

Evaluating the Impact of the Public Budget Deficit on the Money Supply in the Jordanian Economy

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Abstract

The economy of Jordan faces a difficult situation of chronic budget deficits associated with the lack of natural resources and relatively limited financial capital to undertake its activities. This practice will likely harm the economy by causing expansionary monetary policies and inflation. This may also indicate a high likelihood of increased inflation and a low capacity of the economy to generate revenues in the future. This research evaluates the association between public budget deficits and the money supply in the economy using data derived from IMF e-library (International Financial Statistics) and tradingeconomics.com, where the dependent variable was the money supply and the independent variable was GDP growth and debt to GDP ratio during 1997-2022. Using ordinary least squares regression and the Augmented Dickey-Fuller test, the budget deficit was found to have a negative but insignificant impact on the money supply, while economic growth affected the money supply positively. The result of the study reveals that the Jordanian government has an effective strategy for managing its money supply and aligning it with fiscal policies. Hence providing positive effects on economic growth and development. To conclude, effective monetary policies may be recommended to boost growth and outcomes in the long run. Economic development should be boosted through deficit financing to address resource constraints. To support investments and taxes, monetary and fiscal policies must balance. The causal relationship between money supply changes and budget deficits should be studied using different data frequencies. For the future, studying the association using quarterly data may fill a gap in the knowledge of the strategies for enhancing fiscal policies' impact on protecting Jordan's price stability and economic growth would be beneficial.

Keywords: Budget deficit, Money supply, Government expenditure, Public debt, Debt to GDP ratio.

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I. Introduction

Issues of money supply, the public budget, and inflation have been the subject of a wide range of empirical and theoretical assessments due to the impact they may pose on economic outcomes and impact on the citizens' livelihoods. The supply of money and the dynamics with the budget deficits may significantly impact the level of inflation in an economy as well as the interest rates and overall investment. In this way, high inflation can impede economic growth and reduce the capacity of the economy to be self-sustaining (Adom et al., 2018).

Generally, a budget deficit refers to a situation when the public budget has expenses that exceed the revenues generated in the normal operations of the economy. The budget deficit significantly impacts the national debt level, the sum of budget deficits, and what the country owes to domestic and foreign creditors (Alzyadat, 2020). Responses to deficits in the public budget include raising the tax rates or expanding the tax base of expenditure cuts. The deficit may result from various actors, such as low gross domestic product (GDP) and economic growth, which reduce tax revenue. Additionally, it may result from increased spending on government subsidies or social security programs such as healthcare. It also results from corporate tax cuts designed to promote job creation by lowering business costs. A major issue with budget deficits is that they are likely to have a striking impact on inflation (Adjei, 2018). It can cause the monetary authorities to increase the money supply in the economy, feeding inflation and raising the likelihood of inflationary monetary policies. One of the key issues identified in the research is that persistent budget deficits may affect an economy by reducing its ability to handle future expenses and economic growth (Lin & Chu, 2013). However, regardless of the financing method, the impact of budget deficits may vary depending on the behaviour of monetary authorities on the money supply. Knowing the factors leading to inflation is important in selecting adequate policies. Therefore, it is first necessary to prevent budget deficits to reduce inflation. Thus, based on the

assumption that budget deficits impact inflation in the Jordanian economy, the relationship between real GDP growth rate, money supply, and budget deficit GDP growth rate during 1997-2022 was analyzed. The research aim, related problem statement, and theoretical approaches are described within this scope. The empirical studies conducted in this field are included in the literature review. The relationship between the real GDP growth rate, budget deficits, and money supply in Jordan was also analyzed through ordinary least squares regression (OLS) and the Augmented Dickey-Fuller (ADF) tests.

