Final government consumer spending and its impact on the inflation rate in Egypt - an econometric study for the period 1976 – 2021

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Abstract:

Inflation is considered one of the most important problems facing any country, whether developed or developing, as it leads to a decrease in the value of the currency and thus a decrease in real wages and thus a decrease in the standard of living of individuals. There are many causes of inflation, including an increase in government spending, which leads to an increase in aggregate demand over aggregate supply. The study aims to measure the impact of government spending with some other variables (interest rate "lending interest" – broad money "M2" - The foreign exchange rate) on the inflation rate in Egypt during the period (1976-2021), using the deductive approach based on the descriptive analytical method and quantitative analysis based on the use of econometric models, where the Bounds Test approach was used, using an autoregressive distributed lag model (ARDL Model). The study concluded with several results, the most important of which are: proving the co-integration relationship between the variables of the study, as well as the existence of a direct relationship between public spending and the rest of the variables of the study and the inflation rate in the long and short term, with the exception of the mass of money in circulation (M$_2$), as the relationship is direct in the long term and inverse in the short term. The study recommended that public spending be directed to productive economic activities, and that government agencies must coordinate in investment spending to prevent the displacement effect, by encouraging private sector investments through small and medium enterprises.

الملخص:

يعتبر التضخم من أهم المشكلات التي تواجه أي دولة سواء كانت متقدمة أونامية، حيث أنه يؤدي إلى انخفاض قيمة العملة وبالتالي انخفاض الأجور الحقيقية ومن ثم انخفاض المستوى المعيشي للأفراد. وتوجد العديد من المسببات لحدوث التضخم منها زيادة الإنفاق الحكومي مما يؤدي إلى زيادة الطلب الكلي على العرض الكلي. وتهدف الدراسة إلى قياس تأثير الإنفاق الحكومي مع بعض المتغيرات الأخرى (سعر الفائدة "فائدة الإقراض" – النقود بمعناها الواسع"M$_2$" – سعر الصرف الأجنبي) على معدل التضخم في مصر خلال الفترة (١٩٧٦-٢٠٢١) مستخدمة في ذلك المنهج الاستباطي بالاعتماد على الأسلوب الوصفي التحليلي والتحليل الكمي القائم على استخدام النماذج القياسية حيث تم استخدام منهج الحدود (The Bounds Testing)، وذلك باستخدام نموذج الانحدار الذاتي لفترات الإبطاء الموزعة والذي يعرف اختصاراً (ARDL Model). وخلصت الدراسة لعدة نتائج أهمها: ثبوت علاقة التكامل المشترك بين متغيرات الدراسة، وكذلك وجود علاقة طردية بين الإنفاق العام وباقي متغيرات الدراسة وبين معدل التضخم في الأجلين الطويل والقصير فيما عدا النقود بمعناها الواسع (M$_2$) فالعلاقة طردية في الأجل الطويل وعكسية في الأجل القصير. وأوصت الدراسة بأن يتم توجيه الإنفاق العام إلى الأنشطة الاقتصادية المنتجة، كما يجب التنسيق بين أجهزة الحكومة في الإنفاق الاستثماري لمنع تأثير أثر الإزاحة "المزاحة"، وذلك بتشجيع استثمارات القطاع الخاص عن طريق المشروعات الصغيرة والمتوسطة.

الكلمات الدالة: التضخم- الإنفاق الحكومي الاستهلاكي- نموذج ARDL

The introduction:

Public spending is one of the financial policy tools that the state may use to influence many economic phenomena in order to achieve economic goals: raising the rate of economic growth - reducing inflation and unemployment rates. The high rate of inflation is considered one of the most important problems that countries suffer from, whether developed or developing, as it affects the economy negatively. Therefore, we see all governments implementing programs and policies in order to control inflation rates.

The changing role of the state in economic and social life and its transformation from a guardian state to an intervening state led to the development and expansion of its tasks, and thus an increase in its public expenditures. Public spending is considered one of the most important criteria used to measure the extent of state intervention in economic activity.

Government spending has a prominent impact on overall economic activity, especially aspects of price and monetary stability. Government spending has a clear impact on all aspects of economic activity, as it can cause inflationary pressures in the economy, and it can have a weak impact on prices. For example, if the goal of increasing government spending is to reduce public debt, it will have a weak effect on prices, whereas if its goal is to increase the purchasing power of individuals, this will lead to higher prices (Noureddine, 2017).

Accordingly, the **problem** of the study is to answer the following question:

To what extent does public spending affect the inflation rate in Egypt during the period (1976-2021)?

In light of the study problem, the following two **hypotheses** can be formulated:

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-There is a direct relationship between public spending and the inflation rate in Egypt during the study period.

- There is a statistically significant relationship between government spending and the inflation rate in Egypt during the study period.

The **importance** of the study is evident from the importance of the topic it discusses through the following points:

- Testing the impact of public spending in Egypt on inflation in Egypt.

- The study discusses one of the most serious problems facing countries, which is the problem of inflation, as it has a direct negative impact on the real income of individuals in society, and therefore it is important to search for appropriate policies to treat this problem.

Accordingly, the **objectives** of the study can be formulated as follows:

- Identify the conceptual framework for both public spending and the inflation rate.

-Knowing the impact of the development of public spending on the inflation rate in Egypt during the study period through the estimated econometric model.

- Providing some proposals to address the problem of inflation as well as the optimal use of public spending.

The study **methodology** can be determined as follows:

To achieve the research objectives and to address the research problem, the study relied on the deductive method. The study used the case study method to identify the impact of public spending on the inflation rate in Egypt. The research also used the descriptive and analytical method to review and analyze data on government spending and the inflation rate obtained from international development indicators issued by the International Bank for Reconstruction and Development. The study also used econometric models based on time series analysis, where the Bounds Test Approach was used, using the Autoregressive Distributed Lag Model (ARDL Model).

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The **limitations** of the study can be determined as follows:

- Location: Arab Republic of Egypt.

- Temporal: period (1976-2021).

The study **plan** can be determined as follows:

- First section: Conceptual framework and literature review.

