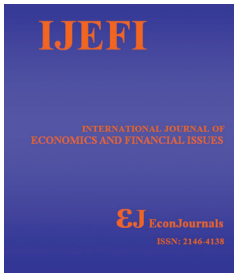

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Effect of Fiscal Policy on Economic Growth Sustainability in Egypt

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ABSTRACT

This study analyses how fiscal policy influences economic growth in Egypt by analyzing its components and building a model that captures both the short- and long-run economic patterns. The paper uses a time series methodology to investigate the relation between various fiscal policy measures and growth from 2000 to 2022. While tax receipts were separated into distortionary and non-distortionary categories, government spending was categorized as productive or unproductive. Our results show that while income tax has no discernible effect on GDP, non-tax revenue and wages significantly impact economic growth at the 5% level. Additionally, government expenditures and investments in education and health were viewed as insignificant for immediate growth. These observations are crucial for Egyptian policymakers since they highlight the necessity to increase public expenditures while reducing wasteful spending.

Keywords: Fiscal Policy, Taxes, Economic Growth, Sustainability, Vector Autoregressive Model
JEL Classifications: E62, H21, H52, H54

1. INTRODUCTION

Increasing potential output remains a paramount priority for major developed and emerging market economies. Following the global financial crisis, which was made worse by the COVID-19 epidemic, and the ongoing conflict in Europe between Russia and Ukraine, the level of potential output in numerous affected countries has experienced a sharp decline, with the reduction in its growth rate persisting (Barro, 1990; IMF, Fiscal Monitor Report (n.d.). Consequently, restoring robust and sustainable growth has become essential to addressing future challenges, necessitating that policymakers effectively leverage fiscal tools to stimulate economic recovery and ensure long-term financial stability (Afonso and Furceri, 2010).

The two main pillars of fiscal policy are taxes and government spending. By funding public projects and providing necessary services, government spending is essential to increase aggregate demand, which in turn promotes economic growth and the creation of jobs (Gupta et al., 2005). In contrast, taxes are largely employed to finance public spending and preserve fiscal equilibrium, Nevertheless, the impact of these policies on the economy is contingent upon the structure and composition of the tax system in question. While indirect taxes are imposed on products and services, direct taxes are imposed on the income of individuals and enterprises; both types of taxes have different impacts on economic activity (Kneller et al., 1999).

In Egypt's case, fiscal policies are an important tool for fostering economic growth (Erős, 2010) and reducing the fiscal deficit, especially in light of the country's present financial difficulties. According to research, reorganizing public spending to give infrastructure and education priority can improve long-term growth potential (Adam and Bevan, 2005). Additionally, achieving better fiscal stability and lowering economic inequality may be facilitated by strengthening the tax system

and diversifying its structure (Blanchard and Perotti, 2002; Ali and Ahmad, 2010).

In the past, economic growth has been a key indicator of a country's development. In addition to its immediate positive effects on the economy, it stimulates investments that increase productivity, create jobs, reduce poverty, and boost human well-being in general. However, there has been a noticeable change in recent years towards putting human development first. To promote sustainable economic growth, this strategy emphasizes how crucial it is to use state resources effectively and efficiently, especially in areas like health and education (World Bank, 2020).

In light of this, the nexus between fiscal policy and economic growth has recently become a subject of intensified scrutiny and analysis, particularly with the emergence of endogenous growth theories. These theories underscore the significance of fiscal policies, especially public expenditure, in shaping long-term economic growth and ensuring its sustainability. Scholars such as Aghion and Howitt contend that fiscal policy, including public investment in education and health, can serve as a key driver of sustainable long-run economic growth. By investing in human capital, governments can promote innovation, enhance productivity, and mitigate inequality, collectively contributing to a sustainable growth trajectory (Aghion and Howitt, 1998). Consequently, the role of government spending is increasingly recognized as pivotal in promoting economic and human development (Barro, 1990). By prioritizing the development of human capital, governments can enhance productivity and ensure that the advantages of economic growth are equitably distributed, thereby cultivating a more inclusive and resilient economy (UNDP, 2019).

The interconnection between fiscal policy and sustainable growth has emerged as a pivotal topic of discussion in recent years, particularly concerning public expenditure. Governments are progressively acknowledging the importance of efficiently managing public spending to foster long-term economic stability and growth, particularly through investments in education, healthcare, and infrastructure (IMF, 2021).

It is worth noting that the Egyptian economy has confronted significant financial challenges, particularly following the January 2011 revolution. There was an increase in the level of fiscal deficit, which expanded from a range of between 7% and 8% of gross domestic product (GDP) before the revolution to approximately 10%-13% afterward. Public debt escalated from 80% of GDP in June 2010 to roughly 138% in June 2017, with interest payments consuming over a third of public spending by the 2017/2018 fiscal year (CAPMAS, 2017). This situation necessitated comprehensive financial and monetary reforms through an economic reform program. The key priorities of this program included achieving financial and economic stability, controlling the budget deficit and public debt, rationalizing public spending, reforming the energy subsidy system, addressing social impacts, and increasing government investment in health, education, and scientific research (Ministry of Finance, 2016).

The importance of this study lies in the efforts of developed and emerging countries, including Egypt, to attain long-lasting economic stability, accelerate economic growth and improve employment rates within the economy, which requires the availability of directed measures related to revenues (such as canceling tax exemptions and enhancing collection tax) in addition to continuing to rationalize and re-prioritize spending, increase the efficiency of public investments, and energy price reforms, while taking into account the social dimension. Social protection programs are directed to those who deserve it, which ultimately results in enhanced growth within the economy (Alderman et al., 2013). It is therefore crucial to undertake this study in order to ascertain the influence of fiscal policy on economic growth in Egypt. This will be achieved by employing a standard model that incorporates a number of economic variables, with the aim of formulating the most pertinent recommendations for decision-makers seeking to enhance economic growth per the findings of the standard study.

The objective of this paper is to assess the influence of fiscal policy on economic growth in Egypt over the period 2000-2022, and within the framework of a standard model that includes some economic variables, to propose the most important policies that may help decision-makers in raising growth rates according to the results of the study.

