA (Official Development Aid) received as a % of GDP in year t.

$\ln \text{EXT}_t$ = Natural log of openness (the total Exports of goods and services as % of GDP) in year t.

$\ln \text{GCF}_t$ = Natural log of the Gross Capital Formation in year t.

¹Foreign aid to Egypt is presented by the Net official Development Assistance (ODA) which consists of disbursements of loans made on concessional terms, and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare in the country.

4.2. Econometric Methodology

1. Unit Root Tests

Stationary of series is a prerequisite before conducting any econometric work. Granger and Newbold(1974) discussed that working with non-stationary variables may brings spurious results that may lead to incorrect results. The study uses unit root test namely ADF (Augmented Dickey- Fuller test). A unit root test for each variable is performed on both levels and first difference (table 1). The ADF test results show that all the variables (in levels) are non stationary with the two different specifications. Furthermore, the first differences of the variables are investigated for a unit root and the test result proved that all of them are stationary. Therefore, we could conclude that all variables are integrated of order one. Hence the four series are non-stationary, a regression analysis using ordinary least squares (OLS) produce spurious results. However all of the series are stationary after first differencing and can be used in regression analysis, but the drawback of such a method that is the possibility of losing long-run information present in the variables (Mallik, 2008). For that reason the study will apply a cointegration technique, which shows the long-run relationship among the non stationary series. The rank of the cointegrating vector is determined using the Johansen's cointegration test.

Table 1. Unit root test using Augmented Dickey- Fuller test

Variables	Levels/First Difference	ADF test statistics	
		C	C&T
lnODA	Level	-0.29	-2.34
	First Diff.	-4.81*	-5.28*
lnRGDPPC	Level	-0.72	-1.27
	First Diff.	-3.64*	-3.63**
lnEX	Level	-2.2	-2.04
	First Diff.	-4.69*	-4.71*
lnGCF	Level	-1.97	-1.88
	First Diff.	-4.06*	-4.21**
Mac-Kinnon Critical Values			
1%		-3.61	-4.21
5%		-2.94	-3.53
10%		-2.62	-3.19

- i) *, **, *** indicates significance at 1%, 5%, and 10% levels respectively.
 ii) C=Constant, C&T= constant and trend.

2- Johansen's cointegration test Result

The Cointegration procedure yields two likelihood ratio test statistics- Trace test (λ trace) and maximum eigen-value (λ max). The distribution of both test statistics follows chi-square distribution, the main reason for using the Johansen's cointegration test is to determine the number of cointegrated vector(r), if ($0 \leq r \leq n$) is zero, it would imply that there is no long- run equilibrium relationship among the variables. On the other hand if r is ($1 < r < n$), it suggests that there are ($n-r$) common stochastic trends among the variables that link them together. Table 2 shows the results of the Johansen's test.

Table 2. Johansen's Cointegration Test

Ho (null hyp.)	Ha (alt. hyp)	Eigen-value	λ trace Stat	5% Critical Value	λ max Stat	5% Critical Value
$r = 0$	$r = 1$	0.728	123.339***	47.856	47.115***	27.584
$r \leq 1$	$r = 2$	0.667	76.218***	29.797	39.578***	21.132
$r \leq 2$	$r = 3$	0.630	36.640***	15.494	35.816***	14.264
$r \leq 3$	$r = 4$	0.0226	0.825	3.841	0.825	3.841

Notes: i) *** denotes rejection of the null hypothesis at 1% significance level.

- ii) Variables in the cointegrating vectors: lngdppc, lnoda, lnex, and lngcf, Lag lengths determined by AIC and FPE criteria (Lag=4).

The second and third column of table 2 shows the null and alternative hypothesis while the fourth column shows the eigen-values of the maximum likelihood estimates. Finally the fifth and sixth columns show the λ max and λ trace test statistics.

As shown from table 2, there are three long run relations describing the output growth equilibrium relationship with the variables in the model. As the values of the λ trace statistics and λ max statistics are greater than the 5% critical values. The asymptotic distributions of λ max and λ trace test statistics can identify the number of cointegrating vectors properly (Osterwald-Lenum, 1992). We didn't use the Engel-Granger two steps procedures as we have more than two variables in our model. The eigen value statistics drop sharply for alternative hypothesis of three cointegrating vector ($r=3$). As the variables were cointegrated and the interest of the study was to examine the response of real GDP per capita to foreign aid, gross capital formation and openness, the cointegrated vectors were normalized by real GDP per capita.

The lag lengths are selected using AIC and FPE criteria. We present the long run estimated normalized coefficients between \ln RGDPPC, \ln ODA, \ln GCF, and \ln EX under the cointegration test statistics of table 2 as follows:

$$\ln\text{RGDPPC} = 17.815 + 0.038100 \ln\text{EX} - 0.1926 \ln\text{ODA} - 1.014800 \ln\text{GCF} \\ (0.19040) \quad (-2.37890) ** \quad (-5.30443) * \quad (2)$$

It is observed that variables have their expected signs and they are statistically significant too except openness of trade. The results state that in the long run the contribution of foreign trade to economic growth is negative and significant at 5%, as shown in the estimated equation the coefficient of foreign aid is negative, because of poor disbursement of aid received, trade openness as our estimated model shows insignificant impact on growth, because of large and inefficient governance body of government. Gross Capital Formation has a negative and significant impact at 1% on growth because of inefficient policies pursued by the Egyptian government and the inefficiency associated with capital formation activity.