- The second section: Tracking the development of government spending and the inflation rate in Egypt during the study period.

- Third section: The econometric model to estimate the effect of government spending with other variables on the inflation rate in Egypt during the study period.

- Fourth section: Conclusion (results and recommendations).

1. Conceptual framework and literature review:

1.1 Public spending:

1.1.1 Concept:

Public expense can be defined as follows:

- An amount of money spent by a public person with the aim of achieving a public benefit (Al-Aasar, 2016).

- An amount of money issued by a state or a public legal entity, with the aim of achieving a public benefit (Ibrahim, 2017).

1.1.2 Pillars:

- A cash amount (Mahmoud, 2010).

- Issued by the state or one of the components of its authorities (Al-Majdi, 2014, p. 195).

- Its goal is to achieve public benefit (Al-Majdi, 2014, p. 179).

1.1.3 Divisions:

There are several criteria for dividing public expenditure, the most important of which are (Taqa and Al-Azzawi, 2007):

- The nature of the expense: real - transferable.

- The periodicity of alimony: current - capital.

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- The purpose of alimony: administrative - economic - social.

1.1.4 Effects:

The effects of government spending can be limited to the following points (Baswed, 2017):

- Stimulate national production.
- Direct impact on national consumption.
- Contributing to achieving balance in the national economy.
- Contributing to the redistribution of income.

1.2 Inflation:

1.2.1 Concept:

Inflation can be defined as: a continuous rise in the general level of prices, which results in a decline in the purchasing value of the currency in the markets (Maarouf, 2005).

1.2.2 Types and source of occurrence:

The economic literature indicates the existence of several forms of inflation. Economists rely on a set of criteria by which these forms are classified. Perhaps among these criteria are the following:

- Inflation by its strength (Ramadan, 2016):
* Hyperinflation. * Creeping inflation.
- Inflation by source (Masouda and Marzouk, 2016):
* Domestic inflation. * Imported inflation.

1.2.3 Measurement methods:

There are several ways to measure inflation, perhaps the most important of which are the following (Al Ziara and Al Brain, 2012):

- The gaps method: This method is influenced by Keynesian thought, which is the difference between the volume of goods and services produced and the purchasing power available to consumers.

- The surplus money supply method: This method is influenced by the monetary thought of the Chicago School adopted by the International

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Monetary Fund, and it is the difference between the change in the money supply and the change in the demand for money.

- Index numbers method: It is the most widely used method and it estimates the inflation rate through price developments.

1.3 The relationship between public spending and inflation:

To clarify the relationship between public spending and inflation, we will review some theories about the causes of inflation:

- Demand-pull inflation theory: Inflation occurs according to this theory because there is a surplus of aggregate demand over aggregate supply in the market for goods or factors of production. At the level of full employment, the increase in public spending leads to an increase in aggregate demand for goods and services, which in turn leads to an increase in the general level of prices (Kazem, 2005).

- Cost inflation theory: Inflation occurs according to this theory when production costs rise and therefore producers raise the prices of their products. This results in workers and trade unions demanding a wage increase. This leads to an increase in the cost of production, forcing producers to raise prices (Azza, 2015).

- Structural theory of inflation: This theory believes that there are structural factors that contribute to the occurrence of inflation, and these factors differ in developed countries from developing countries. For example, the structural imbalances that exist in developing countries work to increase the amount of money and thus spending, which leads to the emergence of inflationary forces. For example, the productive system in developing countries is characterized by inflexibility (i.e. the inability to increase supply and its limitations), and this is matched by an increase in the volume of spending, meaning the total demand will be greater than Aggregate supply, which leads to inflation (Issa, 2007).

When the state faces imbalance, the state uses monetary policy tools, fiscal policy tools, or both, in order to reach a state of balance. For example,

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with regard to government spending, as one of the financial policy tools, it increases or decreases it based on the status of the economy.

In the case of inflation, the government reduces government spending, which results in the volume of consumption, that is, reducing aggregate demand, which contributes to lowering prices and thus reducing inflationary pressures, and vice versa in the case of deflation.

1.4 Literature review: Many studies have addressed the impact of government spending on the inflation rate, whether in Arabic or English, including the following:

1.4.1 Studies in English:

- A study (Shifaniya, Hettiarachchi, Weeraddana, & Parmila, 2022) analyzes the relationship between government spending and inflation in India and Sri Lanka during the period (1977-2019), using co-integration with a bounds test and an autoregressive distributed lags (ARDL) model. The results showed a stable co-integration relationship between the variables in the two countries and the existence of a positive and statistically significant relationship between government spending and inflation in the long run, where increasing government spending by (1%) leads to an increase in the inflation rate (0.0793%) and (4.6469%) in both countries. India and Sri Lanka respectively. Granger causality test also indicates a one-way relationship of government expenditure to inflation. The study recommends the need for Sri Lanka to manage its public expenditures because of its impact on money supply and thus price stability.

- A study (Joy, Okafor, & Abaa, 2021) examines the relationship between public capital expenditure on the inflation rate in Nigeria during the period (1981-2015) using the co-integration technique via the autoregressive distributed lags (ARDL) model. The results showed that the co-integration relationship between the variables was proven and that capital spending had a significant negative impact on the inflation rate in Nigeria during the study period. The study also recommended the need for the government to

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increase its investments in productive sectors while encouraging skilled citizens to participate in production, which leads to reducing expenses and thus reducing the rate Inflation.

- A study (Ebisine & Oki, 2021) studied the impact of public spending on inflation in Nigeria during the period (1981-2018), relying on the descriptive analytical method as well as the quantitative analysis method, relying on time series analysis using the co-integration technique and the error correction model. The results revealed a long-term relationship between the variables, as there is a positive, non-significant relationship between government spending on (transportation, communications, defense, education) and inflation during the study period. There is also an inverse, non-significant relationship between government spending on (agriculture, health), and inflation in Nigeria during the study period. The study also recommended directing public spending to productive economic activities, which enhances price stability, and there must be coordination between government agencies in government consumer spending to prevent the impact of the "crowding out" effect on government investments.

