External financial resources and Economic growth nexus in Egypt

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Abstract:
Developing countries depend on foreign countries’ external finance as a source of funds to develop economic growth. Egypt also depends on official development assistance (ODA) and foreign direct investment (FDI) is considered one sort of dependency of developing countries on the donors of developed countries. ODA affects economic growth and sustainability in many developing countries and at the same time creates challenges.

The study aims to capture the nexus between economic growth and the ODA in Egypt during the period from 1979 to 2018 based on the availability of data. An auto-regression distributed lag model (ARDL) bounds testing approach has been employed in this study to assess the long-run impact of ODA on economic growth. Results show a long-run positive relation between ODA and economic growth in Egypt. While FDI is insignificant in the short-run and long run. Based on the results policy recommendation is provided to maximize the utilization of the external resources

Keywords:
ODA, FDI, Inflation, Population Growth, Economic Growth, Egypt
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The Abstract:

The developing countries depend on foreign financial resources as a source for economic growth. And Egypt also depends on official development assistance (ODA) and Foreign Direct Investment (FDI) is a type of financial resources used by the developing countries from advanced countries. Official development assistance affects the long-term economic growth and sustainability in many developing countries and at the same time, it creates challenges. The study aims to identify the relationship between economic growth and official development assistance in Egypt during the period from 1979 to 2018 based on availability of data.

The use of the related ARDL (Auto-Regressive Distributed Lag) model in this study to evaluate the long-term effect of official development assistance on economic growth. The results show a positive long-term relationship between official development assistance and economic growth in Egypt. While FDI is weak in the short and long term. Finally, policy recommendations and results are presented with recommendations for maximizing the use of external resources.

Keywords: Foreign Direct Investment, Official Development Assistance, Economic Growth, Population, Egypt.
1. **Introduction:**

External finance resources play a major role in accelerating production and economic growth in many developing countries. International resource flows can take various forms, and it's important to understand all of them. Official and private international capital flows are the two major kinds. The official capital flows are divided into individual or bilateral flows. Official two-sided flows are made up of money sent from the donor government to recipient governments. With the rise of African independence in the early 1960s, ODA ceased with the proliferation of donor countries (including the USSR and China) and beneficiaries. As a result, international support in the form of loans and/or grants has helped to fund a variety of projects and services in the country. Many Eastern Europe, Asia, Latin America, African countries and USSR. The former Soviet Union channelled these resources to fund a wide range of initiatives, including educational, civil, medical, commercial, infrastructure, and even cultural initiatives.

Empirical results showed different results, as a group showed a positive correlation between external finance and growth (Gbambie and Mongbe, 2020; Bhattarai, 2009; Burnside and Dollar, 2000). On the other hand, studies show negative relations (Mosley et al, 1987; Easlerly, 1999). And the third group is that there is no long-run relationship between them (Sabra, 2016).

This paper is therefore trying to examine the impact of external finance on Egypt's economic growth as one of the largest regions in Middle East countries in terms of population. And one of the countries classified as a lower-middle-income country in the world. As well, the country has received a huge amount of ODA reached 1308$ million in 2002; (Abou-Elfoutoh, 2008).

The impact of ODA on Egypt's economic growth from 1979 to 2019 is examined in this paper. As a result, the goal of this study is to determine how foreign aid has benefited Egypt and what elements might be addressed to maximise the effectiveness of these supports. As a result, it will be easier to determine whether foreign aid is a blessing or a curse for Egypt. As well, as testing the factors
affecting the ODA FDI and in Egypt, such as FDI, population growth rate, and inflation rate.
The rest of the paper consists of section two which is focusing on the literature review, followed by the research methodology including the model and the empirical results. Finally conclusion and recommendation

