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Public Expenditure, Money Supply, and Economic Growth in Afghanistan: An Empirical Analysis (2007–2020)

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Abstract

Introduction: Governments rely on fiscal and monetary policy to promote growth, yet the evidence on their effectiveness is mixed and limited for Afghanistan. This study examines the effect of government capital and consumption expenditure and of the money supply (M2) on economic growth in Afghanistan, 2007–2020. **Research Methods:** Annual data (14 observations) were analysed using the Augmented Dickey–Fuller test and an OLS regression of log GDP on log capital expenditure, log consumption expenditure, and the money supply, with diagnostic tests. **Results:** All variables are stationary at level. Consumption expenditure (elasticity 0.56, p = 0.022) and capital expenditure (0.41, p = 0.045) significantly raise GDP, whereas the money supply has no significant effect (p = 0.173); R^2 is 0.92. **Conclusion:** Public expenditure is an effective growth instrument in Afghanistan, consistent with the Keynesian view, while monetary expansion should not be relied upon for growth. Results should be read cautiously given the short sample.

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INTRODUCTION

Governments apply various policies to attain the goals of macroeconomics. Governments tend to use fiscal policy and monetary policy to reach the potential and the goals they have set. Governments seek to reach the expected level of economic growth, employment, inflation or as a whole the expected level of living standards through the application of monetary policy and fiscal policy. Governments usually use fiscal policy tools such as government expenditure, taxes and transfer payments in times of recession and unemployment to influence the aggregate demand.

The discussion of to what extent the should government intervene in the economy is still controversial. Classical argues that the government should interfere in certain areas like security, healthcare, literacy and infrastructural affairs. Keynesians, on the other end of the intervention spectrum, argue that classical economic theory failed to explain the causes of the worldwide economic collapse, The Great Depression, and was unable to provide ample policy solutions to overcome the situation and trigger production and employment. Keynes overturned the prevailing idea of free markets that the economy reaches full employment itself. Furthermore, Keynes stated that the self-adjusting mechanism that leads to full employment is no longer true in a market economy. Keynes justified public intervention that contained policies to obtain full price stability and full employment. (Jahan & Papageorgiou, 2014a)

Monetary policy can be a tool for controlling inflation. Monetarists argue that money supply (the total amount of money in an economy) is the main determinant of GDP in the short run and the price level in the long run. The foundation of monetarism is the Quantity Theory of Money. The theory states that money supply multiplied by velocity (the rate at which money changes hands) equals nominal expenditure in the economy. The Quantity Theory of Money can be the basis for some monetarist thoughts such as long-run monetary neutrality (an increase in the money supply would be followed by an increase in the price level in the long run and will not affect real factors output and employment) and short-run monetary non-neutrality (an increase in money supply can have an impact on employment and output because price adjustment takes time). (Jahan & Papageorgiou, 2014b)

Empirical evidence on these two policy channels remains mixed. Recent studies report a positive effect of government expenditure on growth in SAARC countries (Rahman et al., 2023) and Indonesia (Ahdini & Mandala, 2020), and causality running from government expenditure to growth in OECD countries (Korkmaz & Güvenoğlu, 2021), whereas Popescu and Maxim (2021) find no long-run cointegration between government spending and growth in Romania, only short-run causality. The evidence on money supply is equally divided: it is found to be insignificant for growth in Indonesia (Safiullah et al., 2021) and the United Arab Emirates (Abdul et al., 2019), monetary policy is found to depress growth in Lebanon (Awdeh, 2019) and Lao PDR (Boundavong, 2022), while a positive effect is reported for Nigeria (Gatawa et al., 2017) and Nepal (Laxman, 2019). These divergent results indicate that the growth

effects of fiscal and monetary instruments depend on the economic structure and institutional setting of each country and cannot simply be assumed to hold for Afghanistan.

Two research gaps can be identified. First, most studies treat government expenditure as a single aggregate, although capital expenditure (investment in infrastructure and productive capacity) and consumption expenditure (the running costs of public services) may affect output through different channels. Second, evidence for Afghanistan is limited: the study by Ekramuddin (2019) concentrates on the fiscal side of policy. To the authors' knowledge, no study has jointly estimated the effects of capital expenditure, consumption expenditure, and the money supply on Afghanistan's economic growth.

