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MACROECONOMIC FACTORS AND DEVELOPMENT EXPENDITURE IN SUDAN (1990–2018): THE INTERVENING ROLE OF FISCAL SPACE AND THE MODERATING EFFECT OF INTERNATIONAL SANCTIONS

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ABSTRACT

This study examines the influence of macroeconomic factors on development expenditure in Sudan over 1990–2018 and introduces fiscal space as an intervening variable and international sanctions as a moderating variable. The independent construct comprises government revenue, gross domestic product (GDP), exchange rate, rate of inflation and economic growth, while development expenditure is reflected through capital expenditure, public investment ratio, sectoral allocation and utilization rate. Fiscal space captures the budgetary room through which macroeconomic conditions are translated into feasible development spending, whereas the sanctions regime is treated as a contextual moderator that can weaken access to trade, finance, foreign exchange and external resources. The study uses secondary annual time-series data from the Central Bank of Sudan, the Central Bureau of Statistics and the Ministry of Finance and National Planning. Descriptive, comparative and correlation analyses are organized around three policy periods: 1990–2005, 2006–2010 and 2011–2018. The research data show substantial instability in development expenditure and marked changes in the association between macroeconomic variables and development expenditure across the three periods. Government revenue and GDP were strongly positively correlated with development expenditure in 1990–2005 ($r = .98$ and $r = .90$ respectively), while the pattern changed in later periods. The 2006–2010 period, associated with partial external normalization, recorded the highest development-expenditure-to-revenue ratio (32%), compared with 23% in 1990–2005 and 16% in 2011–2018. The findings support the argument that macroeconomic conditions affect development expenditure partly through available fiscal space and that sanctions alter the strength and direction of these relationships. The study recommends stronger domestic revenue mobilization, credible macro-fiscal planning, exchange-rate and inflation stabilization, protection of productive capital spending, improved project execution and policies that expand lawful external economic engagement.

Key Words: Macroeconomic Factors; Development Expenditure; Fiscal Space; International Sanctions; Government Revenue; Groce Domestic Product; Exchange Rate; Inflation; Economic Growth; Sudan

2. Introduction

Development expenditure is the portion of public spending directed toward the creation, rehabilitation and expansion of productive and social assets (Heller, 2005). It includes infrastructure, irrigation, energy, transport, water systems, industrial development and other investments whose benefits extend beyond a single fiscal year. In a low-income and fragile economy, the size and effectiveness of such expenditure depend not only on policy priorities but also on the macroeconomic environment within which the budget is prepared and executed. Government revenue determines the domestic resource envelope; GDP reflects the scale of the tax base and economy; exchange-rate movements alter the domestic cost of imported capital goods; inflation changes real purchasing power and project costs; and economic growth affects both revenue buoyancy and the sustainability of public investment.

Sudan provides an important setting for examining these relationships. The period 1990–2018 combined prolonged economic sanctions, restricted international financial access, changing oil revenues, episodes of partial normalization, high inflation, currency depreciation and the major structural break associated with the secession of South Sudan. Official statistics and reports from the Central Bank of Sudan, the Central Bureau of Statistics and the Ministry of Finance and National Planning show that development expenditure fluctuated substantially and that its associations with macroeconomic variables were not stable across the three sub-periods. (Central Bank of Sudan [CBOS], various years; Central Bureau of Statistics [CBS], various years; Ministry of Finance and National Planning [MFNP], various years). These reports also indicate that access to contracted foreign financing was constrained during the sanctions period, while 2006–2010 coincided with relatively greater external engagement.

The analytical challenge is that macroeconomic factors do not automatically translate into development spending. A country can experience nominal revenue or GDP growth while still lacking room to increase capital expenditure if debt service, recurrent commitments, inflation, financing constraints or external restrictions absorb available resources. The concept of fiscal space addresses this transmission problem. Heller (2005) defines fiscal space as room in the budget that allows a government to provide resources for a desired purpose without undermining fiscal sustainability. In this study, fiscal space is introduced as an intervening variable through which macroeconomic conditions are converted into feasible development expenditure.