- A study (Onuoha & Okorie, 2020) aimed to measure the impact of government spending on inflation in eleven selected African countries during the period (1990-2019) using the co-integration technique for Panel Data models, and the results showed the existence of an integration relationship. What is common among the variables is that a change of (1%) in capital spending and defense spending leads to a change of approximately (0.55%) and (0.27%) in the inflation rate, respectively. The study recommended the need for the governments of the countries selected in the research to appropriately direct spending to develop infrastructure in a way that does not exacerbate the problem of inflation, and this can be done by issuing infrastructure bonds, as well as the need to support private investment and foreign direct investment to reduce government expenditures and direct them to non-inflationary growth.

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- A study (M'hamed & Senoussi, 2019) aimed to study the impact of government spending on inflation in Algeria during the period (1986-2016), relying on the descriptive analytical method as well as the quantitative analysis method, relying on time series analysis using the Johansson co-integration technique. After confirming the absence of a co-integration relationship between the variables, a vector autoregressive model (VAR) was used, which showed a direct relationship with capital expenditures with inflation and an inverse relationship with current expenditures. The study recommended several recommendations, the most important of which is the need to increase the flexibility of the production system by activating productive sectors such as agriculture and industry, while encouraging small and medium enterprises by directing public spending to them.

1.4.2 Studies in Arabic:

- A study (Awad, 2022) examines the impact of government spending and tax revenues on the rate of economic inflation in Palestine during the period (1996-2017) using the co-integration technique via the Vector Error Correction Model (VECM). The results of the study showed the presence of a direct statistically significant effect for government spending on inflation rates, as if government spending increases by (1%), it will increase inflation (0.37%). The study also recommended rationalizing government spending and making it on priority aspects that contribute to creating job opportunities.

- A study (Maglakh and Bashishi, 2021) examines measuring the impact of some economic and monetary variables on the inflation rate in Algeria during the period (1970-2018) using the Vector Autoregressive Model "VAR", in which the results showed the presence of statistically significant relationships, and the existence of a two-way causal relationship between the inflation rate and public expenditures, and a one-way causal relationship between the inflation rate and both the monetary supply and the exchange rate. The study recommended developing mechanisms to control the

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exchange rate of the national currency, along with setting a policy targeting reducing inflation.

- A study (Rahouma and Bel Abbas, 2019) that studied the impact of government spending on North African countries (Egypt - Tunisia - Algeria - Morocco) during the period 2000-2016 by applying cross-sectional time series data models (Panel Data). The results of the study showed that government spending had a direct impact on inflation, as the spending policies applied in countries lead to an increase in prices and thus the occurrence of inflation, as the increase in government spending led to an increase in demand for final consumer goods and services more than the demand for investment goods, and the severity of the inflation problem increases in Egypt and Tunisia, which is greater than in Algeria and Morocco.

- A study (Abd Rabbo, 2017) that studied the impact of both government spending and the money supply on inflation in Egypt during the period (1980-2016) by applying the Vector Autoregressive Model (VAR), as well as measuring the causal relationship using the Granger methodology. The results showed a one-way causal relationship between money supply and inflation, and a two-way causal relationship between government spending and inflation. The study recommended the need to reform monetary policy by linking money supply to growth in gross domestic product and fiscal policy by rationalizing government spending and directing it to productive activities.　　Notes from studies

It is noted from studies which previously discussed that there is no agreement among these studies regarding the impact of variables affecting the inflation rate, and that this varies according to the circumstances of each country. Therefore, the current research differs from studies which previously discussed in several aspects, perhaps the most important of which are:

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- It uses modern analytical and measurement methods in time series analysis through the co-integration method.

- Lack of studies related to analyzing the determinants of inflation in the Egyptian economy.

- It covers a relatively longer period of time, as well as being more recent compared to most previous studies.

2 The evolution of both the inflation rate and government spending during the period (1976-2021):

This section reviews the development of both the inflation rate and final government spending as a percentage of GDP during the study period, as shown in Tables No. (1) and (2) in the statistical appendix as well as Figures No. (1) and (2).

2.1 Evolution of the inflation rate:

Table No. (1)

Shows the average inflation rate and government spending during each decade

Years	Inflation, consumer prices (annual %)	General government final consumption expenditure (% of GDP)
1976-1980	12.97	18.96
1981-1990	16.96	14.69
1991-2000	9.08	10.85
2001-2010	8.40	11.91
2011-2021	11.29	10.09
1976-2021	11.60	12.62

Source: Prepared by the researcher based on the data in Table No. (2) in the statistical appendix.

Figure No. (1)

Shows the development of the inflation rate during the period (1976 - 2021)
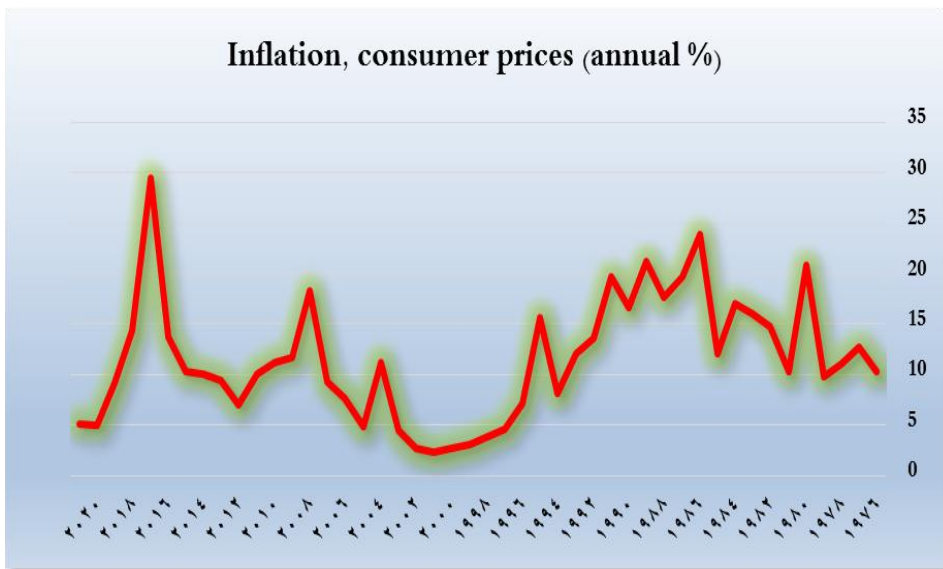
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Source: Prepared by the researcher based on the data in Table No. (2) in the statistical appendix.