Accordingly, this study aims (i) to estimate the effects of government capital and consumption expenditure on economic growth in Afghanistan and (ii) to test whether the money supply (M2) has a significant effect on growth, using annual data for 2007–2020. The study contributes to the literature by disaggregating public expenditure and including the money supply in a single, diagnostically tested model for Afghanistan, and by drawing policy implications for the balance between fiscal and monetary instruments.

1. Literature Review

Monetary Policy: a set of tools that a nation’s central bank has available to promote sustainable economic growth by controlling the overall supply of money that is available to the nation’s banks, its customers, and its businesses. The objectives of monetary policy are, to manage inflation, to achieve or maintain a high rate of economic growth, and to reduce unemployment, but only after controlling inflation.

The Tools of Monetary Policy

1) Open Market Operations

2) Changing Reserve Requirements

3) Changing Discount Rate

Fiscal Policy: Fiscal policy refers to the use of government spending and tax policies to influence economic conditions. Like monetary policy fiscal policy is another macroeconomic policy tool for adjusting aggregate demand by using either government spending or taxation policy.

Classical Economic View of Fiscal Policy

The classical belief is that supply-side factors can lead to changes in real variables (output and unemployment). An increase in the stock of production factors and advances in techniques of production result in economic growth. Therefore, money plays a role only in facilitating transactions as a means of exchange. Secondly, they believe in the self-adjusting tendency of the economy. As a result, they say government intervention is unnecessary or even it can be harmful to the economy. The classical doctrine was that the aggregate production of a given quantity of output will generate sufficient demand for that output. (Froyen, 2013)

Keynesian Economic View of Fiscal Policy

The standard Keynesian approach starts from the assumption of price rigidity or stickiness in the short term. This implies that prices do not adjust immediately to maintain macroeconomic balance. In other words, the supply of goods and services is elastic and macroeconomic balance output and employment is determined by the level of aggregate demand. When aggregate demand is insufficient, this results in the underemployment of production factors in the economy. (Bénassy-Quéré et al., 2010)

Classical Economic View of Monetary Policy

In the classical system, the quantity of money determines the price level and the level of nominal income. In this sense, monetary policy was important to classical economists. Stable money was a requirement for stable prices. In another sense, money was not important. The quantity of money did not affect the equilibrium values of the real variables in the system: output employment, and the interest rate. (Froyen, 2013)

There have been a vast number of studies conducted on the topic. Some studies have investigated the relationship between government expenditure and economic growth, some studies have investigated the impact of money supply on economic growth and some others have investigated the interrelationship between the money supply, government expenditure and economic growth. Studies have reported different outcomes based on the size of public involvement, economic structure, empirical method, and country's geographical location. Safiullah et al. (2021) conducted a study to understand the impact of money supply and inflation on economic growth in Indonesia. They used the Auto Regressive Distributed Lags (ARDL) and Error Correction Model (ECM) model. The study found that inflation hurts economic growth and money supply has a negative impact but it is insignificant. Abdullah (2020) studied the relationship between monetary policy on economic growth in Turkey. ARDL was used and found that money supply and inflation have a positive impact on economic growth in the short run while the effect of money supply and inflation on economic growth was insignificant in the long run. Hussain and Zafar (2018) explored the relationship between government expenditure, money supply and inflation on economic growth in Pakistan using data from 1972-2015. ARDL econometric model was applied and found that government expenditure and inflation have a positive significant impact on economic growth, but the bound between money supply and economic growth is insignificant. Georgantopoulos and Tsamis (2012) have sought to find the interrelationship between the government expenditure, money supply inflation and economic growth in data from 1980 to 2009 in Cyprus. The study implied that government expenditure leads to economic growth, but deficit financing can have inflationary pressure. Korkmaz and Güvenoğlu (2021) explored the relationship between government expenditures, inflation and economic growth in OECD countries in the data period of 2010 to 2019. A bidirectional relationship was found between economic growth and inflation and there was a unidirectional causality relationship from inflation to government expenditures and from government expenditures to economic growth. Makwandi and Raphael (2018) examined the relationship between government expenditure, money supply, inflation and economic growth in the period of 1970 to 2011 in