International sanctions are retained as a moderator because they can change the strength of the relationship between macroeconomic factors and development expenditure. Sanctions may restrict trade, banking relationships, access to external finance, investment and foreign exchange. Neuenkirch and Neumeier (2015) show that economic sanctions can impose measurable output costs on target economies. In Sudan, sanctions therefore provide a plausible contextual condition under which the same level of domestic economic activity may yield different development-spending outcomes depending on access to finance, imported capital equipment and international transactions.

The study is guided by five specific objectives: to determine the relationship between government revenue and development expenditure; to assess the relationship between GDP and development expenditure; to examine the relationship between exchange rate and development expenditure; to establish the relationship between inflation and development expenditure; and to determine the relationship between economic growth and development expenditure. A sixth analytical objective evaluates whether international sanctions alter the relationship between the combined macroeconomic factors and development expenditure, while fiscal space is theorized as the intervening mechanism.

2. Literature Review

2.1 Theoretical Foundation

2.1.1 The tax-spend hypothesis

The Government revenue–expenditure relationship is supported by the tax-spend hypothesis and the fiscal-space perspective. The tax-spend proposition holds that public expenditure is constrained by the revenues that government can mobilize; expansion of the revenue envelope can therefore precede or enable expansion of expenditure. For development expenditure, the logic is particularly strong because capital projects require multiyear commitments and counterpart funding. Heller (2005) further argues that additional spending is sustainable only where governments have budgetary room that does not threaten macroeconomic stability or debt sustainability. Thus, stronger government revenue is expected to expand fiscal space and, subject to allocation choices, increase development expenditure.

2.1.2 Wagner's Law

Wagner's Law provides the principal theoretical basis for the GDP objective. Wagner proposed that public expenditure tends to grow as national income and economic activity expand because industrialization and development increase demand for administrative, social and infrastructure services. Peacock and Wiseman (1961) subsequently showed that the relationship between national income and public expenditure may also shift discontinuously when major disturbances change society's tolerance for taxation and public spending. In Sudan, GDP therefore represents both the scale of economic resources available to government and the income base from which revenue can be generated.

2.1.3 Mundell–Fleming Framework

The Mundell–Fleming framework explains how exchange-rate conditions interact with fiscal policy in an open economy. Fleming (1962) and Mundell (1963) show that the effectiveness and sustainability of fiscal and monetary policies depend on the exchange-rate regime, external balance and capital mobility. For a country that imports machinery, transport equipment and other capital inputs, currency depreciation raises the domestic-currency cost of development projects. Exchange-rate instability can also weaken planning, increase financing needs and reduce the real quantity of capital goods that a fixed nominal budget can purchase.

2.1.4 Quantity-Theory and Fiscal-Dominance Logic,

The inflation objective is grounded in the quantity-theory and fiscal-dominance logic, under which sustained monetary expansion and deficit financing can raise the general price level. Friedman (1968) emphasized the long-run monetary nature of inflation and the limits of attempts to exploit inflation for real gains. In public investment, high inflation erodes the real value of appropriations, increases contract variation and replacement costs, and can force governments to postpone or scale down projects. Inflation may therefore raise nominal expenditure while reducing real development output, making price stability an important condition for effective development spending.

2.1.5 Endogenous Growth Theory

Endogenous Growth Theory supports the relationship between economic growth and development expenditure. Barro (1990) models productive government services as inputs into private production and shows that public spending can influence long-run growth, although the relationship is not indefinitely positive. The causality can also run from growth to expenditure: higher growth broadens incomes, profits, imports and taxable transactions, increasing revenue and fiscal capacity. The relationship is therefore potentially reciprocal, but this study focuses on the extent to which observed economic growth expands the capacity to finance development expenditure.