From Tables (1) and (2) in the statistical appendix and Figure (1), we note the following:

-The inflation rate fluctuated during the study period. In the seventies, we find that the average was (12.97%), then it rose to (16.96%) during the eighties, due to the economic crises that passed through the Egyptian economy, from the decline in export earnings to the decline in oil prices and the increase in the value of imports, thus increasing pressure on the value of the pound and the spread of the black market for currency trading, which led to an increase in prices and a rise in the inflation rate.

- As for the 1990s, we find a decline in the average inflation rate to reach (9.08%) due to the deflationary policies followed by the state after implementing the economic reform and structural adjustment program in 1991, the results of which included controlling the exchange market and eliminating the black market for currency trade, which led to stability. The

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exchange rate, as well as the use of treasury bills and bonds to finance the budget deficit, that is, they are financed with real sources and not by increasing cash issuance, which led to a decrease in inflation rates during the nineties. The decline continued during the first decade of the current century, reaching (8.4%).

- In the second decade of the current century, we find an increase in the average to reach (11.29%). This is due to the economic and political instability after the January 2011 revolution, which directly affected all aspects of economic activity, in addition to the pressure on the value of the pound and the return of the black market for currency trade, which It ultimately led to the decision to liberalize the exchange rate in November 2016, which was the main reason for the rise in inflation rates, which reached unprecedented rates of (29.51%) in 2017, that is, immediately after the liberalization of the exchange rate.

- We find that the average for the period is (11.6%), and its highest value was (29.51%) in 2017 and its lowest value (2.27%) in 2001.

2.2 evolution of government spending:

Figure No. (2)

Shows the development of government spending as a percentage of GDP during the period (1976 - 2021)
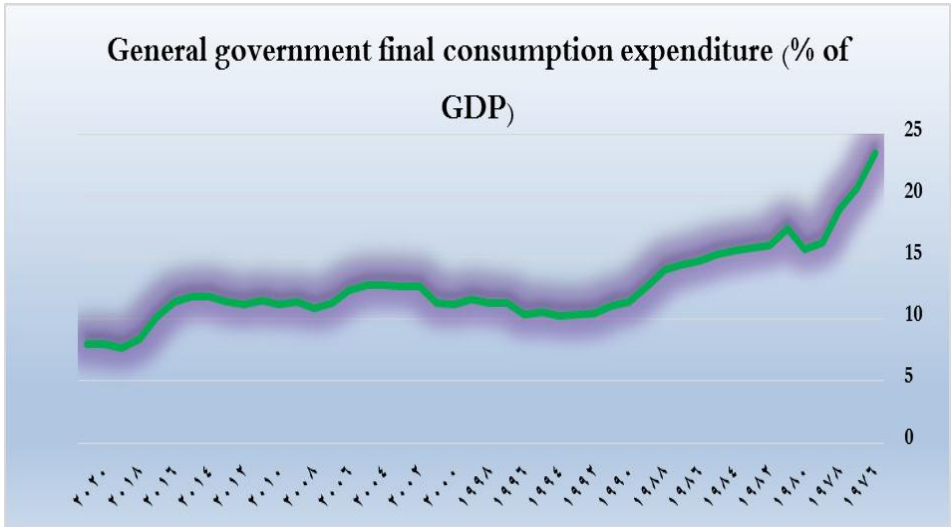
Source: Prepared by the researcher based on the data in Table No. (2) in the statistical appendix.

From Tables (1) and (2) in the statistical appendix and Figure (2), we note the following:

- There is a general negative (downward) trend in government spending due to Egypt suffering from a permanent deficit in the state's general budget, so it seeks to remedy this deficit by reducing government spending.

- We find that the average government spending during the seventies was (18.96%) of the GDP, then it decreased until it reached (14.69%) of the GDP during the eighties, in the state's attempt to reduce the general budget deficit, then it continued to decline until it reached (10.85%) of GDP in the 1990s, after Egypt implemented the economic reform and structural adjustment program, one of the goals of which was to reduce the budget deficit by reducing public expenditures.

- However, with the first decade of the current century, there was a slight increase in government spending, reaching (11.91%) of the GDP. However,

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in the second decade, after the January 2011 revolution, we find that there was a decrease in government spending, reaching (10.09%) of the GDP.

- The average value for the period was (12.62%), the highest value was (23.44%) achieved in 1976, and the lowest value was (7.66%) achieved in 2019.

3. An econometric model showing the impact of government spending on the inflation rate in Egypt:

The model aims to estimate the parameters of the factors affecting the inflation rate, determining their impact, in addition to determining the relative importance of each of them during the period (1976-2021), which may help in determining appropriate economic policies to treat the high inflation rate in the future. We will follow the following steps:

3.1 Description of the model and identification of variables and data sources:

According to the applied literature discussed in the first section, the estimated model links the inflation rate (Inf) as a dependent variable, and the factors affecting this rate as independent variables, the most important of which are: government spending as a proportion of GDP (expn), the credit interest rate (r), the broad money as a proportion of GDP (m_2) (: m2), the effective foreign exchange rate (EXCH), the economic growth rate (GDP), and thus the function that expresses the model used is in the following form:

$$\text{Inf}_t = f\,(\text{expn}_t\ r_t\ m_{2t}\ \text{exch}_t\,). \quad (1)$$

Therefore, the equation of the proposed model can be written as follows:

$$\text{Inf}_t = \beta_0 + \beta_1\,\text{expn}_t + \beta_2\,r_t + \beta_3\,m_{2t} + \beta_4\,\text{exch} + u_t \qquad (2)$$

The research used time series for all variables for the period (1976-2021) from the World Development Indicators issued by the International Bank for Reconstruction and Development.