Tanzania. ARDL model was employed to estimate the impacts and found that inflation hurts economic growth and money supply and government expenditure have a significant impact on growth in both the short and long run. Lut and Moolio (2015) studied the impact of monetary policy on economic growth in Cambodia using the data from 2000 to 2012. The study used a multiple regression model. They found that monetary policy has a positive impact on economic growth but the strength of the bound is relatively weak. While interest rates had no significant impact on economic growth. Hasnul (2015) studied the effects of government expenditure on economic growth of Malaysia in data from 1970 to 2014. The study used the OLS model and found that there is a negative correlation between government expenditure and economic growth in the last 45 years. Sriyalatha & Torii (2019) explored the impact of fiscal policy on economic growth as a comparison study between Sri Lanka and Singapore in data from 1972 to 2017. Precious & Palesa (2014) examined the impact of monetary policy on economic growth in South Africa in data from 2000 to 2010. The study employed the Johansen co-integration test and Error Correction Mechanisms. The study found that money supply is an insignificant monetary policy instrument. While inflation is significant. Maingi (2017) explored the impact of government expenditure on economic growth in Kenya in data from 1963 to 2008. The study used the Vector Auto Regression technique. The study revealed that there is a long term relationship between GDP growth and the component of government expenditure. Denbel & Ayen (2016) explored the relationship between money supply, inflation and economic growth in Ethiopia in data from 1970 to 2010. The study employed the Johansen co integration test and the VECM econometric techniques. They found that a long run bidirectional relationship exists between inflation and money supply and a unidirectional causality relationship between from economic growth to inflation. In the short run one way causality was found from money supply and economic growth to inflation. Popescu & Maxim (2021) studied the impact of government spending on the economic growth of Romania. The study employed the Johansen co-integration test and the Granger Causality Test. They found that results do not indicate the existence of long-term co-integration vectors, but they support the double causality relation in the short term. Gatawa et al. (2017) studied the impact of money supply and inflation on economic growth of Nigeria in data from 1973 to 2013. The study used the VAR model and Granger Causality Test. The results stated that there is a positive impact of money supply on economic growth whereas inflation and interest rates have harmed economic growth. Laxman (2019) examined the impact of money supply on the economic growth of Nepal using data from 1975 to 2016. The study used VECM and Granger Causality tests and found that money supply is positively significant to economic growth while foreign assistance is negatively significant to the economic growth of Nepal at a 1 percent level of significance. Rahman et al. (2023) explored the impact of government expenditure on economic growth of SAARC countries in data from 2011 to 2020. The study employed the OLS econometric model. Foremost, government expenditure has a strong positive impact on SAARC countries. Secondly, in SAARC countries government expenditure and economic growth have a long-lasting relationship. Ekramuddin (2019) researched exploring the impact of fiscal policy on economic growth in Afghanistan in

data from 2003 to 2019. The study employed the ARDL model and found that there is a strong positive impact of government expenditure on the economic growth of Afghanistan. Raziiakhan (2017) explored the relationship between government expenditure and economic growth of Kyrgyzstan and Tajikistan using data from 2000 to 2013. They applied Engle-Granger Co-integration and Granger Causality Tests. They found that there is a long-run relationship between government expenditure and economic growth in both countries and there is a unidirectional relationship from government expenditure to economic growth in Kyrgyzstan, but no causality relationship in Tajikistan. Tun Lin Oo (2019) researched the impact of fiscal policy on the economic growth of Myanmar in data from 1979 to 2016. The study employed the OLS econometric approach. The outcome shows a positive significant impact of fiscal deficit on economic growth. The analysis expresses that there is a multiplier effect of fiscal deficit affecting economic growth, which supports Keynesians' assumptions. Ahdini and Mandala (2020) researched the impact of government expenditure and inflation on economic growth in Indonesia in data from 1981 to 2018. The study employed the Engel-Granger co-integration test and Error Correction Model. The study shows that the relationship between government expenditure and economic growth was positive and between inflation and economic growth was negative. Boundavong (2022) researched the impacts of monetary policy on economic growth in Lao PDR using data from 1995 to 2018. The study used the Vector Autoregressive Model and found a notable effect. The expansionary monetary policy has a negative impact on economic growth. Awdeh (2019) studied the impact of monetary policy on economic growth in Lebanon. The study used the VEC econometric model and used data from 2002 to 2017. The results showed that monetary policy depresses economic growth in long run. Abdul et al. (2019) examined the impact of monetary policy on economic growth of UAE. The found that monetary policy has an insignificant impact on United Arab Emirates economic growth from money supply aspect using data from 2008 to 2018.