2.1.6 Fiscal Space Theory

The overall framework is anchored in Fiscal Space Theory. Heller (2005) argues that governments can increase priority expenditure when they create room through stronger revenue, expenditure reprioritization, grants, sustainable borrowing or other financing without jeopardizing fiscal stability. This provides the theoretical bridge linking the five macroeconomic factors to development expenditure. GDP and growth shape the revenue base; inflation and exchange-rate depreciation can erode real fiscal capacity; and revenue directly determines available domestic resources. International sanctions can reduce the effectiveness of these channels by restricting external finance, trade and foreign-exchange access. Fiscal space therefore operates as the intervening mechanism, while sanctions condition the strength of the macroeconomic-development expenditure relationship.

2.2 Empirical Literature

2.2.1 Government Revenue and Development Expenditure

Empirical public-finance literature generally finds that domestic revenue mobilization is central to sustainable public investment. Heller (2005) argues that higher revenue creates durable fiscal room when it does not impose excessive economic distortions. Fiscal-space literature similarly emphasizes revenue capacity and expenditure efficiency. Sudanese official statistics show that development expenditure moved strongly with government revenue in 1990–2005 ($r = .98$) and remained positively related in 2006–2010 ($r = .82$), before turning negative in 2011–2018 ($r = -.35$). This reversal suggests that revenue alone is insufficient: structural breaks, allocation priorities and reduced fiscal space can interrupt the expected positive transmission.

2.2.2 Gross Domestic Product (GDP) and Development Expenditure

Empirical tests of Wagner's Law frequently identify a positive long-run association between national income and public expenditure, although the magnitude varies across countries and expenditure categories. Peacock and Wiseman (1961) also show that exceptional disturbances can change expenditure patterns relative to income. In the Sudan data, GDP was strongly positively associated with development expenditure in 1990–2005 (r = .90), weakly negative in 2006–2010 (r = −.30), and strongly positive in 2011–2018 (r = .88). The instability reinforces the need to account for sanctions, oil-sector changes, currency redenomination and the post-secession macroeconomic environment rather than assume a constant income-expenditure elasticity.

2.2.3 Exchange Rate and Government Expenditure

Exchange-rate movements affect government expenditure through import prices, debt-service costs and the domestic-currency cost of externally procured capital goods. Fleming (1962) and Mundell (1963) demonstrate that exchange-rate conditions shape the operation of fiscal policy in open economies. In Sudan, the correlation between the exchange rate and development expenditure was positive in 1990–2005 (r = .60), negative in 2006–2010 (r = −.35) and strongly positive in 2011–2018 (r = .89). The positive later-period correlation should not be interpreted as evidence that depreciation improves development capacity; it can arise because both nominal expenditure and the exchange rate rose sharply during inflation and currency depreciation. Real-value analysis is therefore essential.

2.2.4 Rate of Inflation and Development Expenditure

Inflation can reduce the real value of approved budgets and increase the cost of infrastructure delivery. It also complicates procurement and may generate repeated supplementary financing needs. Analysis of the official time-series data shows that inflation correlated negatively with development expenditure in 1990–2005 (r = −.50), positively in 2006–2010 (r = .44), and positively in 2011–2018 (r = .53). These mixed signs are consistent with a nominal-data problem: during high-inflation episodes, nominal expenditure can rise even when the real volume of development activity falls. The literature therefore supports the expectation that persistent inflation weakens the real purchasing power and efficiency of development budgets (Friedman, 1968).

2.2.5 Economic Growth and Development Expenditure

Barro (1990) demonstrates that productive public expenditure and growth can be mutually reinforcing up to an efficient range. In the reverse direction examined here, economic growth can enlarge the tax base and ease fiscal constraints. The Sudan correlations, however, are small: r = .07 in 1990–2005, r = .04 in 2006–2010 and r = .22 in 2011–2018. These coefficients suggest that growth did not automatically translate into higher development expenditure. Revenue composition, oil dependence, sanctions, conflict and expenditure priorities may have weakened the transmission from aggregate growth to capital spending.