Problem statement

Jordan, one of the smallest economies in the Middle East, is categorized as a developing nation because it has limited petroleum and other natural resources (Shihab, 2021). The nation also suffers from various challenges, including water shortages due to its location in the desert. It also suffers from a high unemployment rate and focuses on developing the services sector and other areas to enhance its current account. Historically, three occasions of 19.5% inflation were reported in Jordan. First, in 1974, due to rising oil prices in 1973. Second, in 1989, due to the Jordanian Dinar crisis. Third, in 2008, due to the subprime mortgage crisis at the end of 2007. In other eras, when mild inflation was high, the budget deficit averaged 4.6% of real GDP (SAWAIE, 2018). Overall, no Jordanian government has had a budget surplus since 1965, which is noteworthy in public finance. From 1965-1980, 1981-2000, and 2001-2019, the average annual budget deficit to GDP ratios were -17.9%, -10.8%, and -7.1%, respectively.

Moreover, Jordanian governments have relied on public debt for management, but the ratio of public debt to GDP has increased. For example, general government debt to GDP ratio rose from 80.2% in 2012 to 95.2% by 2019. This proportion rises after COVID-19, which catalyzes change (Obeidat et al., 2022). As a result, the chronic budget deficit presents a huge burden on the economy and challenges the government heavily in trying to finance the deficit (Ananzeh, 2016). The government has to rely on borrowing from internal and external sources, which has increased the loan amount and may influence the monetary policies adopted. Therefore, evaluating how the budget deficits affect monetary policies and the money supply in Jordan would be beneficial to provide insight into the situation.

Research Aim and Objectives

Consistent budget deficits in Jordan are not rational. Therefore, this research evaluates the effect of Jordan's budget deficit on the money supply in the economy. The specific objectives of the research are:

1. To investigate the recent change in the Jordanian economy's budget deficits
2. Explain the theoretical and empirical aspects of the relationship between budget deficit and money supply in Jordan
3. Investigate the strategies adopted by the Jordan government in response to the budget deficit

To answer these questions, the given framework for the Jordanian economy is investigated (**Figure 1**).

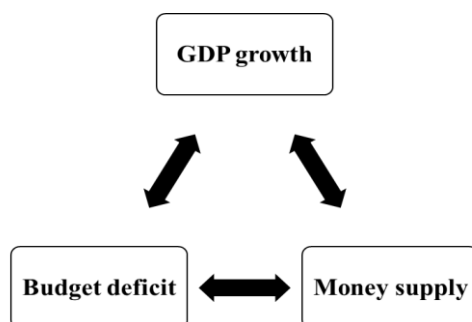


Figure 1. Theoretical model

Theoretical Approaches to Budget Deficit

The theoretical underpinnings of this association include the quantity theory of money (proposed by Irving Fisher in the early 20th century) and the quantity theory of government debt (proposed by James Buchanan in the mid-20th century). The quantity theory of money posits that the nominal money supply in the economy is exogenously determined, but it is solely responsible for price changes and stability. It indicates that changes in the money supply directly affect the price level in equal proportions, although it has no impact on the real sector of the economy (SAWAIE, 2018). In this respect, the real wages and output of the economy are not affected by the nominal changes in the money supply. In essence, the theory draws parallels between government debt and the money supply, similar to the quantity theory of government debt.

While the monetarist hypothesis, advocated by economist Milton Friedman in the mid-20th century, holds that the nominal money supply determines the price level. According to this theory, the general price in the economy ensures that the real balances are equal to the purchasing power of the money in supply at any time (Chiaraah & Nkegbe, 2014). This means changing the money supply from the real balances in the economy channels into price changes. The monetarists further posit that budget deficit causes inflation through money supply. They further suggest that budget deficit cause inflation because it is financed through seigniorage (printing of money) or open market operations that increase the money supply (Mangio, 2004). Additionally, the financial theory of the price level emerged from extensive studies by Woodford (Woodford, 1994, 1995, 1996) and Sims (Sims, 1997) over constant periods. Unlike the monetary theory, this theory suggests that the budget deficit may not solely be caused by money creation but rather by current and future debts and taxes. The theory by Woodford states that a non-neutral fiscal policy controls inflation, while the relationship between inflation, the budget deficit, and money supply is influenced by wealth from bond-funded budget deficits. The dominant Ricardian system, a standard for the quantity money theory, is likely driven by the target of the monetary authority represented by debt financing. While the Keynesian approach, proposed during the 20th century by John Maynard Keynes, postulates that the determination of inflation occurs through excessive demand domination in the market. Assuming the economy is at full employment, higher demand causes firms to demand more labour, increasing wages and general prices (Bordo & Levy, 2021; Kliem et al., 2016). On the other hand, structuralists present a different view where they argue that inflation arises from the structural misalignment between demand and supply. The structural bottlenecks make it difficult for firms to respond effectively to demand increases (Nguyen, 2015). The gaps result in inflationary pressure in the economy due to the shortage of goods. All these frameworks highlight the importance of the budget deficit in formulating the macroeconomic policy of any country by evaluating the relationship between the money supply, inflation, and economic growth rate. These approaches also lead to the emphasis on examining how fiscal and monetary policies develop in response.