2. REVIEW OF LITERATURE

The nexus between fiscal policy and economic growth has been subjected to extensive empirical investigation, yielding mixed results. This literature can be categorized into two primary groups as follows:

2.1. Studies Examining the Interrelationship of Fiscal Policy Components

Many applied studies investigating the nexus between fiscal policy and economic growth have failed to consider the comprehensive structure of government revenues and expenditures. Instead, these studies predominantly focus on one aspect—either spending or taxation—thus introducing bias in coefficient estimates. Notably, Cashin (1995) conducted a study involving 23 developed countries from 1971 to 1988, which revealed a positive correlation between sustainable economic growth, government transfers, and public investment, while establishing a negative correlation between the level of taxation and economic growth. Similarly, Nikos (2009) analyzed 14 European Union countries during 1990-2006, concluding that government spending on infrastructure and human capital positively influences growth, while expenditures on social protection do not yield significant effects. This study also found that taxation generally dampens economic growth.

M'Amanja and Morrissey (2005) tested the relationship between government spending and taxation in Kenya from 1964 to 2002. He categorized government spending into two distinct types: Productive and non-productive. Similarly, he classified taxes into two categories: Distorted and non-distorted. The study concluded that non-productive spending and non-distorted taxes have no discernible impact on economic growth, contrary to the predictions of economic theory. The study revealed that productive spending has a pronounced adverse impact on economic growth. However,

government investment has been identified as a key driver of long-term growth. These insights have proven instrumental for Kenyan policymakers in shaping expenditure and taxation policies to mitigate unproductive expenditures while enhancing public investment.

2.2. Studies Focusing on Individual Aspects of Fiscal Policy

This section on the empirical literature covers two elements in the existing literature. The first element in Section 2.2.1 covers the relationship between Government Spending and Economic Growth; the link between Government Revenues and Economic growth is presented in Section 2.2.2.

2.2.1. Government spending and economic growth

The theoretical framework around government spending and economic growth is encapsulated in Wagner's Law, which posits a unidirectional causal relationship from GDP growth to government spending. Conversely, Keynesian economics argues that government spending drives GDP growth.

Landau (1985) identified a significant negative correlation between economic growth and government spending using quantitative analytical methods. In contrast, Fan and Rau (2003) established a significant positive relationship between government expenditure and economic growth in Asia and Africa from 1980 to 1998. Othman (2002) found a one-way causal relationship from GDP to government spending in Saudi Arabia (1965-1996), supporting Wagner's Law. Al-Haqbani (2004) reported a stable long-term relationship between GDP and government spending and identified bidirectional causality during the period from 1969 to 2000 using co-integration analysis.

Bagdige and Cetintas (2004) tested Wagner's Law within the Turkish economy (1965-2000) and posited that government spending is a consequence rather than a cause of GDP growth. Sobhi (2004) reported a positive impact of government spending on economic growth in Egypt (1974-2002). Similarly, Al-Ghalabi (2011) discovered a causal relationship from output to government spending in Iraq (1975-2010). Other studies, including those by Al-Mazrouei (2012) in the UAE, Ibrahim (2012) in Jordan, and Adel (2014) in Egypt, also corroborate the positive association between public spending and economic growth.

In contrast, Chipaumira and Mangena (2014) investigated the South African context and found a negative causal relationship, suggesting that an increase in government spending leads to a decline in growth due to inefficiencies in governmental programs. Ali (2015) argued for the importance of structural adjustments in local public spending to enhance its positive effects on economic growth, using a multi-equation regression model across Eastern European countries. Study of Ghadabna (2015) supported Wagner's hypothesis in Algeria (1990-2012), establishing a long-term causal relationship from government spending to GDP.

2.2.2. Government revenues and economic growth

The relation between taxation and economic growth is often viewed as indirect, with tax levels influencing capital availability, local savings, investment allocation, employment levels, and productivity. Economic theory generally predicts a negative correlation between taxes and economic growth, given their impact on investment and employment. For instance, Lucas (1990) found a negative yet insignificant relationship between economic growth and taxes, while Sobhi (2004) noted a detrimental effect of income tax on growth during Egypt's tax reforms Gustavo et al. (2013). Vazquez et al. (2010) reached similar conclusions in their comparative analysis of developed and developing nations (1972-2005).

Conversely, Adel (2014) identified a significant positive relationship between public revenues and economic growth in the short term, albeit a negative relationship in the long term. Other scholars, including Engen (1992) and Barro (1997), have underscored that tax revenues can stimulate growth when allocated effectively toward public services. Notably, Bakhtash Radia (2006) in Abdel Qader (1998) in Jordan reported positive associations between tax rates and GDP growth, challenging conventional economic theory by attributing these outcomes to effective public spending (tax revenues are used to finance government spending on public services such as health, education, and infrastructure projects, which have a positive role in supporting economic growth).

Given the limitations in existing studies—particularly the lack of integrated analysis of revenues and expenditures—this study aims to investigate the joint impact of these fiscal components on the gross domestic product (GDP/growth) of the Egyptian economy from 2000 to 2022.

3. THE ANALYTICAL FRAMEWORK

We will explain in this section 3 key parts: The first element in Section 3.1 covers the tax Revenue Analysis in Egypt; the Expenditure Analysis in Egypt (especially spending on health and education), is presented in Section 3.2; and the analysis of Egypt's economic growth pattern, is presented in Section 3.3.

3.1. Tax Revenue Analysis in Egypt

Public revenues are divided into tax and non-tax revenues, and taxes are the cornerstone of being an instrument that regulates the state's financial trajectory. Taxation is a key fiscal policy tool that affects economic activity. It influences investment and consumption by the government and individuals, and thus tax revenue receipts contribute a greater proportion of total public revenues than non-tax revenues.

Recent data indicates that tax revenues are a clear indicator of the development of economic performance during the study period, showing a clear increase in tax revenue growth rates and their proportion of public revenues as well as its ratio of GDP, the ratio of taxes to total revenues decreased from 72.4% in 2010/2011 to 57% in 2013/2014, affected by the events of the January 2011 revolution, and then began to increase, as tax revenues jumped dramatically beginning in 2016 owing to the commitment to implement a program of reforms resulting in the expansion of the tax base, The informal economy was incorporated into the formal economy as it contributed to raising tax revenues until it reached 78.2% in 2018/19, but again declined as a result of the fallout

from the COVID-19 pandemic and the Russia-Ukraine war until it reached 73.6% in 2021/2022.

Figure 1, shows the evolution of tax revenue structure as a percentage of total revenue in Egypt from 2000 to 2022. For the purposes of this study, the tax revenue structure includes income tax (Inc.), property tax (PT), value added tax (VAT), and taxes on international trade.

During the study period, over 80% of total taxes were paid from income, profit, and goods and services taxes. Tax revenues from income and capital gains (% of total tax revenues) decreased significantly from 51% in 2006/2007 to 44% in 2011/2012 as a result of Arab Spring events and continued political turmoil.