RESEARCH METHOD

Data and Variables

The study uses annual time series data for Afghanistan covering 2007–2020 (T = 14), the period for which data on all variables were available. The dependent variable is Gross Domestic Product (GDP), which serves as the proxy for economic growth. The explanatory variables are (i) the money supply, measured by broad money (M2), obtained from the World Bank data (World Bank, n.d.); (ii) government consumption expenditure, i.e., government spending on the running costs of public services; and (iii) government capital expenditure, i.e., government spending on investment in physical assets. Both expenditure components were obtained from the National Accounts section of the United Nations Statistics Division (United Nations Statistics Division, n.d.). All variables enter the model in natural logarithms, so that the estimated coefficients can be read as elasticities.

Stationarity Test

Regressions on non-stationary series can produce spurious results, so stationarity was examined before estimation. The Augmented Dickey–Fuller (ADF) test was applied to each

variable at level. The null hypothesis (H0) is that the series has a unit root; the alternative is that it is stationary. H0 is rejected when the ADF t-statistic is more negative than the critical value at the 1%, 5%, or 10% significance level. Variables found to be non-stationary at level would be tested in first differences; as Table 1 shows, all variables were stationary at level, so no differencing was required.

Estimation Strategy and Justification of OLS

The relationship is estimated by OLS in a single-equation framework (Equation 1). OLS is appropriate for three reasons. First, the stationarity tests show that all series are integrated of order zero, I(0), so a regression in levels does not suffer from the spurious-regression problem, and cointegration-based techniques (ARDL, VECM), which are designed for non-stationary or mixed-order series, are not required. Second, the objective is to estimate the elasticity of output with respect to each policy variable, which OLS provides in a transparent and easily interpreted form. Third, with only 14 observations, dynamic specifications with many lagged terms would consume scarce degrees of freedom. OLS has also been widely used in comparable studies (Hasnul, 2015; Tun Lin Oo, 2019; Rahman et al., 2023). The validity of OLS inference rests on the classical assumptions, which were checked with the diagnostic tests below.

Diagnostic Tests

Four diagnostic checks were applied to the estimated model: the Breusch–Pagan–Godfrey test for heteroscedasticity (H0: homoscedastic residuals); the Breusch–Godfrey LM test for serial correlation (H0: no serial correlation up to order 2); the Jarque–Bera test for normality of the residuals (H0: normally distributed residuals); and multicollinearity diagnostics for the regressors. The Durbin–Watson statistic is also reported. A probability value above 0.05 means that the null hypothesis is not rejected at the 5% level.

RESULT AND DISCUSSION

1. Unit Root Test

To avoid spurious regression, the stationarity of each variable was tested first with the ADF test (null hypothesis: the variable has a unit root).

Table 1. The Outcomes of the ADF test

Null Hypothesis: The variable has a unit root.				
Variable	**Level: Augmented Dickey Fuller Test (T-statistics)**	**Test critical values: the level of significance**		
		1% level	**5%**	**10%**
L GDP	-3.548850	-3.920350	-3.065585	-2.673459
Ln MS (M2)	-3.580752	-4.057910	-3.119910	-2.701103
L Con Exp	-4.436922	-3.95148	-3.081002	-2.681330
L Cap Exp	-3.850636	-4.057910	-3.119910	-2.701103

Source: Authors' estimation using data from the World Bank and the United Nations Statistics Division (2007-2020)

Table 1 shows that, at level, the ADF t-statistics of all four variables are more negative than the 5% critical values, so the null hypothesis of a unit root is rejected: L GDP (−3.549 against −3.066), Ln MS (−3.581 against −3.120) and L Cap Exp (−3.851 against −3.120) are stationary at the 5% level, and L Con Exp (−4.437 against −3.951) is stationary at the 1% level. All variables are therefore integrated of order zero, I(0), and the model can be estimated in levels without differencing.

2. Ordinary Least Square Model (OLS)

The effects of the explanatory variables on GDP are estimated with the OLS model justified in the Research Method section. The estimated model is as follows:

$$lnY_t = \beta_0 + \beta_1 lnMS_t + \beta_2 lnCap\,E_t + \beta_3 lnCon\,E_t + \varepsilon_t \quad (1)$$

Where Y_t stands for Gross Domestic Product (GDP), MS_t stands for money supply, $Cap\,E_t$ stands for Capital Expenditure, $Con\,E_t$ stands for Consumption Expenditure β_is are the coefficients that will be estimated by the model, ε_t is the error term.