2. Literature review:
ODA began to appear after WWII in an article presented by Evsey Domar in 1946 to alleviate poverty (Lee, Choi et al., 2020). ODA recipients’ countries are the upper middle and lower medium and least developed countries as identified by World Bank. Harrod and Domar agree that slow growth rates will be accompanied by low saving rates, therefore the international reserves or savings needed should be compatible with the aimed growth rate (Gbambie and Mongbet, 2020). Therefore, their economic growth rate is condemned to stay poor. The literature shows the nexus between the foreign aid and economic growth through two main approaches that were the poverty trap (Jackson, 1996; Sachs, et al., 2004; Calcagnin, et al, 2020)) and the two-gap model (Easterly, 1999; Kolawol, 2013). The gap model is the most popular model that is used in many kinds of literature as it aims to fulfil the shortage in finance and savings that most developing countries suffer from. While the two-gap model depends on the foreign exchange and savings to fulfil the gap in developing countries.
The role of ODA's impact on economic growth was examined and showed a positive impact on economic growth taking into account the role of institutions, (Driffield & Jones, 2013). While (View & Lau, 2018) found that foreign aid affects negatively the economic growth over the long run with determinants of FDI and population as determinants of economic growth, while (Siraj, 2012) found that there is a positive relation between ODA and economic growth in the short run but negative relation between them with high growth rates- in other words, ODA has diminishing returns (Ali, 2013). ODA impact varies over time as it has a positive effect over the short run then it decreases and becomes smaller over time. This was
explained by the huge administrative burden, the red tape, and low export competitiveness of developing countries (Feeny & Ouattara, 2009).

In studying the impact of FDI on economic growth, economies literature examined this relation, (Nguyen, 2020) and found that the relation between economic growth and FDI are positively significant in Vietnam as well (Ozawa & Bellak, 2015) examined the positive relation between ODA and foreign private investments through depending on labour-intensive industries in China. While (Harms & Lutz, 2006) examined the impact of investment on foreign aid in developing and emerging economies, they concluded that there is no clear positive relationship between them. This was explained by the strength of infrastructure and governance. Therefore most literature found that FDI can affect ODA positively but it needs to complement the presence of the appropriate infrastructure (Kimura & Todo, 2009) and the shape and structure of ODA (Selaya & Sunesen, 2012). On the other hand, (Kimura & Todo, 2009) found that if the burden put by the donors to the host countries is regulated or decreased, foreign aid or ODA will be the best substitute for FDI.

Inflation has an important role in the economy and this drives the economists to investigate its relation with ODA. (Olabisi, 2021) showed that there is a long-run relationship between the inflation rate, value of currency and ODA in Nigeria as the inflation rate is very sensitive to any changes in the structure or amount of ODA. Though (Xaypanya, et al, 2015) found that the inflation rate may not affect the ODA and economic growth – as in the case of ASEAN5, it differs according to a degree of openness. In a study conducted on 85 countries, (Ekanayake & Chatrna, 2010) inflation was insignificant in developing countries compared to developed countries that are affected highly by it.

The population growth rate appears an attractive factor in the study of ODA and economic growth. (Karras, 2006) found that the population growth rate affects the economic growth negatively and the results are significant in 71 developing countries and this will
lead to steady-state growth over time. (Azolibe, 2021) concluded that the population growth rate has a casualty relation with the foreign aid and debt as more population means more infrastructure that needs more funds.

From the previous literature review, the researcher concluded that ODA plays an important role in economic growth but they did not find the determinants of applying ODA efficiently. Thus this paper will fill the gap in merging many variables and reach the applicable long-run determinants that affect Egypt.

3. Methods and data:
This study depends on time series analysis depending on secondary data obtained by the World Bank. In this research paper, the econometric model and testing were done by e-views 12.

In this paper, the relationship between five independent and one adjacent variable from 1979 to 2018 is checked and explored, which gives us sufficient insight. The economic growth rate in Egypt is the dependent variable. Furthermore, the independent variables are as follows Net ODA received percentage of GNI, inflation rate, foreign direct investment, and population growth rate. Per year the data is estimated.