3.2 econometric approaches:

In order to determine the impact of government spending on the inflation rate in Egypt, the co-integration method was used through Bounds

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Test, known as (Auto Regressive Distributed Lag "ARDL"), which is based on the Unrestricted Error Correction Model. UECM), which contains time lag periods, and thus relationships, can be measured in both the long and short terms. This method of analysis is characterized by the following (Narayan & Narayan, 2005):

. It is used when the order of integration differs between variables in the form I (0) or I (1).

. It is preferred in the case of small samples as they are more accurate.

. It takes into account structural changes in time series of variables over time.

The model is applied by following the following steps (Naga, 2023, p. 35):

i. Co-integration analysis: This step passes two tests as follows:

- Unit root test to determine the stationarity or non-stationarity of the variables included in the model.

- Testing the availability of co-integration through bounds tests.

ii. Estimating long-term relationships using the ARDL model.

iii. Estimating short-run relationships using the error correction model (ECM).

3.3 Co-integration Analysis:

3.3.1 Unit Root Test:

This test is used to determine whether the time series data for the variables in the model are stationary or not, and if they are not stationary, how many differences are used to achieve stationarity for these series, and thus the degree of integration of the variables is determined. (ARDL) analysis analyzes the relationships between variables with a different degree of integration, whether I (0) or I (1), but it is not allowed to use variables with degree of integration I (2) (Koop, 2000).

Tables No. (3) and (4) in the statistical appendix show the unit root test results using the Augmented Dickey-Fuller "ADF" and Phillips-Perron "PP" tests, using the (Eviews12) program. The results indicate that all

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variables are stationary at the first difference, I (1), except for government spending as a percentage of GDP, which is stationary at the level I (0).

3.3.2 Co-Integration Test:

The presence of co-integration will be revealed through the Bounds Test, in order to determine the extent of the presence of the phenomenon of co-integration between the variables of the model, and it will be determined whether there is a long-term relationship between the variables of the model or not (Naga, 2023, p. 38).

The general form of the equation for the ARDL model, which combines all variables in the short and long run, and which is used in conducting co-integration tests, is as follows:

$$
\begin{aligned}
\Delta Inf_t &= \beta_0 \\
&+ \left[\sum_{i=1}^{p} \delta_{1i} \Delta Inf_{t-i} + \sum_{i=0}^{q} \delta_{2i} \Delta expn_{t-i} + \sum_{i=0}^{q} \delta_{3i} \Delta r_{t-i} + \sum_{i=0}^{q} \delta_{4i} \Delta exch_{t-i} + \sum_{i=0}^{q} \delta_{5i} \Delta m2_{t-i} \right] \\
&\qquad\qquad\qquad\qquad \textbf{ARDL Short Run Terms} \\
&+ \left[\varphi_1 inf_{t-1} + \varphi_2 expn_{t-1} + \varphi_3 r_{t-1} + \varphi_4 exch_{t-1} + \varphi_5 m2_{t-1} \right] \\
&\qquad\qquad\qquad \textbf{Long Run Term} \\
&+ u_t \qquad\qquad \textbf{(3)}
\end{aligned}
$$

Where: (q) refers to the number of time lags of the variables, (Δ) refers to the first difference of the variables, δ_{1i}: δ_{5i} refers to the short-run parameters, φ_1: φ_5 refers to the long-run parameters, β_0 is the constant term parameter, and u_t is the random error term.

Table No. (5) in the statistical appendix shows the results of the Bounds Test, where we compare the calculated F-statistics value with its tabulated values, as the null hypothesis and the alternative can be explained as follows (Naga, 2023, p. 39):

H₀: $\varphi_1 = \varphi_2 = \varphi_3 = \varphi_4 = \varphi_5 = 0$

H₁: $\varphi_1 \neq \varphi_2 \neq \varphi_3 \neq \varphi_4 \neq \varphi_5 \neq 0$

We note that the value of the calculated (F-statistics) = (4.872276), which is greater than the value of the tabulated (F-statistics) at a significance level of (5%). Therefore, the null hypothesis that there is no long-term

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relationship between the variables can be rejected, and the alternative hypothesis that there is a long-run relationship between variables is accepted.

3.4 Estimating the relationship in the long term:

After establishing the property of co-integration between the variables in the previous step through Bounds Test, in this step we will estimate the relationship between the variables in the long run, and the general formula for the long-run inflation rate equation is as follows:

$$Inf_t = \beta_0 + \sum_{i=1}^{p} \varphi_{i1} Inf_{t-i}$$
$$+ \sum_{i=0}^{q} \varphi_{2i} expn_{t-i}$$
$$+ \sum_{i=0}^{n} \varphi_{3i} r_{t-i} \sum_{i=0}^{m} \varphi_{4i} exch_{t-i} + \sum_{i=0}^{o} \varphi_{5i} m2_{t-i}$$
$$+ u_t \qquad (4)$$

Where (m,n,o,p,q) represents the number of time lag periods for each variable, while φ_1: φ_5 are the long-term parameters to be estimated, which appear in Table No. (6) in the statistical appendix, and from the table we note:

- The inflation rate is **positively** affected by government spending (expn), as the estimated value indicates that increasing government spending by (1%) results in an increase in the inflation rate by (1.36%) at a significant level (1%), meaning that increasing government spending increases money, circulated between individuals, aggregate demand exceeds aggregate supply, which leads to an increase in the inflation rate in the long run.
- The inflation rate is **positively** affected by the interest rate (R), as the estimated value indicates that increasing the interest rate by (1%) results in

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an increase in the inflation rate by (1.52%) at a significant level (1%), meaning that increasing the interest rate increases the cost of production, which increases the prices of products in the market, which leads to an increase in the inflation rate in the long run.