3. Vector Error Correction Model Results

Since, \ln RGDPPC, \ln ODA, \ln EX, and \ln GCF are found to be cointegrated, we proceed to test the vector error correction mechanism which also represents the short run relationship among the variables under study. The log changes in the relevant variables represent short-run elasticities, while the error correction mechanism term represents the speed of adjustment back to the long run relationship among the variables. Table 3 presents the results of the error correction model for real GDP per capita growth $\Delta \ln$ RGDPPC. The estimated coefficients show the immediate and short run impact of $\Delta \ln$ ODA, $\Delta \ln$ EX, and $\Delta \ln$ GCF on $\Delta \ln$ RGDPPC.

The log changes in the relevant variables represent short run elasticities, while the Error Correction Mechanism (ECM) term represents the speed of adjustment back to the long run relationship among the variables. As shown in table 3, the estimated coefficients show the immediate impact of $\Delta \ln$ ODA, $\Delta \ln$ EX, and $\Delta \ln$ GCF, on $\Delta \ln$ RGDPPC. Here a reasonable value of adjusted R2 is indicating that there is almost 71% variation in dependent variable explained by independent variables in the model. There is also no incidence of autocorrelation and F-Stat shows that overall model is best fitted.

The ECM term is negative and significant for Egypt which suggests that there is a significant long run relationship between the variables, and the coefficient of the error correction term was -0.0772 which showed low speed of adjustment towards long run equilibrium. This indicated that whenever there was any disturbance in the system in the long run, in every short period only $\Delta \ln$ RGDPPC is corrected by 7.72 % per annum. The short run coefficients of $\Delta \ln$ ODA are also negative and significant for the first and second lags. On contrary a positive and weak significant effect of gross capital formation in the short run is observed, and positive and somewhat significant impact of openness on growth is found.

The results in general points that aid doesn't support growth in Egypt, it has a short and long run negative and significant impact on growth. The negative result is associated with the poor policy environment in the country which makes aid ineffective. Also such negative and inefficient relationship between aid and growth in Egypt could be due to the use of aid in financing imports which might lead to discouragement of exports and liberalization of trade.

Table 3. VECM Estimates 1975-2010

Variables	Eq.1 $\Delta\ln\text{RGDPPC}$
ECM t-1	-0.0772 (-4.392)*
$\Delta\ln\text{RGDPPC } t - 1$	-0.431 (-2.3932)**
$\Delta\ln\text{RGDPPC } t - 2$	-0.253 (-1.621)***
$\Delta\ln\text{RGDPPC } t - 3$	-1.105 (-0.747)
$\Delta\ln\text{RGDPPC } t - 4$	-0.547 (-3.551)*
$\Delta \ln \text{ODA } t - 1$	-0.0485 (-4.608)*
$\Delta \ln \text{ODA } t - 2$	-0.0176 (-1.951)**
$\Delta \ln \text{ODA } t - 3$	-0.00474 (-0.573)
$\Delta \ln \text{ODA } t - 4$	-0.0021 (-0.464)
$\Delta\ln\text{EX } t-1$	0.0494 (2.468)*
$\Delta\ln\text{EX } t - 2$	0.00194 (0.099)
$\Delta\ln\text{EX } t - 3$	0.0348 (1.793)**
$\Delta\ln\text{EX } t - 4$	0.0279 (1.5332)***
$\Delta\ln\text{GCF } t - 1$	0.0584 (2.465)*
$\Delta\ln\text{GCF } t - 2$	0.0903 (3.086)*
$\Delta\ln\text{GCF } t - 3$	0.0236 (0.848)
$\Delta\ln\text{GCF } t - 4$	0.0070 (0.249)
Constant	0.0599 (6.383)*
R2	0.850
Adj . R2	0.709
Standard Error	0.0137
AIC	-5.440
F-Stat	6.0350

*, **, *** indicates significance at 1%, 5%, and 10% levels respectively.

5. Conclusion

Foreign aid remained an important source of finance for capital scarce (poor) countries and continued to play a multifaceted role in financing their development needs. Despite the massive literature on the subject, a consensus has not been reached by researchers regarding the growth impact of aid, rather the results are inconclusive. Thus one can find both success and failure stories. The study examined the macroeconomic impact of aid in Egypt with special emphasis, as the country is seeking financial aid from Arab countries as well as international donors to help narrow its deficit. This paper rises a main question to what extent such foreign capital flows will help the country to improve its economic growth and pass its critical period. The paper used a Johansen cointegration test to test the long run impact of foreign aid on economic growth for 1970-2010 period, it also used a Vector Error Correction Model (VECM) model to facilitate the discrimination of the short run and long run impact of foreign aid on economic growth.

The empirical results support that there is a long run relationship between foreign aid, gross capital formation, and trade openness, and economic growth in Egypt. The impact of foreign aid was negative and significant on economic growth in the short and long run. The study also found a negative and significant impact of gross capital formation on economic growth in the long run, but its impact on growth was positive and weak significant in the short run. The weak effect of gross capital formation and foreign aid on growth appears on the surface to indicate inefficiency in putting domestic and foreign capital for productive activity to promote growth. The study also found a negative and insignificant impact of openness on economic growth in the long run, but its impact on growth is positive and to somewhat significant in the short run.

Due to the negative and statistically significant short and long run impact that foreign aid on economic growth, it is recommended that, the government pay particular attention to direct the incoming foreign aid to Egypt in productive activities rather than financing imports, and also it is strongly recommended to rely on its internal resources, to help the country to promote growth and overcome the challenges in the current critical transition period.

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