Table 2. OLS estimation of coefficients

Variable	Coefficient	St-error	t-statistic	Probability
Ln(Con Exp)	0.56004	0.206414	2.713205	0.0218
Ln(Cap Exp)	0.414520	0.180947	2.290837	0.0449
MS	-0.007723	0.005269	-1.465858	0.1734
R-Squared	**Adjusted R^2**	**Prob (F-statistic)**	**DW-statistic**	
0.921721	0.898237	0.00008	0.922663	

Source: Authors' estimation using data from the World Bank and the United Nations Statistics Division (2007-2020)

Table 2 reports the estimated coefficients. Because the model is specified in natural logarithms, the coefficients are elasticities. The coefficient of consumption expenditure (0.560) indicates that, holding the other variables constant, a 1% increase in government consumption expenditure is associated with a 0.56% increase in GDP (p = 0.0218). Likewise, a 1% increase in capital expenditure is associated with a 0.41% increase in GDP (p = 0.0449). Both coefficients are statistically significant at the 5% level. The 95% confidence intervals, computed from the reported standard errors with 10 degrees of freedom, are approximately 0.10–1.02 for consumption expenditure and 0.01–0.82 for capital expenditure. These wide and overlapping intervals show that the elasticities are imprecisely estimated and that the data do not allow us to conclude that one expenditure category has a larger effect than the other.

In contrast, the coefficient of the money supply (M2) is small and negative (−0.0077) and statistically insignificant (p = 0.1734): the null hypothesis that the money supply has no effect on GDP cannot be rejected at the 1%, 5%, or 10% level. In this sample, therefore, there is no evidence that the money supply affects economic growth. The R-squared of 0.9217 means that about 92% of the variation in (log) GDP over 2007–2020 is jointly explained by the three explanatory variables; the adjusted R-squared of 0.898 shows that this fit is not merely a result of the number of regressors, and the F-test rejects the joint insignificance of the regressors at the 1% level.

3. Diagnostic Tests Results

Tables 3 to 5 summarise the diagnostic tests. The results show no evidence of heteroscedasticity, whereas the evidence on serial correlation is borderline and has to be taken into account when interpreting the standard errors. The results for normality and multicollinearity are reported in Table 5.

Heteroscedasticity Test

The Breusch-Pagan-Godfrey test was employed to explore whether heteroscedasticity exists.

Table 3. Heteroscedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.150875	Prob. F(3,10)	0.9268
Obs*R-squared	0.606237	Prob. Chi-Square(3)	0.8950
Scaled explained SS	0.132118	Prob. Chi-Square(3)	0.9877

Source: Authors' estimation using data from the World Bank and the United Nations Statistics Division (2007-2020)

All three test statistics have probability values far above 0.05 (F-statistic: 0.9268; Obs*R-squared: 0.8950; scaled explained SS: 0.9877), so the null hypothesis of homoscedastic residuals is not rejected: there is no evidence of heteroscedasticity.

Serial Correlation Test

Table 4. Breusch-Godfrey Serial Correlation LM Test

F-statistic	2.968918	Prob. F(2,8)	0.1085
Obs*R-squared	5.964319	Prob. Chi-Square(2)	0.0507

Source: Authors' estimation using data from the World Bank and the United Nations Statistics Division (2007-2020)

The Breusch–Godfrey LM test gives a probability of 0.1085 for the F-version and 0.0507 for the Obs*R-squared version. Neither rejects the null of no serial correlation at the 5% level, but the second is only marginally above the threshold and would reject at 10%. In addition, the Durbin–Watson statistic of 0.9227 (Table 2) is well below 2; for n = 14 and three regressors it lies between the approximate 5% lower and upper bounds (dL ≈ 0.77, dU ≈ 1.78) and is therefore inconclusive. Positive first-order serial correlation consequently cannot be ruled out. Serial correlation does not bias the OLS coefficients but can understate their standard errors, so the significance of the capital expenditure coefficient (p = 0.0449), which is close to the 5% threshold, should be interpreted with caution. Heteroscedasticity- and autocorrelation-consistent (Newey–West) standard errors or a dynamic specification should be applied in future work with a longer sample.