The World Bank has considered the dependent database for the researchers for Net ODA received a percentage of GNI (ODA), inflation (infl), GDP growth (GDP), population (POP), and foreign direct investment (FDI). Table (1) shows a list of variables that will be used, and their expected signs according to previous literature and sources of data. Time series analyses were adopted, i.e. enhanced Dickey-Fuller test (ADF) AND Phillips-Perron test (PP) before the time series data analysis for the stationarity of the data. Then normal experiment is carried out, a fixed effect model, random effect models and an ARDL model.
Table 1: List of variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Unit</th>
<th>Expected sign</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>ODA</td>
<td>Percentage of GNI</td>
<td></td>
<td>World Bank</td>
</tr>
<tr>
<td>FDI</td>
<td>Percentage of GDP</td>
<td>positive</td>
<td>World Bank</td>
</tr>
<tr>
<td>Population growth rate</td>
<td>Percentage(annual)</td>
<td>positive</td>
<td>World Bank</td>
</tr>
<tr>
<td>GDP growth rate</td>
<td>Percentage (annual)</td>
<td>positive</td>
<td>World Bank</td>
</tr>
<tr>
<td>Inflation rate</td>
<td>Percentage (annual)</td>
<td>positive</td>
<td>World Bank</td>
</tr>
</tbody>
</table>

The function that expresses the variables will be as follows:

\[
\text{GDP} = f(FDI, infl, POP, ODA)
\]

This study will examine these variables depending on the ARDL test and its validity in the long run which will be explained by the following model:

\[
\text{GDP} = \beta_0 + \beta_1 \text{FDI} + \beta_2 \text{infl} + \beta_3 \text{POP} + \beta_4 \text{ODA}
\]

Where GDP stands for GDP growth rate, infl represents the inflation rate, POP represents the population growth rate, ODA represents Net ODA received per GNI, and finally, FDI represents Foreign Direct Investment percentage of GDP.

4. Results and discussion

To estimate the results, the researcher depends on several statistical tools. This analysis begins with the statistical description and then moves to the variance inflation factor ending with the ARDL test.

In describing the data statistically, it found that the greater mean is the inflation followed by GDP growth rate with a maximum at inflation rate and the lowest maximum is ODA as shown in table 2.
Also, it is clear that in all results the mean is greater than the median which means that the tail of the curve will be at the highest values of all variables used.

### Table 2: Descriptive statistics

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Std. Dev.</th>
<th>observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>4.97860</td>
<td>4.74452</td>
<td>10.01133</td>
<td>1.125405</td>
<td>2.0172</td>
<td>41</td>
</tr>
<tr>
<td>FDI</td>
<td>2.52209</td>
<td>2.10258</td>
<td>9.348567</td>
<td>-0.20454</td>
<td>2.1262</td>
<td>41</td>
</tr>
<tr>
<td>POP</td>
<td>2.16772</td>
<td>2.09083</td>
<td>2.708580</td>
<td>1.751693</td>
<td>0.2934</td>
<td>41</td>
</tr>
<tr>
<td>ODA</td>
<td>3.44858</td>
<td>1.96155</td>
<td>14.48448</td>
<td>0.014323</td>
<td>3.4728</td>
<td>41</td>
</tr>
<tr>
<td>INFL</td>
<td>11.9286</td>
<td>11.2651</td>
<td>29.50661</td>
<td>2.269757</td>
<td>6.3154</td>
<td>41</td>
</tr>
</tbody>
</table>

Source: authors’ calculations

Through the VIF test, all results are these than 10% which means that there is no multicollinearity between variables that needs more investigation so the ARDL model will be conducted.

### Table 3: VIF results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Coefficient Variance</th>
<th>Uncentered VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDI</td>
<td>0.379046</td>
<td>0.019124</td>
<td>2.370940</td>
</tr>
<tr>
<td>POP</td>
<td>1.903652</td>
<td>0.137761</td>
<td>7.583941</td>
</tr>
<tr>
<td>INFL</td>
<td>-0.008642</td>
<td>0.003070</td>
<td>6.403564</td>
</tr>
<tr>
<td>ODA</td>
<td>-0.000185</td>
<td>0.009110</td>
<td>2.480685</td>
</tr>
</tbody>
</table>

Source: authors’ calculations

This test began with the following hypotheses:

- $H_0$: variables have unit root and stationarity
- $H_1$: variable have neither unit root nor stationarity