- The inflation rate is **positively** affected by the broad money (M_2), as the estimated value indicates that increasing the broad money by (1%) results in an increase in the inflation rate by (0.2%) at a significant level (1%), that is, increasing the money in circulation among individuals, so it increases Aggregate demand exceeds aggregate supply, which leads to an increase in the inflation rate in the long run.

- The inflation rate is **positively** affected by the exchange rate (exch), as the estimated value indicates that an increase in the exchange rate by (1%) results in an increase in the inflation rate by (0.46%) at a significant level (5%), and since in Egypt its imports are characterized by not flexibility because most of it is food and production supplies. Increasing the exchange rate increases the prices of imported products in the market, which leads to an increase in the inflation rate in the long run (imported inflation).

- The explanatory power (Adjusted R-squared) indicates that (62%) of the changes in the inflation rate can be explained by changes in the four variables included in the model, while (38%) of the changes in the inflation rate are due to variables not included in the model.

Tests of goodness of model:

The results of the diagnostic tests that appear in Table No. (7) in the statistical appendix indicate that the (p-value) is greater than (0.05) for the four tests, which indicates the acceptance of the null hypothesis for each of the diagnostic tests of the estimated model, which indicates that the residuals are free of a Heteroscedasticity problem, as well as the problem of serial correlation, as the residuals are normally distributed, as well as the fitting of the functional form of the models.

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Tests of stability of the model:

Figure No. (3)

Shows the stability test of the long-run model
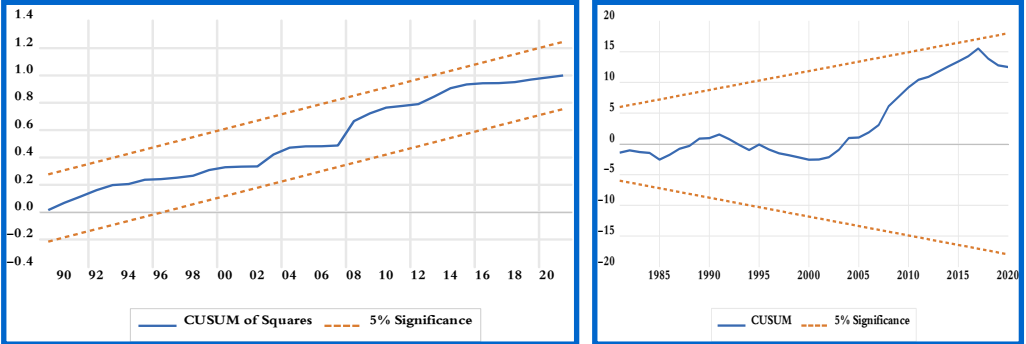
Source: Prepared by the researcher using Eviews 12 software.

The two tests for model stability indicate the stability of the model that was prepared and thus the possibility of using it in prediction, as the error values did not exceed the confidence limits of 5% according to the stability test for the two models, as shown in the figure above.

3.5 Estimating the relationship in the short run:

The short-run parameters are estimated by the error correction model (ECM), and the general form of the ECM equation is as follows:

$$\Delta Inf_t = \beta_0 + \sum_{i=1}^{p-1} \beta_{1i} \Delta Inf_{t-i}$$

$$+ \sum_{i=0}^{q-1} \beta_{2i} \Delta expn_{t-i}$$

$$+ \sum_{i=0}^{n-1} \beta_{3i} \Delta r_{t-i} \sum_{i=0}^{m-1} \varphi\beta_{4i} \Delta exch_{t-i} + \sum_{i=0}^{o-1} \beta_{5i} \Delta m2_{t-i}$$

$$+ \varphi ect_{t-1} + u_t \qquad (5)$$

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Where (Δ) represents the first difference of the variables, (β_1: β_5) represents the parameters to be estimated in the short run, φ shows the speed of adjustment in the short run to reach equilibrium in the long run, (ECT) the Error Correction Term in the rate of inflation resulting from a change in the factors affecting it, it explains the time period required for the dependent variable to achieve equilibrium with the independent variables in the long run. Table No. (8) in the statistical appendix shows the results of the short-term estimates. We note from them:

- The inflation rate is negatively affected by the inflation rate in the previous year, that is, by one lag period inf (-1) in the short run.

- It is positively affected by government spending, whether in the same period or in one lag period; it is consistent with the result achieved in the long term.

-It is positively affected by the interest rate in the same period; it is consistent with the result achieved in the long term.

- It is negatively affected by the broad money in the same period; it is not consistent with the result achieved in the long term.

- It is positively affected by the exchange rate in the same period; it is consistent with the result achieved in the long term.

- The value of the error correction term is significant and negative, and it shows that any shocks or imbalances that occur in the short term are corrected at a rate of (51%) annually, that is, any imbalance in the inflation rate is corrected within approximately two years.

Tests of goodness of model:

The results of the diagnostic tests that appear in Table No. (7) in the statistical appendix indicate that the (p-value) is greater than (0.05) for the four tests, which indicates the acceptance of the null hypothesis for each of the diagnostic tests of the estimated model, which indicates that the residuals are free of a Heteroscedasticity problem, as well as the problem of

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serial correlation, as the residuals are normally distributed, as well as the fitting of the functional form of the models.

Tests of stability of the model:

Figure No. (4)

Shows the stability test of the short-run model
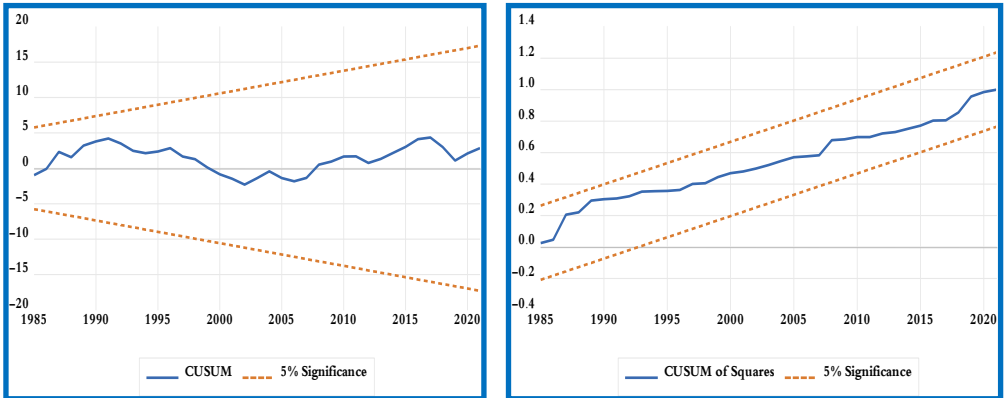
Source: Prepared by the researcher using Eviews 12 software.