Income and profit tax is increasing at a higher rate than those of goods and services and, according to the literature in this context, this theoretically indicates the tax structure's tendency towards a greater degree of justice, tax on goods and services was the largest in the 1st years, and then the situation was reversed starting in 2005/2006 after the application of the Tax Law on Income No. 91 2005, with a surge in income and profit taxes in 2005/2006 of about 52.8%.

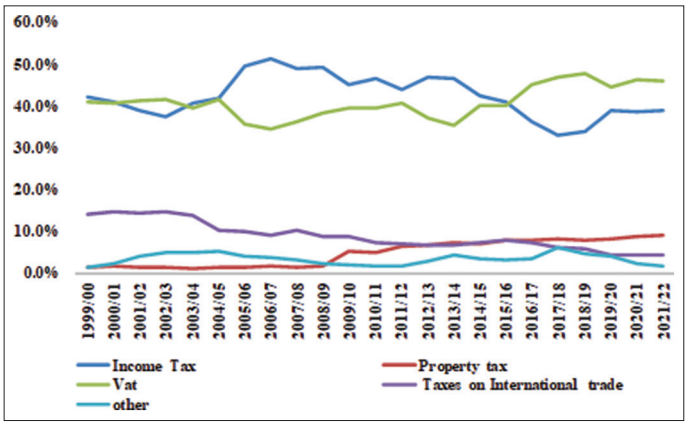
Taxes on goods and services (sales tax/VAT) include three main types of taxes: General taxes on goods and services, production taxes, and taxes on private services (stamp duty, resource development fee, and amusement park tax). More than half of sales tax's proceeds are derived from imported goods, which shows the extent of import dependency on the supply of different goods, resulting in weakening domestic production growth rates and possibly weakening the role of taxes in stimulating growth.

More than half of the sales tax's proceeds come from imported goods, illustrating the scale of import dependence on the provision of different goods, thus weakening domestic production growth rates, and possibly weakening the role of taxes in stimulating growth.

3.2. Expenditure Analysis in Egypt

During the period of study, the government pursued (implemented) an expansionary fiscal policy. The proportion of public expenditure

Figure 1: Tax revenues structure (% total revenues) in Egypt, 2000-2022



Source: By Author calculation depending on data from the Ministry of Finance

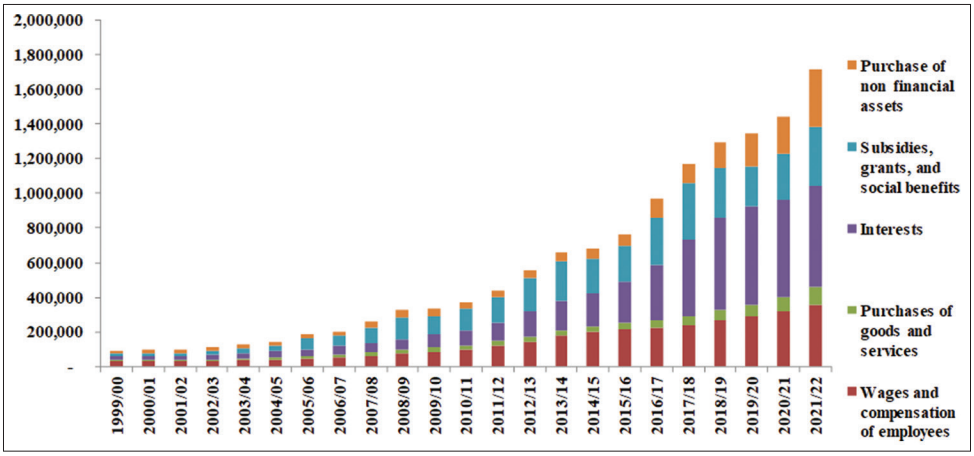
from GDP increased from 28.9% in 2000/2001 to about 33.6% in 2005/2006 and reached about 33.7% in 2008/2009. As a result of the implementation of the economic reform and rationalization program, expenditures began to decline as a proportion of GDP until they reached 22.8% in 2020/2001. Investment spending has also increased. As a result, the rate of economic growth has risen, but this growth has been volatile and unsustainable. It has been unable to sustain, resulting in a rapid and severe decline due to the 2008 global financial crisis, reaching a rate of 4.7%. and notes that current expenditures account for the largest proportion of total expenditures at the expense of investment expenditures, whose relative importance has declined as a result of the Government's response to many class demands through increased wages and pensions, The Egyptian economy was barely recovering from the global financial crisis until the 25 January 2011 revolution and the resulting events overshadowed the Egyptian economy, which led to a decline in the rate of economic growth. Public expenditures increased during the COVID pandemic in 2019, with 100 billion pounds allocated to fund the country's comprehensive plan to address the consequences of the coronavirus. Stimulus efforts to support industries and production projects, the largest package in the history of the Egyptian budget's economic crisis, exceeding the package of measures implemented in 2008 to address the global financial and economic crisis.

Figure 2, displays the composition of public expenditure by economic classification in Egypt, (1999/2000-2021/2022). Wages accounted for almost a quarter of expenditures throughout the study period, and they received the largest share of expenditures up to 2004/2005, then fell to second place in expenditures due to the substantial increase in the value of support. Wages were increasing annually at a rate of at least 10% until the 25 January 2011 Revolution and then jumped to 27.5% in 2010/11 as a result of the hiring of temporary workers who had spent at least 3 years on the one hand, and increased wages on the other.

For public investment (purchase of non-financial assets) Because of its linkage to the political conditions of the country, the Egyptian economy was shocked by the global financial crisis of 2008, the events of the Arab Spring in 2011, and the crises resulting from the COVID pandemic and the Russian-Ukrainian war, which may not contribute to the growth of the Egyptian economy as required, from 17.1% during 2000/2001 to 10% again in 2005/2002. (In the turbulent political circumstances of these 2 years, which discourage investment) It then began to grow again from 2016/2017 to reach 10.6%-13.3% during 2020/2021.