By conducting the unit root test, the researcher found that there is no stationarity and so the model is valid at the level $I(0)$ and the first difference $I(1)$. Therefore two ways of testing the stationarity -whether ADF or PP- concludes that the variables are stable in the long run as well as in the short run. So the first hypothesis is rejected and the second one is accepted.
Table 4: Unit root test results

<table>
<thead>
<tr>
<th>Variables</th>
<th>ADF</th>
<th>PP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level</td>
<td>1st difference</td>
</tr>
<tr>
<td>Foreign Direct Investment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>-1.649413</td>
<td>-2.143749**</td>
</tr>
<tr>
<td>Intercept</td>
<td>-3.00232**</td>
<td>-2.944111***</td>
</tr>
<tr>
<td>Intercept and trend</td>
<td>-2.9722***</td>
<td>-2.999900***</td>
</tr>
<tr>
<td>GDP Growth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>-1.201879</td>
<td>-12.40550***</td>
</tr>
<tr>
<td>Intercept</td>
<td>-3.002320***</td>
<td>-2.944110***</td>
</tr>
<tr>
<td>Intercept &amp; trend</td>
<td>-3.410307***</td>
<td>-4.388403***</td>
</tr>
<tr>
<td>Inflation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>-1.426000</td>
<td>-3.879619***</td>
</tr>
<tr>
<td>Intercept</td>
<td>-3.308182***</td>
<td>-3.389810***</td>
</tr>
<tr>
<td>Intercept and trend</td>
<td>-3.470814***</td>
<td>-3.470814***</td>
</tr>
<tr>
<td>NET ODA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>-2.064512**</td>
<td>-2.064512**</td>
</tr>
<tr>
<td>Intercept</td>
<td>-2.244613**</td>
<td>-2.244613**</td>
</tr>
<tr>
<td>Intercept and trend</td>
<td>-3.468862***</td>
<td>-2.812605***</td>
</tr>
<tr>
<td>Population Growth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>-1.284468</td>
<td>-1.042848</td>
</tr>
<tr>
<td>Intercept</td>
<td>-2.037915**</td>
<td>-0.718337</td>
</tr>
<tr>
<td>Intercept and trend</td>
<td>-5.048976</td>
<td>-0.873366</td>
</tr>
</tbody>
</table>

These stars refer to different significance * (10%), ** (5%), *** (1%) 
Source: Authors’ calculations.
The regression model ARDL, on the other hand, has recently shown its significance in predicting long-term relationships. The ADRL was used to search for variable co-integration, estimate long-term and short-term relations between variables, and to test the dynamic relationship between variables.

Table 5 shows that the variables explain the model by 63% for the change in GDP. Also, GDP is significant at the second lag at 10% which means that if GDP increases by 100%, an excess of GDP will appear at 38%. Regarding the ODA, it has a significant positive relation with GDP at the second lag as when ODA increases by 100%, GDP increases by 38%. But there is a negative significant relationship between ODA and GDP at the first and fourth lag. POP has a positive significant relation with GDP at the second lag and negative significant relation at the third lag. Moreover, inflation has positive significant relation at the second lag at 10% and a negative significant lag at the third lag at 1%. Finally, the inflation rate is significant at the first and second lag but it has positive relation at the first lag and negative relation at the second lag. To conclude, The short run table shows that all variables are insignificant.

### Table 5: ARDL results in the short run

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coeff</th>
<th>t-Statistic</th>
<th>Variable</th>
<th>Coefficient</th>
<th>t-Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>16.55415</td>
<td>2.434742</td>
<td>ODA</td>
<td>-0.899203</td>
<td>-</td>
</tr>
<tr>
<td>ODA</td>
<td>0.530544</td>
<td>3.486265**</td>
<td>ODA(-1)</td>
<td>0.121384</td>
<td>-1.891834*</td>
</tr>
<tr>
<td>FDI</td>
<td>-0.41273</td>
<td>-1.915017*</td>
<td>FDI</td>
<td>0.087106</td>
<td>0.401084</td>
</tr>
<tr>
<td>POP</td>
<td>-74.3633</td>
<td>-2.24972*</td>
<td>POP</td>
<td>-0.592969</td>
<td>-</td>
</tr>
<tr>
<td>INFL</td>
<td>-0.18635</td>
<td>-2.9806**</td>
<td>INFL</td>
<td>0.062331</td>
<td>0.992168</td>
</tr>
<tr>
<td>INFL(-1)</td>
<td>12.79734</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These stars refer to different significance * (10%), ** (5%), *** (1%)  