2.2.6 Influence of the Moderator on the Relationship between Macroeconomic Factors and Development Expenditure

Economic sanctions can alter fiscal transmission by restricting access to export markets, correspondent banking, external borrowing, grants, investment and imported technology. Neuenkirch and Neumeier (2015) find that sanctions reduce economic growth in target countries, with stronger effects for multilateral measures. Official economic reports and the observed structural changes in Sudan support dividing the analysis into strict-sanctions, partial-normalization and post-secession periods. The marked changes in correlation coefficients across these periods provide descriptive evidence that the macroeconomic-development expenditure relationship was conditional on the external policy environment. This study therefore treats sanctions as a moderator, while recognizing that a formal interaction regression would require a consistently coded annual sanctions-intensity series.

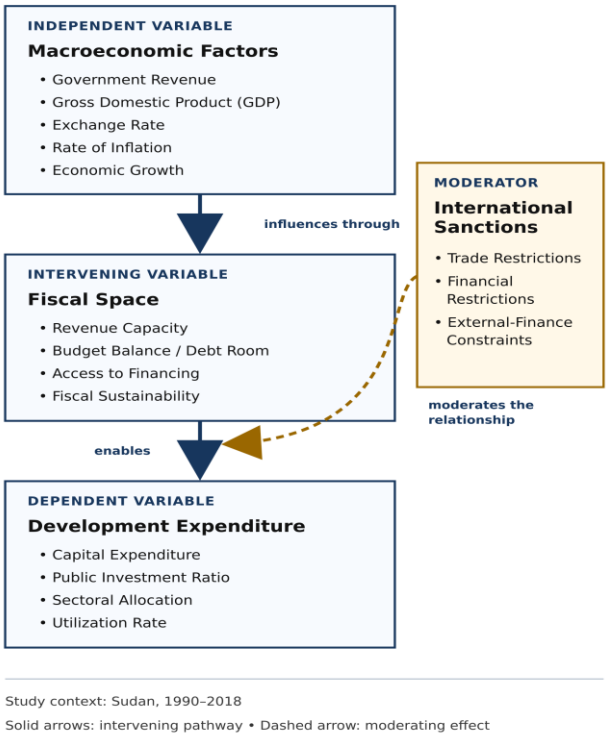
2.2.7 Macroeconomic Factors and Government Expenditure

The broader literature views government expenditure as an outcome of national income, fiscal resources, macroeconomic stabilization and political or institutional shocks. Wagnerian theory predicts expenditure expansion with income; fiscal-space analysis emphasizes sustainable financing; and the displacement hypothesis predicts structural shifts following major disturbances. The Sudan experience combines all three mechanisms (Heller, 2005; Wagner, 1883). Correlation analysis of the official macroeconomic series shows substantial interdependence among GDP, revenue, exchange rate, inflation and budget balance in some periods. Consequently, the combined effect of macroeconomic factors should be interpreted as a system rather than as five isolated bivariate relationships.

2.3 Conceptual Framework

The conceptual framework incorporates five macroeconomic dimensions identified in public-finance literature and introduces fiscal space as the intervening mechanism (Heller, 2005; Wagner, 1883). International sanctions are treated as the moderating condition because sanctions research and official economic reports show that restrictions on trade, finance and external transactions can alter the transmission of macroeconomic capacity into public expenditure (Neuenkirch & Neumeier, 2015). The three policy periods distinguish high-restriction, partial-normalization and post-secession conditions. Fiscal space is therefore not a competing independent variable; it is the budgetary transmission channel between macroeconomic capacity and actual development expenditure (Heller, 2005).