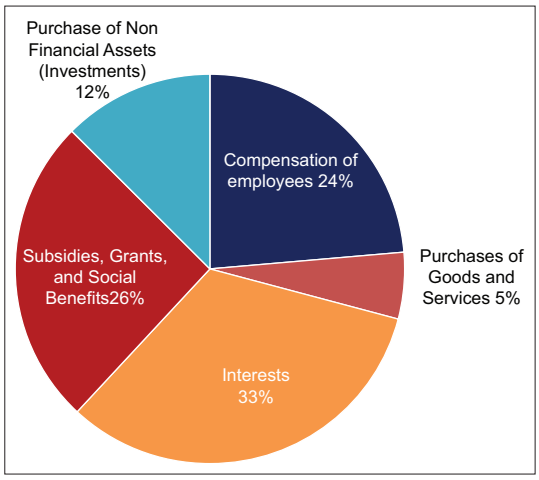
Figure 3 displays the Structure of public Expenditure in Egypt for the average period (1999/2000-2021/2022), and as shown from the pie chart, spending on interest, subsidies, and wages takes up the largest share of expenditures, contributing to a lack of economic productivity. This type of spending does not directly contribute to economic growth. Therefore, it is essential to shift towards increasing investment in productive sectors and infrastructure to stimulate economic growth and achieve sustainable development.

Figure 2: Expenditure analysis in Egypt, 2000-2022



Source: Figure is made by the Author. Fiscal data from the Ministry of Finance

Figure 3: Structure of public Expenditure in Egypt, Average for the period (1999/2000-2021/2022)



Source: Figure is made by the Author. Fiscal data from the Ministry of Finance

3.2.1. Government spending on health

Egypt has gone a long way in spending on the health sector, especially since 2000, where there has been considerable interest in the health sector. Its allocations in the general budget have increased, despite the decline in some other sectors against the backdrop of the structural adjustment program. However, the proportion remains weak compared to other countries and compared to spending on the remaining non-productive sectors. This requires more efforts to increase investment in the health sector, especially in light of the intellectual development of the relationship between health spending and economic growth. health sector expenditures have expanded and the health services market has evolved economic growth, and the more these expenditures are reflected in generating future incomes and expenditures and thus increase the economic growth rate, especially if the geographical expenditure approach is taken into account between the different governorates and regions, it also takes into account the quality and availability of health services received by citizens in a governorate (López et al., 2010).

The Egyptian government's spending on healthcare from 2000 to 2022 has shown gradual increases as a percentage of the Gross Domestic Product (GDP), though it has fluctuated based on various economic factors and health priorities. According to World Bank and WHO data, healthcare expenditure as a share of GDP averaged around 4%-5% during this period. The World Bank reports that the share of health spending relative to GDP reached a high of 5.5% in 2002, with some declines in subsequent years, reaching about 4.6% in 2021.

One notable point is that, despite increases, health spending in Egypt has remained below the global average, where countries tend to allocate around 7% of GDP to healthcare. In Egypt, significant portions of healthcare financing are covered by out-of-pocket spending by households, which puts pressure on low-income families and impacts healthcare access and affordability. Governmental policies in recent years have aimed at improving healthcare access and reducing out-of-pocket expenses, especially through programs like the "Universal Health Insurance" scheme.

On the other hand, wages and workers' compensation account for the largest part of expenditure in the health sector, followed by procurement of goods and services, and finally by investments in the health sector. Although the wage and workers' compensation consume the bulk of the expenditure, wages in this sector remain low for the largest proportion of workers, Thus, increased spending on the health sector requires higher expenditures for all sector items, especially investment in the sector, and also requires wage restructuring to ensure that workers in this sector are entitled to fair remuneration.

3.2.2. Government spending on education

The Egyptian government's spending on education from 2000 to 2022 has been impacted by economic and political shifts, with some efforts to improve allocation. Although spending has nominally increased, it often remains constrained by competing priorities and economic pressures. Sustainable improvements in educational outcomes may require a more substantial increase in spending and targeted allocation of resources.

Between 2000 and 2022, Egypt's government spending on education as a percentage of GDP showed significant fluctuations. Early in this period, government spending on education was around 4%-5%

of GDP, but it declined in recent years, reaching about 2.48% in 2020 (Mitran et al., 2012). This trend reflects various economic and policy changes, alongside challenges such as population growth and fiscal pressures on the Egyptian government to manage spending across other sectors like health and infrastructure.

Egypt's constitution mandates a minimum education expenditure of 4% of GDP, but actual spending has sometimes fallen below this threshold. For example, in 2020, spending was lower than the long-term average of around 4.09% of GDP, a decrease influenced partly by budget reallocations during economic reforms and the COVID-19 pandemic.

For Egypt to achieve sustainable economic growth in the long term, policymakers should prioritize education as a key element of fiscal policy. By investing in education, Egypt can enhance its human capital, improve productivity, and create the conditions necessary for sustained economic development (Said, 2022).

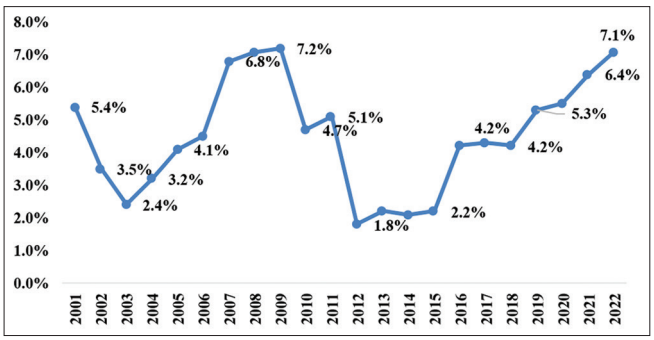
3.3. Economic Growth Analysis in Egypt

Egypt undertook significant economic transformations to stimulate growth and development between 2000 and 2022. This period began with economic reforms in the early 2000s aimed at liberalizing the economy and boosting foreign investments, gradually improving the business environment and growth rates (World Bank, 2007). Moreover, Egypt faced economic challenges due to political upheavals from 2011 to 2013, which led to slowed growth, rising unemployment, and inflation, highlighting the need for deeper economic reforms (African Development Bank, 2015).

Figure 4, reveals the real gross domestic product rate (GDP) during the study period. In 2016, Egypt launched a comprehensive Economic Reform Program in partnership with the International Monetary Fund, which included structural reforms. This program helped raise the growth rate to 5.3% by 2019 and improved foreign exchange reserves (IMF, 2019).

Additionally, Egypt has spearheaded the implementation of several significant national initiatives, including the construction of the New Suez Canal and the development of the New Administrative Capital. These projects are designed to enhance infrastructure, stimulate economic growth, and create employment opportunities. (Egyptian Ministry of Planning and Economic Development, 2019).