II. Literature Review

The fiscal deficit is a common phenomenon in many economies where the expenditures in a particular year are higher than the revenues that the government will generate. Due to its economic impact, this issue presents a significant consideration for theorists, policymakers, and the general public. The fact that governments have to find alternatives for financing the deficits, such as borrowing domestically and internationally, creates significant impacts on economic policies (Duodu et al., 2022). In this regard, empirical investigations on the association between budget deficits and money supply have been undertaken in different economies and settings with varied findings. For example, Adom et al. (2015) evaluated inflation dynamics using time series data (Adom et al., 2018). OLS estimation was applied in the analysis, with the results indicating that money supply changes influence the inflation levels in the economy, while the fiscal deficit was found to influence inflation insignificantly. The same effect was identified in another study by Ndanshau (2012) in Tanzania, where pairwise Granger causality was evaluated (Ndanshau, 2012). The results indicated that inflation caused budget deficits while the budget deficit affected the money supply. The budget deficit was found to have a positive but insignificant effect on inflation. However, inflation was found to have a negative and significant effect on the budget deficit. Interestingly, fiscal deficits in different economies have been found to impact the pressure the monetary authorities feel significantly. Central banks increase the money supply to reduce pressure on interest rates, although this increases inflation and lowers the productivity of the economy in Asian countries (Dejthamrong, 2011). The central banks have to consider strategies of open market operations where they offer higher interest payments for bonds to attract investors.

Meanwhile, studies on the phenomenon of budget deficits in Jordan have been undertaken by different authors, focusing on outcomes such as economic growth and aggregate demand. For example, Abdalla and Al-Tamimi (2020) found that the budget deficit in the Jordanian economy had an insignificant effect on economic growth from 2010 to 2019 (Al-Tamimi, 2020). Using the Vector Error Correction model, Shihab (2021) found that budget deficits did not significantly impact economic growth (Shihab, 2021). It was also found that economic growth in Jordan does not respond to budget deficits in the long term. In another study by Khrawish et al. (2012), the impact of budget deficits on money demand in Jordan was investigated (Khrawish et al., 2012). The results indicated that real money demand and real GDP had a positive and significant association, which was also apparent with the government deficit and real government expenditure levels (Chiaraah & Nkegbe, 2014). The undertaken studies indicate that government deficit has a significant effect on the demand for money as well as economic growth. The studies indicate mixed results on the impact of budget deficits on economic growth and monetary policies. The coordination of monetary and fiscal policies is a central issue in promoting economic stability and growth in Jordan. Such studies indicate the challenges central bank faces in ensuring stability and macroeconomic prosperity. Coordination is relatively effective among the different agencies, but it

has not been easy to achieve the high economic growth rates required (Alzyadat, 2020; Alzyadat & Al-Nsour, 2021). Therefore, the key gap addressed in this research is the association between the budget deficits in Jordan and the supply of money in the economy.