Figure 1. Conceptual Framework



2.4 Research Gap

Three gaps emerge from the reviewed literature and official reports. First, studies of Sudan frequently emphasize sanctions and development, while the available macroeconomic data support a broader macro-fiscal explanation of development expenditure. Second, much of the reviewed literature does not explicitly explain the transmission mechanism linking macroeconomic conditions to development spending. Introducing fiscal space addresses this conceptual gap by showing how revenue capacity, financing room and fiscal sustainability translate macroeconomic conditions into actual capital spending. Third, the literature recognizes structural breaks associated with sanctions and political-economic change but rarely integrates sanctions formally into a development-expenditure model (Neuenkirch & Neumeier, 2015). Treating international sanctions as a moderator makes the period comparisons analytically meaningful. The study therefore examines macroeconomic factors as the independent construct, fiscal space as the intervening variable, development expenditure as the dependent construct and international sanctions as the moderating condition.

3. Methodology

The study adopts a quantitative longitudinal design using annual secondary time-series data for Sudan from 1990 to 2018, comprising 29 annual observations. Data sources are the Central Bank of Sudan, the Central Bureau of Statistics and annual reports of the Ministry of Finance and National Planning. The study is non-experimental and combines descriptive trend analysis, period comparison and Pearson correlation analysis. (CBOS, various years; CBS, various years; MFNP, various years).

The independent variable is macroeconomic factors, operationalized by government revenue, GDP, exchange rate, rate of inflation and economic growth. The dependent variable is development expenditure. In the conceptual model, development expenditure is interpreted through four indicators: capital expenditure, public investment ratio, sectoral allocation and utilization rate. The official data provide annual development expenditure by sector (CBOS, various years; MFNP, various years) but do not consistently report all four indicators as separate annual series. The empirical results therefore use total development expenditure and sectoral allocations as directly observed measures. The public investment ratio is represented by development expenditure relative to government revenue, while a distinct annual utilization-rate series is not available in the official reports reviewed.

Fiscal space is introduced as the intervening variable. Conceptually, it represents the room available for development spending after considering revenue capacity, fiscal balance, financing access and sustainability. Reports from the Central Bank of Sudan and the Ministry of Finance and National Planning provide data on government revenue, budget surplus or deficit and withdrawals from contracted loans, which are relevant fiscal-space indicators (CBOS, various years; MFNP, various years). However, because a validated annual composite fiscal-space index was not constructed from the available data, the intervening effect is assessed conceptually and through descriptive fiscal-capacity evidence rather than by claiming a formal mediation coefficient. International sanctions are treated as the moderator. Consistent with the sanctions literature and the reported structural changes, 1990–2005 represents the strict-sanctions/high-restriction phase, 2006–2010 the partial-normalization phase, and 2011–2018 the post-secession/continued-restriction phase.

The analytical model for future confirmatory estimation can be expressed as: $DE_t = \beta_0 + \beta_1 REV_t + \beta_2 GDP_t + \beta_3 EXR_t + \beta_4 INF_t + \beta_5 GROWTH_t + \beta_6 FS_t + \beta_7 SAN_t + \beta_8 (MACRO_t \times SAN_t) + \varepsilon_t$, where DE is development expenditure, REV is government revenue, EXR is exchange rate, INF is inflation, FS is fiscal space, SAN is sanctions intensity and MACRO is a standardized composite of the five macroeconomic factors. A mediation extension would estimate FS as a function of the macroeconomic variables and then test the indirect path from macroeconomic factors through fiscal space to development expenditure. Given the limitations of the available research data and official reports, the study presents descriptive and correlation evidence and does not claim unestimated regression coefficients.

Table 1. Operationalization of variables

Construct	Indicators / measure	Role
Macroeconomic factors	Revenue; GDP; exchange rate; inflation; economic growth	Independent
Fiscal space	Revenue capacity; budget balance; financing access; sustainability	Intervening
International sanctions	Strict restrictions vs partial normalization / sanctions intensity	Moderator
Development expenditure	Capital expenditure; investment ratio; sector allocation; utilization	Dependent

Source: Author (2026)

Validity was strengthened by retaining official national data sources and by triangulating the interpretation across fiscal, monetary and statistical reports. The principal limitations are inconsistent units across years, currency redenomination, nominal-value distortions during high inflation, a small number of observations in the 2006–2010 sub-period, and the absence of a fully measured annual fiscal-space index and sanctions-intensity scale. Correlations are therefore interpreted as associations rather than causal effects.