Figure 4: Egypt GDP growth rate (2000-2022)



Source: Figure is made by the Author. GDP data from the Ministry of Planning

Despite the considerable impact of the global pandemic caused by the COVID-19 virus in 2020, which reduced growth, Egypt partially recovered in 2021 thanks to stimulus policies. The government continues its efforts to achieve sustainable development under Egypt Vision 2030, focusing on financial inclusion, industrial development, and expanding renewable energy resources to support future growth and resilience (World Bank, 2021; Egyptian Ministry of Planning and Economic Development, 2022).

4. DATA, METHODOLOGY AND RESULTS

4.1. The Theoretical Framework

The present study employs a neoclassical growth model, founded upon the aggregate production function of the entire economy. The theory highlighted the significance of physical and human capital growth, as well as labor productivity growth as the primary drivers of economic growth. This is stated as follows:

$$Y = f(K, L) \quad (1)$$

where Y represents the level of economic output, as measured by the gross domestic product (GDP). In this context, K represents the physical capital stock, while L denotes the labor force.

In accordance with the Cobb-Douglas functional form, equation (1) can be expressed as follows:

$$Y = AK\alpha\, L\beta \quad (2)$$

In the traditional interpretation of Solow's (1956) model, changes in A are regarded as a reflection of technological advancement. Access to technology may, in turn, facilitate accelerated economic growth.

4.2. The Model Specification

To model the effect of government spending and tax revenue on economic growth, the study employs the following economic growth function:

$$Y = f(Wag, Edu, Inc, NTR) \quad (3)$$

From equation (3), The dependent variable is represented by Y (GDP); the independent variables are represented by the following symbols: Wag (spending on wages), Edu (spending on education), Inc. (income tax revenues), and NTR (non-tax revenues). The final form of Equation (3) is as follows:

$$GDP = \alpha + \beta 1 Wag + \beta 2 \log Edu + \beta 3 \log Inc. + \beta 4 Log\ NTR + ui \quad (4)$$

From equation (4), α is the constant term, the parameters $\beta 1$, $\beta 2$, $\beta 3$, and $\beta 4$ are to be estimated in relation to the explanatory variables, while the error term is represented by u_i.

4.2.1. Data description

The paper examines the effect of fiscal policy on economic growth in the Egyptian economy using annual data from 2000 to 2022. As in so much empirical literature, Real gross domestic product

(GDP) is a proxy for economic Growth. Spending on wages (wag), education (Edu.), income tax (Inc.), and non-tax revenue (NTR) are taken as a proxy for fiscal policy. Fiscal data collected from the Ministry of Finance. GDP data from the Ministry of Planning. Table 1 shows the descriptive statistics of the variables.

4.2.2. The Stationarity test (unit root test)

It is essential to ascertain the stationarity of each variable in a vector autoregressive model. The Augmented Dickey-Fuller test, as proposed by Dickey and Fuller (1979; 1981), is the most frequently employed unit root test for time series. Table 2 presents the results of the unit root test (Augmented Dickey-Fuller and Phillips-Perron) models, focusing on the most significant variables. As indicated in Table 2, all model variables were found to be stationary after taking the second difference, except for the log (Edu) series, which became stationary after taking only the first difference. This shows that there is no possibility of co-integration between variables of the model. It is, therefore, more appropriate to utilize a VAR model

4.2.3. The vector autoregressive model

The VAR model, which was developed by Sims (1980), is a widely employed methodology in studies of causal relation between variables. The model employs a linear combination of the lags of a group of endogenous variables to characterize their change over time. The objective of this study is to examine the factors that affect economic growth by evaluating the relationship between their p-lag variables. To this end, we employ a vector auto regression (VAR) model. Table 3 shows the VAR test results, the model's Determination coefficient factor for data suitability (R – squared) was 83.99%, which is high. The mathematical formula of the model can be written as follows:

$$Y = -0.230*Y(-1) - 0.536*Y(-2) - 2.240*X_6(-1) - 0.160*X_6(-2) + 0.063*LOG\_X_5(-1) - 0.019*LOG\_X_5(-2) + 0.008*LOG\_X_1(-1) + 0.056*LOG\_X_{1}(-2) + 0.069*LOG\_X_{12}(-1) + 0.010*LOG\_X_{12}(-2) + 0.887$$

4.2.4. Granger causality test

To test whether a 1-time series can predict another (causality). The null hypothesis is that excluded variables do not exert a causal effect on the dependent variable. Table 4 shows spending on wages (x_6) and non-tax revenues ($\log x_5$) have a significant effect on GDP at the 5% level. Moreover, there is no significant effect of income taxes (x_1) and education spending ($\log x_{12}$) on GDP at the 5% level.

The causality test shows that the model as a whole and all of its coefficients are significant at the 5% significance level, meaning that all the variables plays a key role in explaining growth in the Egyptian economy. However, individually, only two variables, wages (x_6) and non-tax revenues ($\log x_5$) have a significant effect.

Table 1: Variable descriptive statistics

	GDP	Wag	LOG_NTR	LOG_Inc.	LOG_Edu.
Mean	0.045478	0.069461	-2.752687	-2.867200	-4.151717
Median	0.045000	0.073300	-2.815200	-2.878600	-4.148300
Maximum	0.072000	0.083800	-2.236900	-2.543500	-3.963800
Minimum	0.018000	0.045200	-3.086900	-3.130600	-4.303400
Std. Dev.	0.017090	0.012699	0.270915	0.178938	0.098235
Skewness	-0.026154	-1.010701	0.556581	0.510405	0.077510
Kurtosis	1.968864	2.585690	1.981880	2.237789	2.062787
Jarque-Bera	1.021562	4.080314	2.180877	1.555393	0.864800
Probability	0.600027	0.130008	0.336069	0.459463	0.648950
Sum	1.046000	1.597600	-63.31180	-65.94560	-95.48950
Sum Sq. Dev.	0.006426	0.003548	1.614687	0.704411	0.212304
Observations	23	23	23	23	23