Hypotheses

One of the low-income economies in developing nations, a significant budget deficit, high inflation rates, and a variable money supply have long plagued the Jordanian economy. Because it influenced numerous economic variables, including the interest rate, which has been rising over the past years. These fundamental facts are the most significant indicators of the state's financial performance. But the question is? What is the effect of the budget deficit on the Jordanian government during 1997-2022? More precisely, findings from other studies indicate that there may be a strong relationship between money supply, GDP growth, and government budget deficit in the economy. The money supply is expected to increase with the rise in the budget deficit, which is also expected to be associated with the economic growth rate. Thus, the null hypothesis of this study is that there is no relationship between money supply, GDP growth, and budget deficit:

H₀: $\beta_1 = \beta_2 = 0$

While the alternative hypothesis describes the opposite view:

H_a: $\beta_1 \neq \beta_2 \neq 0$

III. Research Methodology

The study followed a positivist philosophy where quantitative data was collected on the economy of Jordan and tested to evaluate the impact of the budget deficit and economic growth rate on the money supply. The data used for the analysis was derived from the IMF e-library (International Financial Statistics) and tradingeconomics.com. The two sources provide data on varied macroeconomic indicators and variables from different economies. The three variables considered in the analysis were real GDP growth rate, money supply, and budget deficit, as shown by the debt-to-GDP ratio. Their relationship and impact on the Jordanian economy were tested over the 1997-2022 period using the OLS, and the econometric model was applied in testing the impact of the budget deficit on the money supply in the Jordanian economy.

The data was analyzed using the Statistics Program for Social Sciences (SPSS). The analysis involved consideration of the budget deficit and the economic growth rate as the independent variables, where the money supply is the dependent variable. In effect, the focus is to assess how deficit financing in the budget and the economic growth rate influence the money supply in the economy. The OLS regression model is developed based on relevant studies (Fatima et al., 2012; Rana & Wahid, 2017). The model is presented in **Equation 1**. The description of the variables used is given in **Table 1**.

$$M2 = \beta_0 + \beta_1 \text{GDPR} + \beta_2 \text{Debt} + \mu_1 \dots \dots \text{Equation 1}$$

Table 1: Description of the variables

Variables	Description
M2	Money supply in the economy, including currency, demand deposits and time (savings) deposits
GDPR	Gross domestic product growth rate
Debt	Budget deficit in terms of government debt to GDP ratio
μ_1	Stochastic error term
$\beta_0, \beta_1, \beta_2$	Respective parameters
y_t	GDP at period t
Y_{t-1}	GDP in the previous period (t-1)

IV. Research Findings

The data was collected on the relevant variables for 1997-2022. As indicated in **Figure 2**, the Jordanian economy's money supply (m2) has steadily increased to 41,681.70 JOD Million in 2022 from 19,234.66 JOD Million in 1994, which has contributed heavily to raising the prices of commodities. The money supply (M2) was used in the analysis because it includes both money supply (M1) and short-term time deposits in banks.

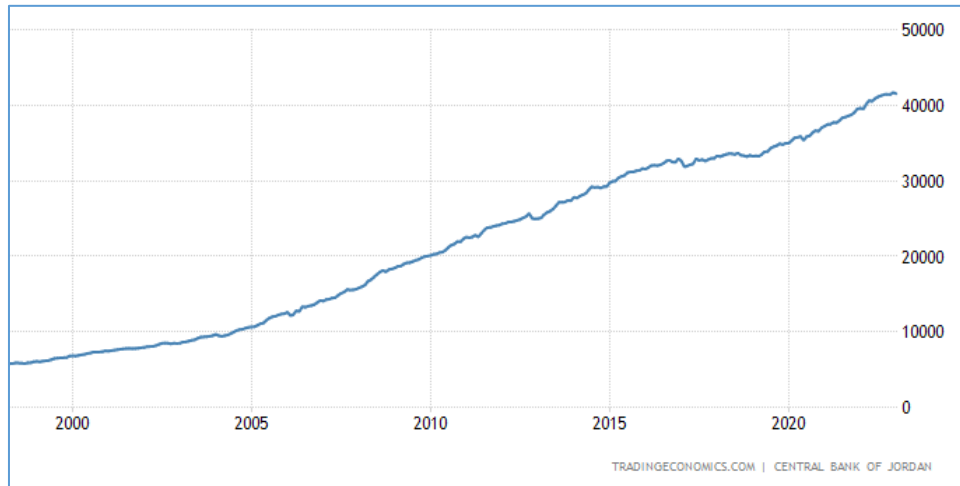


Figure 2: Jordan money supply in millions (m2) JOD during 1997-2022 (Jordan, 2023b)