4. Results and Discussion

4.1 Overview of Results

The research data show pronounced instability in Sudan's macroeconomic environment and development expenditure. Total development expenditure reported for 1990–2018 was 10,836.43 billion Sudanese pounds, but the distribution was highly uneven across periods and sectors. Official fiscal records report development expenditure (CBOS, various years; MFNP, various years) of 10,754.4 billion for 1990–2005, 31.6 billion for 2006–2010 and 50.5 billion for 2011–2018. Because Sudan experienced currency changes, very high inflation and major structural breaks, these nominal totals should not be compared as if they represented constant purchasing power. More informative for the present framework are the within-period associations and the development-expenditure-to-revenue ratio.

Table 2. Development expenditure relative to government revenue

Period	Revenue total	Dev. exp. total	Dev./Revenue
1990–2005	47,163.09	10,754.40	23%
2006–2010	99.04	31.60	32%
2011–2018	320.07	50.50	16%

Source: Author (2026)

The ratio rose to 32% during 2006–2010, a period that official economic reports associate with partial normalization and improved external engagement (CBOS, various years; MFNP, various years), before falling to 16% in 2011–2018. This pattern is consistent with the moderating proposition: the share of revenue translated into development expenditure varied substantially across external-policy regimes. It is also consistent with the fiscal-space mechanism because a larger nominal revenue envelope does not guarantee a larger development share when macroeconomic pressures, debt, recurrent obligations or financing constraints intensify.

Table 3. Correlation of macroeconomic factors with development expenditure by period

Factor	1990–2005	2006–2010	2011–2018
Government revenue	.98	.82	−.35
GDP	.90	−.30	.88
Exchange rate	.60	−.35	.89
Inflation	−.50	.44	.53
Economic growth	.07	.04	.22

Source: Author (2026)

4.2 Government Revenue and Development Expenditure

Government revenue had the strongest relationship with development expenditure in the first two periods. The correlation of .98 in 1990–2005 indicates that development expenditure moved closely with revenue during the strict-sanctions period, while the .82 coefficient in 2006–2010 remained strongly positive. The relationship became negative (−.35) in 2011–2018. This later reversal is important because it shows that nominal revenue growth was not sufficient to preserve development expenditure. The post-2011 economy faced the loss of much oil production after South Sudan's secession, exchange-rate depreciation and high inflation. Under such conditions, revenue can rise in nominal terms while real fiscal space contracts. The result supports the use of fiscal space as an intervening variable rather than treating revenue as a direct and mechanically sufficient determinant of development expenditure.

4.3 Gross Domestic Product (GDP) and Development Expenditure

GDP was strongly positively associated with development expenditure in 1990–2005 (r = .90), weakly negatively associated in 2006–2010 (r = −.30), and strongly positively associated in 2011–2018 (r = .88). The first and third coefficients are broadly consistent with Wagnerian expectations that larger economic activity is associated with larger public expenditure. The negative middle-period coefficient should be interpreted cautiously because the sub-period contains only five observations and the source data show sharp nominal and structural changes. The results indicate that GDP is an important macroeconomic capacity variable, but its effect on development expenditure depends on the composition of growth, revenue capture and the fiscal and external environment.