Source: Author' calculation depending on E-views

Table 2: Augmented Dickey-Fuller and Phillips-Perron unit root results

Variables	ADF			PP		
	Intercept	Trend and Intercept	None	Intercept	Trend& Intercept	None
GDPP	-2.6411	-2.54989	-0.234738	-1.8668	-1.82466	-0.34097
Income	-1.3204	-3.7961**	-0.49508	-1.44937	-1.8474	-0.49535
Wage	-1.3000	-2.0630	-1.2579	-0.4508	-1.6415	-1.0200
INTR	-2.4753	-4.7499***	-0.8041	-2.4753	-2.6649	-1.4472
EDU	-0.7018	-2.8248	-1.4394	-0.8520	-2.2029	-1.3235
Unit root tests at first difference						
GDPP	-4.21092***	-3.37967*	-3.2943***	-4.2516***	-4.3678**	-4.3417***
Income	-5.0415***	-5.006***	-5.1499***	-5.018***	-4.9863***	-5.1146***
Wage	-2.7815*	-2.6465	-2.58229*	-2.8103*	-2.6947	-2.6859**
INTR	-4.0273***	-3.9152*	-4.0621***	-4.1337***	-3.96697**	-4.205***
EDU	-3.2333**	-3.1022	-3.1048***	-3.2333**	-3.1022	-3.1048***
Unit root tests at the second difference						
Wage	-5.2251***	-5.0819***	-5.3705***	-5.2251***	-5.0819***	-5.3705***
EDU	-5.8911***	-5.8087***	-6.0532***	-6.2205***	-6.5128***	-6.4101***

***, ** and * denote stationary at the 1%, 5% and 10% significance level respectively
Source: Table by author depending on E-views

Table 3: The VAR test results

	Coefficient	Std. Error	t-Statistic	Prob.
C (1)	-0.230505	0.552444	-0.417246	0.6853
C (2)	-0.536616	0.506480	-1.059502	0.3143
C (3)	-2.240639	0.879519	-2.547573	0.0290
C (4)	-0.160856	0.922377	-0.174393	0.8650
C (5)	0.063863	0.028830	2.215144	0.0511
C (6)	-0.019489	0.023158	-0.841575	0.4197
C (7)	0.008622	0.031212	0.276242	0.7880
C (8)	0.056396	0.047880	1.177859	0.2661
C (9)	0.069704	0.053578	1.300984	0.2224
C (10)	0.010043	0.043774	0.229418	0.8232
C (11)	0.887817	0.521190	1.703442	0.1193
Determinant residual covariance		4.79E-05		
Equation: Y=C (1)*Y(-1) + C (2)*Y(-2) + C (3)*X6(-1) + C (4)*X6(-2) + C (5) *LOG_X5(-1) + C (6)*LOG_X5(-2) + C (7)*LOG_X1(-1) + C (8)*LOG_X1(-2) + C (9)*LOG_X12(-1) + C (10)*LOG_X12(-2) + C (11)				
Observations: 21				
R-squared	0.839978	Mean dependent var		0.044714
Adjusted R-squared	0.679955	S.D. dependent var		0.017726
S.E. of regression	0.010028	Sum squared resid		0.001006
Durbin-Watson stat	2.352635			

Source: Table by author depending on E-views

Table 4: The Granger causality test

The Granger Causality			
Dependent variable: Y			
Excluded	Chi-sq	df	Prob.
X6	6.536175	2	0.0381
LOG_X5	9.002008	2	0.0111
LOG_X1	2.334360	2	0.3112
LOG_X12	2.090585	2	0.3516
All	20.43451	8	0.0088

Source: Author' calculation depending on E-views

4.2.5. Impulse response function

Table 5 shows the results of the dynamic shock analysis using the VAR model and impulse response function on Egypt's economic data for the period 2000-2022, including a dynamic examination of the relationships between economic variables, revealed the following findings:

1. Impact of shocks on GDP: In the 1st year, the shock to the GDP variable (Y) had a positive but limited effect, with an increase of 0.01. Over time, the response gradually strengthened, with the most significant impacts of the shocks occurring in the early years, followed by a diminishing effect as time progressed.
2. The relationship between wages and GDP: The results demonstrated that a shock to wages (Wage) initially had a small negative impact on GDP, gradually decreasing over time. This indicates a weak but notable inverse relationship between wages and GDP, suggesting that increased wage expenditure negatively affects economic growth in the Egyptian context.
3. Impact of non-tax revenue (LOG NTR) Changes on GDP: A shock to non-tax revenues showed a positive impact on GDP, with a 0.004 increase in the 2nd year. This suggests that even small adjustments in non-tax revenue policies had a quick positive effect on economic growth.
4. The relation between education spending (LOG Edu) and Economic Growth: The analysis indicated that a shock in education spending led to a sustained positive impact on GDP, with gradual increases over time. This emphasizes the significance of investing in human capital as a principal driver of long-term economic growth.
5. Impact of income tax shock (LOG Inc) on GDP:
6. In the 1st year: The effect of the income tax shock was negligible (0.000000), indicating that the economy did not respond immediately to changes in income tax in the 1st year. In the 2nd year: The response began to show a slight increase, with GDP rising by 0.001536, reflecting a delayed positive effect of income tax changes on GDP. In subsequent years, the impact of income tax shock continued to grow gradually, reaching 0.003512 in the third year and further increasing to 0.012929 in the 10th year.
7. Sustainability of effects over time: The general pattern observed in the table suggests that the effects of shocks on GDP persist for up to 10 years, with a gradual decline in magnitude after the initial years. This underscores the temporal nature of economic responses and emphasizes the importance of long-run planning and policy formulation in economic development. This can be represented by the following curves as shown in Figure 5.