The two tests for model stability indicate the stability of the model that was prepared and thus the possibility of using it in prediction, as the error values did not exceed the confidence limits of 5% according to the stability test for the two models, as shown in the figure above.

4. Conclusion:

Inflation is considered one of the most important problems facing the economy of any country, whether developed or developing, and all countries seek to address this problem. Government spending is also one of the financial policy tools that countries use to achieve economic policy goals represented by economic stability (increasing economic growth rates - reducing unemployment and inflation rates - external balance), and the state may use it to solve some of the problems facing its economy. In this study, we studied and analyzed the impact of government final consumer spending

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on inflation rates during the period (1976-2021). The study reached results, the most important of which are:

4.1 Results:

- Inflation rates fluctuated during the study period, but the eighties are considered the largest decade in which inflation achieved high rates.
- Government spending during the study period took a general decreasing trend.
- The inflation rate is directly related to all study variables.
- The inflation rate during the study period was at high rates after every decision to devalue the currency. In 1990, the inflation rate was (16.76%) and rose to (19.75%) in 1991 after the devaluation of the pound in 1991 to become (3.14) pounds to the dollar after It was (1.55) pounds to the dollar in 1990, after the implementation of the economic reform program in 1991. However, after the reduction in 2003, the inflation rate increased from (4.51%) to (11.27%) in 2004, after the exchange rate was (4.50). pounds in 2002, then it became (6.20) pounds in 2004. After the 2016 devaluation, the exchange rate was (10.03) pounds in 2016, then it became (17.78) in 2017. The inflation rate jumped from (13.81%) in 2016 to (29.51%) in 2017, which is the highest inflation rate during the study period.
- Proving a statistically significant relationship between government spending and the inflation rate.

Based on these results, the study presents the following recommendations:

4.2 Recommendations:

- Adjusting government spending growth rates in Egypt so that they are compatible with national production and real GDP growth.
- Achieving efficiency and effectiveness in the use of available public resources, requires subjecting government spending to criteria of investment and economic feasibility.
- Directing government spending to profitable investment projects, and working to finance this investment spending through private savings, in

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order to prevent it from being directed to financing consumption spending that provokes inflation.

- Develop solid plans and programs to combat administrative and financial corruption in government institutions, as it is the largest aspect of wasted government spending in Egypt, which has contributed significantly to the rise in the general level of prices.

- Working to diversify sources of economic growth by paying attention to productive sectors such as agriculture and industry to reduce internal and external risks, especially since the agricultural sector is responsible for the phenomenon of inflation in many developing countries.

- Reviewing the financial and monetary policy in Egypt to ensure rationalization of government spending, especially consumption spending, and making the money supply in line with the real commodity supply, in order to curb inflation.

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Statistical Appendix:

Table No. (2) Study variables

Years	Inflation, consumer prices (annual %)	General government final consumption expenditure (% of GDP)	Lending interest rate (%)	Official exchange rate (LCU per US$, period average)	Broad money (% of GDP)
1976	10.32	23.44	8.00	0.39	45.66
1977	12.73	20.67	8.83	0.39	49.97
1978	11.08	18.84	10.17	0.39	53.35
1979	9.90	16.20	12.00	0.70	54.26
1980	20.82	15.67	13.33	0.70	66.42
1981	10.32	17.34	15.00	0.70	82.82
1982	14.82	15.96	15.00	0.70	79.23
1983	16.08	15.79	15.00	0.70	82.02
1984	17.04	15.51	15.00	0.70	82.05
1985	12.11	15.28	15.00	0.70	82.24
1986	23.86	14.74	15.00	0.70	84.13
1987	19.69	14.37	16.33	0.70	87.14
1988	17.66	13.96	17.00	0.70	88.55
1989	21.26	12.60	18.33	0.87	83.24
1990	16.76	11.38	19.00	1.55	86.13
1991	19.75	11.11	19.85	3.14	87.52
1992	13.64	10.42	20.33	3.32	84.54
1993	12.09	10.31	18.30	3.35	85.81
1994	8.15	10.29	16.51	3.39	84.63
1995	15.74	10.54	16.47	3.39	79.79
1996	7.19	10.37	15.58	3.39	78.64
1997	4.63	11.32	13.79	3.39	75.15
1998	3.87	11.31	13.02	3.39	77.03
1999	3.08	11.61	12.97	3.40	76.04
2000	2.68	11.20	13.22	3.47	76.74
2001	2.27	11.32	13.29	3.97	82.38
2002	2.74	12.59	13.79	4.50	87.84
2003	4.51	12.67	13.53	5.85	96.68
2004	11.27	12.75	13.38	6.20	96.68
2005	4.87	12.74	13.14	5.78	97.14
2006	7.64	12.29	12.60	5.73	97.39
2007	9.32	11.33	12.51	5.64	96.21
2008	18.32	10.89	12.33	5.43	88.40
2009	11.76	11.35	11.98	5.54	83.16
2010	11.27	11.16	11.01	5.62	80.75
2011	10.06	11.45	11.03	5.93	75.79
2012	7.11	11.18	12.00	6.06	69.72
2013	9.47	11.35	12.29	6.87	74.61
2014	10.07	11.85	11.71	7.08	75.44
2015	10.37	11.76	11.63	7.69	77.99
2016	13.81	11.43	13.60	10.03	98.14
2017	29.51	10.09	18.18	17.78	87.60
2018	14.40	8.35	18.32	17.77	77.77
2019	9.15	7.66	16.12	16.77	73.45
2020	5.04	7.92	11.37	15.76	79.97
2021	5.21	7.94	9.43	15.64	87.39