4.4 Exchange Rate and Government Expenditure

The exchange rate was moderately positively correlated with development expenditure in 1990–2005 (r = .60), negatively correlated in 2006–2010 (r = −.35) and strongly positively correlated in 2011–2018 (r = .89). Since the exchange-rate series is expressed as Sudanese currency per US dollar, a rising value represents depreciation. The strong positive coefficient after 2011 should therefore not be read as a beneficial effect of depreciation. Rather, depreciation and nominal development expenditure can rise together because domestic prices and project costs are increasing. Central Bank reports record a dramatic deterioration of the exchange rate in the later years, while official price statistics show accelerating inflation (CBOS, various years; CBS, various years). In real terms, depreciation likely reduced the quantity of imported machinery and equipment purchasable from a given budget. The finding supports the Mundell–Fleming argument that external and exchange-rate conditions shape fiscal effectiveness.

4.5 Rate of Inflation and Development Expenditure

Inflation showed a negative relationship with development expenditure in 1990–2005 (r = −.50), but positive relationships in 2006–2010 (r = .44) and 2011–2018 (r = .53). The negative first-period coefficient is consistent with the expectation that high inflation erodes fiscal purchasing power. The positive coefficients in later periods are best understood as nominal co-

movement rather than evidence that inflation promotes development spending. When prices rise rapidly, nominal appropriations and project costs may both increase. Without deflating expenditure, the nominal series can therefore produce a positive correlation even if real investment falls. This is one of the clearest reasons future work should convert all fiscal variables into constant prices or ratios to GDP.

4.6 Economic Growth and Development Expenditure

Economic growth had only weak positive correlations with development expenditure in all three periods: .07, .04 and .22. The coefficients suggest that annual growth changes were not strongly translated into development expenditure. This can occur where growth is concentrated in sectors that do not generate broad-based revenue, where recurrent and security expenditure absorb additional resources, or where sanctions and financing constraints limit investment execution. The result is consistent with the fiscal-space interpretation: growth can improve potential capacity, but the conversion of that capacity into development expenditure depends on revenue mobilization, fiscal priorities and access to financing.

4.7 Influence of the Moderator on the Relationship between Macroeconomic Factors and Development Expenditure

The evidence for moderation is comparative rather than a formally estimated interaction coefficient. The correlation structure changes materially across the three policy periods. Government revenue moves from strongly positive to negative; GDP moves from positive to negative and back to positive; exchange rate changes from positive to negative and then strongly positive; and inflation changes from negative to positive. In addition, the development-expenditure-to-revenue ratio is highest during 2006–2010 (32%), a period described in official reports as one of partial normalization (CBOS, various years; MFNP, various years), compared with 23% in 1990–2005 and 16% in 2011–2018. These shifts are consistent with the proposition that sanctions and external normalization altered the environment in which macroeconomic resources were translated into development expenditure.

However, moderation should not be overstated. The three periods also differ because of oil production, the Comprehensive Peace Agreement, the secession of South Sudan, domestic policy choices and macroeconomic instability. A future confirmatory study should construct an annual sanctions-intensity variable and estimate interaction terms while controlling for oil revenue, conflict and structural breaks. The present results support contextual moderation but do not isolate a pure sanctions causal effect.

4.8 Macroeconomic Factors and Government Expenditure

Taken together, the five macroeconomic factors show that development expenditure in Sudan was embedded in a tightly connected macro-fiscal system. In 1990–2005, development expenditure was highly correlated with revenue and GDP and negatively correlated with inflation. In 2006–2010, revenue remained the clearest positive correlate while GDP and exchange rate turned negative. In 2011–2018, GDP and exchange rate were strongly positively correlated with nominal development expenditure, but revenue was negative and inflation positive. These changing patterns demonstrate that single-variable explanations are inadequate. They also reveal a multicollinearity problem for any small-sample regression because several macroeconomic variables are themselves strongly correlated. A parsimonious time-series model using real variables, structural-break controls and a measured fiscal-space index would therefore be preferable to a large unrestricted regression.