Table 5: Impulse Response Function

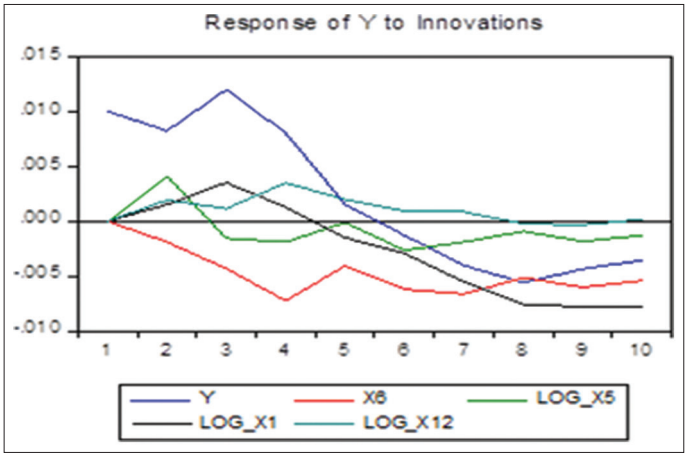
	Response of Y				
Period	DDP	Wage	LOG NTR	LOG Inc.	LOG_ Edu.
1	0.010028	0.000000	0.000000	0.000000	0.000000
	(0.00155)	(0.00000)	(0.00000)	(0.00000)	(0.00000)
2	0.008263	-0.001890	0.004107	0.001536	0.001921
	(0.00331)	(0.00288)	(0.00192)	(0.00288)	(0.00151)
3	0.012022	-0.004311	-0.001559	0.003512	0.001163
	(0.00455)	(0.00304)	(0.00201)	(0.00405)	(0.00184)
4	0.008066	-0.007251	-0.001898	0.001287	0.003501
	(0.00600)	(0.00424)	(0.00208)	(0.00503)	(0.00266)
5	0.001544	-0.004064	-0.000111	-0.001505	0.001977
	(0.00666)	(0.00475)	(0.00228)	(0.00564)	(0.00281)
6	-0.001294	-0.006202	-0.002651	-0.002927	0.000925
	(0.00671)	(0.00513)	(0.00200)	(0.00536)	(0.00244)
7	-0.004032	-0.006632	-0.001902	-0.005544	0.000860
	(0.00682)	(0.00608)	(0.00232)	(0.00580)	(0.00240)
8	-0.005600	-0.005149	-0.000904	-0.007587	-0.000245
	(0.00725)	(0.00733)	(0.00277)	(0.00692)	(0.00258)
9	-0.004337	-0.005999	-0.001838	-0.007811	-0.000312
	(0.00773)	(0.00791)	(0.00292)	(0.00811)	(0.00268)
10	-0.003566	-0.005427	-0.001297	-0.007861	0.000172
	(0.00817)	(0.00813)	(0.00298)	(0.00889)	(0.00274)

Source: Table by author depending on E-views

The VAR model results in Egypt during (2000-2022) reveal that economic policies, including tax management, education expenditure, and wage policies, have varying impacts on GDP in both the short and long term. These findings highlight the necessity of understanding the temporal dynamics of economic responses to inform effective policymaking and promote sustainable economic growth.

The increasing positive impact of tax policy changes over time indicates their role in improving economic performance by

Figure 5: Response to Cholesky (d.f. adjusted) innovations



Source: Figure by author based on E-views

boosting government revenues, which can be used to finance public spending or reduce fiscal deficits. The income tax shock demonstrated a gradual positive effect on GDP, with an initial negligible impact in the 1st year, followed by a slight increase in the 2nd year, and a consistent growth in the following years, reaching 0.012929 in the 10th year.

These findings emphasize the importance of tax policy as a tool for stimulating economic growth, as well as the critical role of investment in education for fostering long-term economic development. However, the results also indicate that the effects of these policies may take time to be clearly reflected in GDP, as evidenced by the delayed response observed in the early years, which suggests the presence of time lags in the economy's reaction to tax and expenditure adjustments.

5. CONCLUSION AND POLICY IMPLICATIONS

This study explored the impact of fiscal policy on economic growth in Egypt during the period 2000-2022, focusing on the relationship between government spending, taxation, and economic performance. The results underline that fiscal policy, particularly in the area of public spending, has a significant influence on Egypt's economic growth trajectory. The study highlights that while tax policies are essential for generating revenue, they need to be balanced in a way that does not discourage private sector investment or consumption. Excessive taxation may limit the private sector's ability to contribute to economic growth, whereas a well-structured tax system that provides sufficient revenue without stifling economic activity is vital for long-term development. As such, fiscal policies that support productive investments, especially in education lead to a more skilled and productive workforce, which in turn boosts overall economic productivity in the long term (Ahmed and Fayed, 2021).

Moreover, managing fiscal deficits and controlling public debt are essential for maintaining economic stability. Unchecked fiscal deficits can lead to inflation and loss of investor confidence, which can undermine growth prospects. Therefore, fiscal policies must be designed to balance spending on crucial sectors like education while ensuring macroeconomic stability (Mohamed, 2021).

It would be prudent for decision-makers in Egypt to avoid relying excessively on reducing public spending on investment as a means of adjusting the public sector budget. This is because such spending has been demonstrated to exert a positive impact on economic growth. It is recommended that fiscal adjustment rely on the reduction of wasteful expenditures, including a significant proportion of current expenditures that are perceived to impede economic growth. It is recommended that public investment efforts focus on physical and social infrastructure, with the aim of complementing rather than competing with private investment (IMF, 2015). It is regrettable that fiscal adjustment has relied to a significant extent on the reduction of public investment expenditure. The implementation of this ineffectual fiscal policy would impede the process of economic growth. So, policymakers should focus on improving public spending efficiency, optimizing the tax system, and maintaining fiscal discipline to foster an environment that supports sustainable and inclusive economic growth. Furthermore, fiscal policies should be continuously adjusted in response to changing global and domestic economic conditions to guarantee the sustained viability and expansion of the Egyptian economy.

REFERENCES

Abdel Qader, S.M. (1998), Taxation and economic growth in Jordan. Jordanian Economic Studies Journal, 10(1), 25-42.

Adam, C.S., Bevan, D.L. (2005), Fiscal deficits and growth in developing countries. Journal of Public Economics, 25, 563-577.

Adel, M. (2014), Public expenditure and economic growth in Egypt: Empirical evidence. Egyptian Economic Review, 25(4), 345-360.

Afonso, A., Furceri, D. (2010), Government size, composition, volatility, and economic growth. Economics of Governance, 8, 23-51.

African Development Bank. (2015), Egypt Country Strategy Paper 2015-2019. AfDB Report. Abidjan, Côte d'Ivoire: African Development Bank.

Aghion, P., Howitt, P. (1998), Endogenous Growth Theory. United States: MIT Press.

Ahmed, A., Fayed, M. (2021), The effect of government expenditure on economic growth: Evidence from Egypt (2000-2020). Journal of Economic Policy, 34(2), 102-118.

Alderman, H., Yemtsov, R. (2013), Productive Role of Social Protection. Background Paper for the World Bank 2012-2022, Social Protection and Labor Strategy. Washington, DC: World Bank.

Al-Ghalabi, A. (2011), The causal relationship between government spending and output in Iraq. Middle Eastern Economic Studies, 20(2), 215-230.

Al-Haqbani, S. (2004), The long-term relationship between government spending and GDP in Saudi Arabia. Arabian Economic Journal, 18(2), 102-118.

Ali, H. (2015), Structural adjustments in local public spending and economic growth. Eastern European Economic Review, 14(5), 214-229.

Ali, S., Ahmad, N. (2010), The effects of fiscal policy on economic growth: Empirical evidences based on time series data from Pakistan. The Pakistan Development Review 49, 497-512.