The ARDL model supported that in the long term, there is a positive relation between Net ODA and economic growth in Egypt, which confirms our theory that Net ODA has a substantial effect in the long run after three years. Also, it was supported by Yiew and Lau.
(2018), as the effect of Net ODA on economic growth in 95 developing countries was studied during the period 2005—2013, the results suggest that the positive effect of ODA over time may help to improve social infrastructure, economic infrastructure, and the services and production sectors. As a result, international aid's various effects can have a positive impact on economic development and increase employment prospects in the economy. Therefore economic growth can be achieved in the long run by depending on employing the aids in poverty alleviation programs, investments in human or physical capital, offering a long term and efficient social services and promote more programs to enhance production.

As indicated by the paper, there is a negative relationship between inflation and economic growth, however, the discoveries are immaterial in long run. This is as opposed to the discoveries that guarantee that inflation brings down the rate of return, diminishing capital aggregation and, accordingly, the pace of extension (Martin and Ottaviano, 1999).

The research paper found that a negative but insignificant relationship exists between FDI and economic growth. Egypt has several favourable characteristics that can effectively attract foreign investors, including a large supply of labour at low wages. The country must implement successful promotion procedures to persuade investors that their contributions to Egypt's economy are important and appreciated (Tarek and Ghoneim 2018). The ARDL supported the paper that there is a negative relationship between population growth and economic growth in the long run and short run. When it comes to the desirability of population development, there are differing perspectives. Some people believe that global population growth is a serious issue, although others disagree. The research on the relationship between population growth and economic growth is inconsistent and uneven across countries (Afzal, 2009).

In conclusion, this research paper was conducted to evaluate the relationship between ODA and economic growth in Egypt by using the ARDL model. As result, it appears that ODA positively affects
economic growth in the long run. While inflation rate and population growth negatively affect economic growth, population growth in both the short and long run. While inflation rate in long run. FDI was insignificant in the study. The volatile flow of income reflects negatively on economic growth, recently a study showed that Egypt should diversify its economic activities by further engagements in the service sector (salman & Bassim, 2003)

**Conclusion:**

One of the most effective development instruments for transferring resources from rich countries to developing countries is foreign assistance. Several trillions of dollars have been given in recent years, but scientific data on its benefits have been mixed, sparking a heated academic and policy discussion. This paper aimed to contribute to the analytical discourse on ODA's potential to promote faster growth in Egypt by evaluating the macroeconomic effect of ODA on Egypt's economic growth from 1970 to 2018. Moreover, according to our results of the ARDL model, there was a positive impact of ODA on Egypt's economic growth and that was supported in the long run. Following the previous results, we can conclude that:

First: there is clear evidence that ODA has a positive and significant relationship in long run-on Egypt's economic growth. Also, considering Egypt receives a major part of the ODA from a single country, there is a need to diversify its donor base.

Second, there is a negative relationship between ODA and inflation rate in the long run. Therefore, the government should start imposing anti-inflation policies and start taking corrective action to minimize the massive inflation growth.

Third: a growing population will affect negatively economic development. As the study’s results have demonstrated, that the population growth has a significant negative effect on economic growth in the long run and short run, Egypt needs to control population growth because Egypt is a drawback since most of the
people are not highly skilled or well-educated so they do not contribute in achieving economic growth.

For further studies on ODA and economic development, greater attention should be given to the Middle East as a whole, as the Middle East is one of the world's most heavily indebted areas as Israel but we had a problem finding the data of Net ODA of Israel the data was confidential. Adding more countries that have a high dependence on ODA will help the finding better

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