4.9 Discussion of Findings

The findings support the conceptual framework in three ways. First, government revenue and GDP are important indicators of fiscal capacity, but their relationship with development expenditure is unstable across periods. This aligns with Wagnerian and fiscal-space perspectives: economic size and revenue matter, but the expenditure outcome depends on the government's ability to convert resources into sustainable budgetary commitments. Second, exchange-rate depreciation and inflation are associated with major distortions in nominal development spending. The later-period positive correlations should be interpreted through the rising-cost channel rather than as welfare-enhancing effects. Third, the period comparison suggests that the external sanctions environment altered fiscal transmission. The relatively high development-expenditure-to-revenue ratio during partial normalization is consistent with improved access to external engagement and financing, though the result is not sufficient on its own to establish causality. These interpretations are consistent with fiscal-space and sanctions literature (Heller, 2005; Neuenkirch & Neumeier, 2015).

Fiscal space provides a more coherent interpretation of these results than a direct-effects model. Macroeconomic improvement expands potential fiscal space when it raises real revenue, stabilizes prices, strengthens the currency and supports sustainable growth. Conversely, sanctions, debt pressures, financing restrictions and macroeconomic instability can narrow fiscal space even when nominal GDP or revenue is rising. The development budget is therefore the outcome of both macroeconomic capacity and the institutional-financial channel through which that capacity is translated into implementable projects.

5. Summary, Conclusion and Recommendations

5.1 Summary

The study examined government revenue, GDP, exchange rate, inflation and economic growth as macroeconomic determinants of development expenditure in Sudan from 1990 to 2018. The conceptual framework introduces fiscal space as an intervening variable and international sanctions as a moderator. Secondary official time-series data were analyzed descriptively and through period-specific correlations. Government revenue was strongly associated with development expenditure in 1990–2005 and 2006–2010 but negatively associated in 2011–2018. GDP was strongly positive in the first and third periods but negative in the middle period. Exchange-rate and inflation relationships changed sign across periods, while economic growth showed only weak positive associations. The development-expenditure-to-revenue ratio was 23% in 1990–2005, 32% in 2006–2010 and 16% in 2011–2018.

5.2 Conclusion

The study concludes that macroeconomic factors matter for development expenditure, but their effects are neither constant nor purely direct. Government revenue and GDP provide the underlying economic and fiscal capacity for public investment, while exchange-rate depreciation and inflation can erode the real value of development budgets. Economic growth creates potential resources but does not automatically translate into capital spending. Fiscal space is therefore a necessary intervening concept: it explains why similar nominal macroeconomic outcomes can produce different development-expenditure results depending on fiscal balance, financing access and sustainability. International sanctions plausibly moderate these relationships by restricting trade, banking, foreign exchange and external financing. The Sudan evidence is consistent with this framework, although formal mediation and moderation require a richer annual dataset and additional econometric estimation.

5.3 Recommendations

Sudan should strengthen domestic revenue mobilization through a broader tax base, improved administration and reduced leakages while avoiding excessive reliance on inflationary financing. Medium-term fiscal frameworks should explicitly identify fiscal space for ongoing and new capital projects before commitments are made. Development expenditure should be protected from ad hoc cuts by prioritizing high-return infrastructure and ensuring adequate operation and maintenance funding. Exchange-rate and inflation stabilization should be treated as development-expenditure policies because macroeconomic instability raises the domestic cost of imported capital goods and erodes the real value of appropriations. Public investment management should improve project appraisal, procurement, execution monitoring and reporting of utilization rates. Finally, lawful economic normalization, diversified trade and improved access to transparent external finance should be pursued because external restrictions can narrow fiscal space and weaken the conversion of macroeconomic resources into development outcomes.

For future research, annual fiscal variables should be converted to constant prices, and the analysis should explicitly account for currency redenomination. A fiscal-space index should be constructed from revenue, primary balance, debt service, external financing and financing costs. Sanctions should be measured annually by intensity rather than only by broad period dummies. With these improvements, mediation analysis can test whether fiscal space carries the effect of macroeconomic factors to development expenditure, while moderated regression can test whether sanctions significantly change the strength of that relationship.

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