Normality and Multicollinearity Tests

The Jarque–Bera test was used to examine whether the residuals are normally distributed (H0: the residuals are normally distributed). The test does not reject the null hypothesis, so the residuals can be treated as normally distributed, which supports the validity of the t- and F-tests reported in Table 2. The multicollinearity diagnostics for the three regressors indicate no serious multicollinearity, so the individual coefficients can be estimated reliably. The decisions of both tests are summarised in Table 5.

Table 5. Summary of Diagnostic Tests

Test	Null hypothesis	Statistic	Prob.	Decision
Breusch–Pagan–Godfrey	Homoscedastic residuals	Obs*R^2 = 0.6062	0.8950	Not rejected: no heteroscedasticity
Breusch–Godfrey LM (2 lags)	No serial correlation	Obs*R^2 = 5.9643	0.0507	Borderline: not rejected at 5%, rejected at 10%
Durbin–Watson	No first-order autocorrelation	0.9227	–	Inconclusive (dL ≈ 0.77, dU ≈ 1.78)
Jarque–Bera	Normally distributed residuals	–	–	Not rejected: residuals normally distributed
Multicollinearity diagnostics	No severe multicollinearity	–	–	No serious multicollinearity

Source: Authors' estimation using data from the World Bank and the United Nations Statistics Division (2007-2020)

4. Discussion

The positive and significant effects of both expenditure components are consistent with the Keynesian view that government spending raises aggregate demand and output, and with earlier evidence for Afghanistan (Ekramuddin, 2019), the SAARC countries (Rahman et al., 2023), Myanmar (Tun Lin Oo, 2019), and Kyrgyzstan and Tajikistan (Raziiakhan, 2017). They contrast with the negative relationship reported for Malaysia (Hasnul, 2015), which illustrates that the effect of public spending depends on the structure of the economy and on the composition and efficiency of expenditure. Capital expenditure is expected to raise output by expanding productive capacity, whereas consumption expenditure works mainly through aggregate demand; the present data, however, cannot rank the two effects statistically because their confidence intervals overlap.

The insignificant money supply coefficient is in line with the classical and monetarist proposition of long-run monetary neutrality discussed in the literature review, and with studies that find no significant growth effect of the money supply in Indonesia (Safiullah et al., 2021), South Africa (Precious & Palesa, 2014), and the United Arab Emirates (Abdul et al., 2019), or only a short-run effect (Abdullah, 2020). It differs from the positive effects reported for Nigeria (Gatawa et al., 2017) and Nepal (Laxman, 2019). Because the model does not include prices, the study cannot assess whether monetary expansion affects inflation in Afghanistan.

CONCLUSION

This study set out to estimate the effects of government capital and consumption expenditure and of the money supply on economic growth in Afghanistan during 2007–2020. Using annual data and OLS on variables that were all stationary at level, the study finds that (i) consumption expenditure has a positive and significant effect on GDP (elasticity 0.56; p = 0.022), (ii) capital expenditure has a positive and significant effect (elasticity 0.41; p = 0.045),

and (iii) the money supply has no significant effect (p = 0.173). The model explains about 92% of the variation in GDP. The heteroscedasticity test gives no evidence of unequal variance, whereas serial correlation is borderline (Breusch–Godfrey p = 0.0507; Durbin–Watson = 0.92). These results support the Keynesian view that public expenditure is effective in stimulating growth in Afghanistan. Three policy implications follow. First, the government can use public expenditure as its main instrument for supporting growth; because both categories show a positive effect and their effects cannot be ranked statistically, the allocation between them should be guided by spending efficiency and by the capacity-building role of capital expenditure rather than by the point estimates alone. Second, the way expenditure is financed matters: if spending is met by high and unbearable taxes, a crowding-out effect may reduce aggregate demand and offset the growth impact of the expenditure. Third, because the money supply had no measurable effect on growth, monetary expansion should not be relied upon as a growth instrument; the monetary authority could instead concentrate on price and financial stability, an objective that this study did not test. The study has several limitations. The sample contains only 14 annual observations, which limits statistical power and model complexity; serial correlation could not be ruled out, so the standard errors may be understated; the single-equation OLS framework does not address possible reverse causality between expenditure and GDP; and the model excludes other determinants such as inflation, taxation, foreign aid, and investment, as well as the revenue side of fiscal policy. Future research could use longer or higher-frequency series, ARDL, VECM, or Granger causality approaches, autocorrelation-consistent standard errors, and additional variables such as inflation, tax revenue, and foreign aid.

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