Al-Mazrouei, M. (2012), Public spending and economic growth: Evidence from the UAE. Gulf Economic Review, 12(1), 58-73.

Bagdige, A., Cetintas, S. (2004), Testing Wagner's law in the Turkish

economy: Evidence from 1965-2000. Turkish Economic Review, 22(1), 124-139.
Bakhtash Radia, N. (2006), Taxation and economic growth in Algeria: Evidence from 1990 to 2012. African Development Review, 16(2), 185-197.
Barro, R.J. (1990), Government spending in a simple model of endogenous growth. Journal of Political Economy, 98(5), 103-125.
Barro, R.J. (1997), Taxation and economic growth. Journal of Political Economy, 105(3), 695-716.
Blanchard, O., Perotti, R. (2002), An empirical characterization of the dynamic effects of changes in government spending and taxes on output. Quarterly Journal of Economics, 107, 1329-1368.
Cashin, P. (1995), Government spending, taxation, and economic growth: Evidence from 23 developed countries. Journal of Economic Studies, 22(3), 45-60.
Central Agency for Public Mobilization and Statistics (CAPMAS) in Egypt, The 2017 Statistical Yearbook. Available from: https://www.capmas.gov.eg
Chipaumira, G., Mangena, Y. (2014), The impact of government spending on economic growth: The case of South Africa, 1990-2010. Mediterranean Journal of Italy, 19(2), 92-108.
Dickey, D.A., Fuller, W.A. (1979), Distribution of the estimators for autoregressive time series with a unit root. Journal of the American Statistical Association, 74(366), 427-431.
Dickey, D.A., Fuller, W.A. (1981), Likelihood ratio statistics for autoregressive time series with a unit root. Econometrica, 49(4), 1057-1072.
Egyptian Ministry of Planning and Economic Development. (2019), Major National Projects. Egypt Ministry Report. Egyptian Ministry of Planning and Economic Development.
Egyptian Ministry of Planning and Economic Development. (2022), Egypt Vision 2030 Update. Egypt Ministry Report. Egyptian Ministry of Planning and Economic Development.
Engen, E.M. (1992), Fiscal Policy and Economic Growth. NBER Working Paper No. 4223. National Bureau of Economic Research, Inc.
Erős, A. (2010), Long-run growth effects of fiscal policy: A case study of Hungary. Club of Economics in Miskolc TMP, 5, 11-17.
Fan, S., Rau, R. (2003), Government expenditure and economic growth in Asia and Africa: Evidence from 1980 to 1998. Economic Development and Cultural Change, 51(2), 456-470.
Ghadabna, A.N. (2015), Testing Wagner's law in Algeria (1990-2012). Algerian Journal of Economics, 19(2), 137-148.
Gupta, S., Clements, B., Baldacci, E., Mulas-Granados, C. (2005), Fiscal policy, expenditure composition, and growth in low-income countries. Journal of International Development, 3, 533-551.
Gustavo, C.B., Jorge, M.V., Violeta, V. (2013), Taxation and Economic Growth in Latin America, Universidad EAFIT, International Center for Public Policy, Andrew Young School of Public Studies, Georgia State University, The World Bank, IDB-WP-431.
Ibrahim, M. (2012), The impact of government expenditure on economic growth in Jordan (1990-2006). Interdisciplinary Journal of Contemporary Research in Business, 4(6), 215-230.
International Monetary Fund. (2015), Fiscal Policy and Growth: Why, What, and How? Washington, DC: International Monetary Fund.
International Monetary Fund. (2019), IMF Country Report No. 19/98: Egypt. IMF Report. Washington, DC: International Monetary Fund.
International Monetary Fund. (2021), Fiscal policy and sustainable growth. IMF Policy Paper. Washington, DC: International Monetary Fund.
International Monetary Fund. (n.d.), Fiscal Monitor Report. Available from: https://www.imf.org
Kneller, R., Bleaney, M.F., Gemmell, N. (1999), Fiscal policy and growth: Evidence from OECD countries. Journal of Public Economics, 74, 171-190.
Landau, D. (1985), Government expenditure and economic growth: A cross-country study. Southern Economic Journal, 52(3), 783-792.
López, R.E., Thomas, V., Wang, Y. (2010), The Effect of Fiscal Policies on the Quality of Growth. Washington, DC: The World Bank. Available from: https://www.worldbank.org/ieg
Lucas, R.E. (1990), Taxation and economic growth. Journal of Monetary Economics, 24(2), 41-56.
M'Amanja, D., Morrissey, O. (2005), Fiscal policy and economic growth in Kenya. CREDIT Research Paper, No. 05/06. University of Nottingham.
Mitran, P.C., Bebeşelea, M., Neguriţă, O. (2012), Econometric model concerning the impact of the fiscal policy upon the economic development: The case of the countries from Central and Eastern Europe, members of the European Union. Journal of Knowledge Management, Economics, and Information Technology, 3, 15-35.
Mohamed, I. (1988), On the mechanics of economic development. Journal of Monetary Economics, 22(1), 3-42.
Mohamed, S. (2021), Taxation and economic growth: A critical review of Egypt's fiscal policy. Journal of Public Finance, 18(4), 231-246.
Nikos, S. (2009), Government spending and economic growth in the European Union: Evidence from 14 countries (1990-2006), European Economic Review, 53(4), 97-115.
Othman, E. (2002), The causal relationship between GDP and government spending in Saudi Arabia. Middle Eastern Economics Journal, 9(1), 35-47.
Said, L. (2022), The role of fiscal policy in economic growth: A study of Egypt using EViews. Economics and Development Review, 28(3), 57-73.
Sims, C.A. (1980), Macroeconomics and Reality. Econometrica, 48(1), 1-48.
Sobhi, F. (2004), Government spending and economic growth in Egypt: A causal relationship analysis. African Journal of Economics, 15(3), 201-212.
Solow, R.M. (1956), A contribution to the theory of economic growth. The Quarterly Journal of Economics, 70(1), 65-94.
The Financial Statement Report issued by the Ministry of Finance. (2016). Available from: https://www.mof.gov.eg
United Nations Development Programme (UNDP). (2019), Human Development Report 2019: Beyond Income, Beyond Averages, Beyond Today. United States: United Nations Development Programme.
World Bank. (2007), Egypt - Economic Reforms and Policies. World Bank Report. Washington, DC: World Bank.
World Bank. (2020), World Development Report 2020: Development and the Economy. Washington, DC: World Bank Group.
World Bank. (2021), Egypt's Economic Update. World Bank Report. Washington, DC: World Bank.