The other two variables did not indicate a similar level of consistency in the change over the period. The annual GDP growth rate has been highly erratic, falling to slightly below 2% in 2011, after which it was relatively stable between 2% and 4% until 2020 when there was severe depression due to the COVID-19 pandemic, Figure 3.



Figure 3: GDP annual growth rate (%) during 1997-2022 (Jordan, 2023a)

The debt-to-GDP ratio shows a relatively similar trend to GDP growth, although it appears to have an alternate trend, Figure 4.

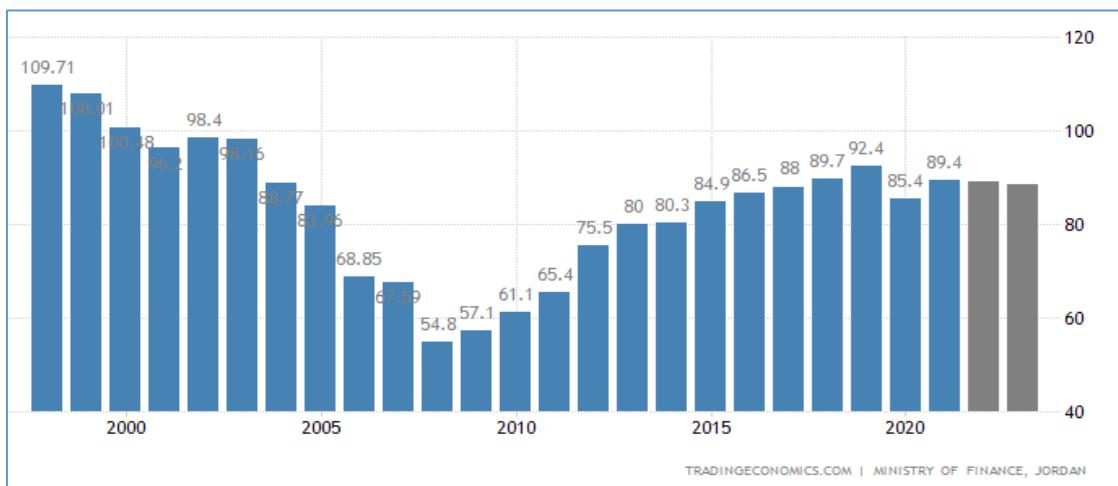


Figure 4: Debt to GDP ratio during 1997-2022 (Ministry of Finance, 2021)

The stability of the time series data was evaluated to ensure it was static before further analysis. This was accomplished using the ADF test (Dickey & Fuller, 1979), which estimates the following model.

$$y_t = \rho y_{t-1} + \nu_t; \rho \in (-1, 1) \dots \text{Equation 2}$$

Taking the first difference of both sides of the equation produces the following form of the equation:

$$y_t - y_{t-1} = \delta (y_{t-1} - y_{t-2}) + \nu_t \dots \text{Equation 3}$$

The null hypothesis of the ADF test is $H_0: \delta \geq 0$, which confirms the presence of the unit root and the non-stationary series. The alternative hypothesis ($H_1: \delta < 0$) indicates that there is a stationary series. The ADF test results are presented in **Table 2**.

Table 2: Augmented Dickey-Fuller test

Variable	ADF (Critical values – 0.05)	Level	First difference
Debt	-2.97	-1.87	-6.5
GDPR	-2.38	-1.9	-9.1
M2	3.04	2.3	10.7

Since the variables' time series is stationary, the OLS regression was undertaken to assess the causal relationships among the variables as they influence the money supply. The results of the OLS regression analysis of budget deficit and GDP growth to money supply are presented in **Table 2**.