Source: Prepared by the researcher based on data World Bank, World Development Indicator, 2023

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Table Number (3)
Results of the Philips-Perron test to study the stability of the study variables at various levels

Variables	INF	EXPN	R	M2	GDP
With Constant & Trend	-3.3086	-3.7354	-2.3176	-3.2144	-4.839
t-Statistic	0.0203	0.0067	0.1710	0.0257	0.000
Prob.	**	***	no	**	***
With Constant	-3.5528	-3.8304	-2.4851	-2.8362	-5.341
t-Statistic	0.0457	0.0239	0.3337	0.1927	0.000
Prob.	**	**	no	no	***
Without Constant & Trend	-1.2595	-2.9845	-0.3254	0.4402	-2.352
t-Statistic	0.1882	0.0037	0.5626	0.8050	0.020
Prob.	no	***	no	no	**
At First Difference					
Variables	d(INF)	d(EXPN)	d(R)	d(M2)	d(GDP)
With Constant	-10.6067	-5.0307	-2.6131	-5.1688	-14.601
t-Statistic	0.0000	0.0002	0.0980	0.0001	0.000
Prob.	***	***	*	***	***
With Constant & Trend	-10.4703	-4.9559	-2.8535	-5.2507	-17.341
t-Statistic	0.0000	0.0012	0.1870	0.0005	0.000
Prob.	***	***	no	***	***
Without Constant & Trend	-10.7306	-4.8204	-2.7062	-5.1347	-14.154
t-Statistic	0.0000	0.0000	0.0079	0.0000	0.000
Prob.	***	***	***	***	***

Source Prepared by the researcher based on a program Eviews 12
Notes: (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1%. And (no) Not Significant.

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Table No. (4)
Results of the expanded Dickey-Fuller (A.D.F) test to study the stability of the study variables at various levels

At Level					
Variables	**INF**	**EXPN**	**R**	**M2**	**GDP**
With Constant	-3.3697	-3.3338	-2.3984	-3.4043	-4.8200
t-Statistic	0.0174	0.0663	0.1481	0.0162	0.0003
Prob.	**	*	no	**	***
With Constant & Trend	-3.1693	-3.8277	-3.5623	-3.1951	-5.3480
t-Statistic	0.1066	0.0456	0.0450	0.0989	0.0004
Prob.	no	**	**	*	***
Without Constant & Trend	-1.5460	-1.8784	-0.2243	0.5401	-2.3462
t-Statistic	0.1135	0.0582	0.5996	0.8289	0.0199
Prob.	no	*	no	no	**
At First Difference					
Variables	**d(INF)**	**d(EXPN)**	**d(R)**	**d(M2)**	**d(GDP)**
With Constant	-9.6849	-5.0478	-4.5403	-5.1531	-12.2640
t-Statistic	0.0000	0.0001	0.0007	0.0001	0.0000
Prob.	***	***	***	***	***
With Constant & Trend	-9.5962	-5.0044	-4.6991	-5.2315	-12.2172
t-Statistic	0.0000	0.0010	0.0025	0.0006	0.0000
Prob.	***	***	***	***	***
Without Constant & Trend	-9.7880	-4.8357	-4.6147	-5.1347	-12.2704
t-Statistic	0.0000	0.0000	0.0000	0.0000	0.0000
Prob.	***	***	***	***	***

Source Prepared by the researcher based on a program Eviews 12
Notes: (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1%. And (no) Not Significant.

Table No. (5) Bounds test results

F-statistic=4.872276** K=4		
I(1)	**I(0)**	
3.52	2.45	10%
4.01	2.86	5%
4.49	3.25	2.50%
5.06	3.74	1%

Source Prepared by the researcher based on a program Eviews 12
 *Significant ، %١ **significant ، %٥***significant . %١٠

Table No. (6)
Estimates of long-term inflation rate parameters

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXPN	1.35819	0.38745	3.50544	0.00110
R	1.51937	0.31727	4.78889	0.00000
M2	0.20161	0.08092	2.49142	0.01810
EXCH	0.46155	0.22314	2.06846	0.04510
C	-31.34064	10.88675	-2.87879	0.00640
R-squared	0.711164			
Adjusted R-squared	0.620903			

It was prepared by the researcher based on variable data sources and using the Eviews 12 program.

Table No. (7)
Results of diagnostic tests for the estimated models

Residual tests	Long term		Short term	
	F-statistic	P-Value	F-statistic	P-Value
Breusch-Godfrey Serial correlation LM Test*	1.878971	0.1697	0.553334	0.58
Heteroskedasiticity Test: Breush-Pagan-	0.595361	0.668	1.549511	0.1823
Normality test of residuals Jarque-Bera***	1.571572	0.455761	4.219740	0.121254
Ramsey Reset test****	0.002324	0.9977	0.5339	0.63886

Source: Prepared by the researcher based on variables data sources and using the Eviews 12 program.
* The null hypothesis of the test is: the absence of autocorrelation of the residuals, ** The null hypothesis of the test is: the consistency of the random error variance. *** The null hypothesis of the test is: the residuals are normally distributed. **** The null hypothesis of the test is: accuracy of the model's description.

Final government consumer spending and its impact on the inflation rate in Egypt - an econometric study for the period 1976 – 2021

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Table No. (8)
Estimates of short-term inflation rate parameters

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF(-1))	-0.344403	0.146676	-2.348046	0.0243
D(EXPN)	1.576992	0.640033	1.838955	0.0344
D(EXPN(-1))	1.288923	0.45869	2.81001	0.0088
D(R)	1.97725	0.669335	2.954054	0.0054
D(M2)	-2.811773	0.795643	-3.533961	0.0014
D(EXCH)	1.428569	0.701096	2.037624	0.0492
ECT(-1)	-0.514727	0.184394	-2.791458	0.0083
R-squared	0.555259			
Adjusted R-squared	0.483139			

Source: Prepared by the researcher based on variables data sources and using the Eviews 12 program.