Variable	Factor	t-statistic	F	R-square	Adjusted R-square
Fixed	3593.28	4.59	31.8	0.624	0.591
Debt	-8.422	-1.247	-	-	-
GDPR	15.971	3.08	-	-	-

Table 3: OLS regression coefficients

The OLS regression analysis results indicate that the model effectively explains the changes in the dependent variable (Money supply). Changes in debt financing and economic growth rate in the Jordanian economy over the period significantly influenced the money supply (m2). The R-square coefficient indicates that the model explains 59.1% of the changes in the relevant variables and the model. The specific impact of the two independent variables indicates different views. As indicated by the debt-to-GDP ratio, the budget deficit has a coefficient of -8.422, which was not statistically significant due to the t-statistic of -1.247. This means the debt-to-GDP ratio has a negative but insignificant impact on the money supply. In effect, the budget deficit in the Jordanian economy is not significantly associated with an increase in the money supply. The regression coefficient for the GDP growth rate was 15.971, which indicates that a percentage increase in GDP growth rate increases the money supply by 15.97%. The t-statistic of 3.08 indicates that the regression coefficient is significant; hence, the GDP growth rate significantly impacts the money supply.

The analysis results align with the outcomes of different studies, such as (Khrawish et al., 2012). The findings indicate that deficit financing of the national budget is not necessarily associated with changes in the money supply in the economy. The fact that the economic growth rate is positively associated with the money supply indicates the other relevant factors that influence the money supply in the economy. It can be argued that deficit financing strategies are effectively managed with clear inflation targets that do not necessarily increase the money supply. Instead, the central bank applies other measures besides the budget deficit to determine how the money supply in the economy is addressed or changed.

V. Conclusion and Recommendations

Governments apply the practice of deficit financing as a tool for enabling them to undertake activities with funds from other sources besides their revenues. Because governments can enhance the services they provide to their citizenry without generating their funds first, however, this practice can increase inflation and general prices because it requires the government to borrow internally and externally and raise interest rates. This may crowd out private investments and make it more difficult for people to access the necessary resources.

In line with the quantity theory of money, debt financing requires the government to increase the money supply; hence, the prices of commodities have to increase because it does not influence the real sector.

An interesting issue in this study is that the money supply in Jordan rose consistently over the period, but this was not reflected in the economic growth rate or budget deficit. The changes in the budget deficit over the period cannot be effectively aligned with the country's inflation levels, indicating that the central bank is more effective in controlling this. The pressure resulting from the budget deficits is addressed through fiscal strategies instead of broadening the money supply. In order to prevent inefficient increases in money supply, the central bank aligns monetary policies to fiscal expansion by investing in different areas to spur economic growth. This explains the positive and significant impact of the economic growth rate on money supply over the period. It is also clear that the Jordanian government has effective economic policies for aligning its fiscal and monetary policies. Money demand and supply are directly associated with economic growth levels and fiscal policies, such as increased taxation and public expenditures.

The findings posit that stakeholders in the economic management sectors have to consider monetary policies in an effective manner to improve economic outcomes while at the same time promoting growth. Economic development and growth can be enhanced through deficit financing to address the Jordanian government's resource limitations. Additionally, there should be a good balance between monetary and fiscal policies to ensure that domestic and international borrowing does not reduce the economy's investments and capacity to generate more taxes. It is clear from other studies, such as Haddad and Shakhathreh (2015), that budget deficits in the current period may affect economic growth in the future; hence, the monetary policies have to be balanced and aligned with the current and future needs of the economy (Haddad & Shakhathreh, 2015). Other key recommendations from this research include the need for further research evaluating the causality between money supply changes and budget deficits. This issue should be evaluated using more frequent data, such as quarterly values and those involving longer periods, to assess whether these variations influence the dynamics. The status of the Jordanian economy as a small developing nation may present a different context compared to other countries evaluated in prior research.

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