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Public Debt Servicing, Government Effectiveness and Economic Growth: In Sub-Saharan Africa

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Abstract
This study examined the relationship among public debt servicing, government effectiveness and economic growth in Sub-Saharan Africa between 2000 and 2023, using panel Autoregressive Distributed Lag (ARDL) technique. Findings revealed that a relationship was established among public debt servicing, government effectiveness and economic growth with the period of study in SSA. Obviously, public debt servicing has negative significant influence on economic growth in the short- and long-runs, while government effectiveness has positive and significant influence on economic growth in the short- and long-runs, showing the effrontery performance of the governance to enhance the economy. In addition, inflation, population, and trade openness have positive and significant effects on the economy in SSA. However, economic growth granger caused public debt servicing, and also government effectiveness granger caused economic growth in Sub-Saharan Africa within the period of study. Therefore, the study recommends that government should reduce borrowing from internal and external banks to finance public projects in order to reduce the burden of debt servicing and create investments that could drive economic performance in Sub-Saharan Africa.

Keywords: Public debt servicing, government effectiveness, Sub-Saharan Africa, economic growth, panel ARDL

1. Introduction

According to Keynes (1936) [16], public expenditure is a drive to economic growth and it is marshalled by every country for making life comfortable for her populace. Government is intervening through public sector to influence and enhance growth for the stability of every economy (Kolapo, Azeez, Mokuolu, Oluwaleye, & Alabi, 2021) [19]. It is the responsibilities of governments in Sub-Saharan Africa to provide the populace with public goods and services needed such as defense, good communication network, energy, roads, agriculture and food security, education etc., (Girma, 2023) [14].

Public expenditure has been increasing remarkably in the 20th century, leading to more government spending on education, healthcare and healthcare facilities, as well as on social protection. At present, the government of developed countries spend more than the governments of developing countries, whereby findings showed that developing countries are spending between 15% and 30% of its GDP as expenditures (Corporate Financial Institution, 2024).

Government effectiveness simply captures the perceptions of the quality of public service, the quality of the civil servant and the degree of its independence from political pressure, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies, using general government performance index (World Governance Indicators, 2013) [33]. Economic growth especially in Sub-Saharan Africa can only be facilitated and promoted by the availability and the development of social and economic activities by enhancing public sector expenditure (Fidelis, Obasanmi & Igbata, 2014) [12].

Spending by the government is an essential element in the fight against poverty, inequality, disparity, lack and want in Sub-Saharan Africa countries. Besides, the countries in SSA have witnessed high rate of economic growth recently, but this growth did not aggregate to reduce mass poverty and extreme hunger in the region as indicated that almost 462 million in Sub-Saharan Africa were living in abject poverty in 2023 (Global Multidimensional Poverty Index, 2023).

Economic growth in Sub-Saharan Africa from 2000 to 2023 shows an increase from $428.35 billion to $2.03 trillion respectively, supporting a rising trend. Healthcare spending in SSA between 2001 and 2013 ranged between $31 and $95 respectively and reduced to $0 in year 2022, indicating a decrease in budgetary allocation on health recently. Sub-Saharan Africa's spending between 2000 and 2023 was fluctuating between 15.3% and 13.9%, which has shown a level of a decrease in the budgetary allocation on education (World Bank Group, 2024). The economies of some of the countries have been transformed from the level of billions to trillions on the expenditure side of the budget but the effects of such expenditures are largely unnoticeable on the citizens and on the entire area, for example, economic growth in Sub-Saharan Africa from 1990 to 2023 showed an increase from $375.06 billion to $2,060.53 trillion respectively (World Bank Group, 2024). Therefore, the rising government expenditure does not always turn into better economic performance for many countries (Nurudeen & Usman, 2010) [23]. In addition, this has not translated to welfare of the citizens (Njoku, Chigbu, & Akujuobi, 2015; Kiertisak, 2016) [22, 17].

In Sub-Saharan African countries, almost all the governments are facing different challenges in developing, implementing and evaluating public policies as a means of conducting services effectively and efficiently (Vab der Waldt, 2017) [31]. Moreover, the public sector in Sub-Saharan African countries has been facing serious challenges over the past two decades, as a result of lack of clear policies of innovation, regulatory constraints, poor coordination of several sectors, lack of adequate funding and lack of incentives to drive innovation (Agolla & Van Lill, 2014; Poskart, 2014) [1, 27].

In this study, some research questions were raised such as; what is the relationship among public debt servicing, government effectiveness and economic growth in Sub-Saharan African countries? What is the impact of government effectiveness on economic growth in Sub-Saharan Africa? What is the causal relationship between government effectiveness and economic growth in Sub-Saharan Africa? Hence, the objective of the study is to examine the relationship among public debt servicing, government effectiveness and economic growth in Sub-Saharan Africa between the period of 2000 and 2023. Also, the study is to examine the causal relationship among public debt servicing, government effectiveness and economic growth in Sub-Saharan Africa.

2. Literature Review

2.1. Theoretical Literature

Keynesian Theory of Public Expenditure

Keynesian school of thought believed that public expenditure can contribute positively to economic growth. Keynes (1936) [16] believed that an increase in savings will never help the economy but spending or investing it. He believed that public sector expenditure is a tool that brings stability in the short-run but this needs to be done cautiously as too much of it will lead to inflationary situations. However, too little of public expenditure will lead to unemployment which exists in under-developed countries. Hence, an increase in the government consumption is likely to lead to an increase in employment, profitability and investment through multiplier effects on aggregate demand. According to Keynes, national income has four (4) components in an open economy which include consumption expenditure (C), investment expenditure (I), government expenditure (G) and net export (Export – Import). Keynes believed that government played an important role in the determination of the aggregate expenditure (AE) in an economy and thus included government expenditure in the aggregate expenditure function as follows;

$$AE = Y = C + I + G + (X - M)$$

Kalman filter theory of measuring effectiveness

The effectiveness of measurement is determined to alleviate the influence of measurement error and uncertainty by employing Kalman Filtering techniques (Bullock, 2006). Government effectiveness is used to capture perceptions of the quality of public service, the quality of the civil servant, the quality of policy formulation and implementation, as well as the credibility of the government's commitment to such policies, using general government performance index (World Governance Indicators, 2013) [33].

2.2. Empirical Literature

Arusha and Young-Sook (2024) [3] examined the relationship among public social spending, government effectiveness and economic growth in 132 developed and developing countries between 2008 and 2019, using panel data. The findings showed the significant relationship among the variables used through fixed effects, system GMM and instrumental variable estimation. It was also exhibited that the spending on social security, education and health have a positive significant impact on economic growth. However, government effectiveness has a positive direct growth-enhancing effect on the association between public social spending and economic growth, while Mawejje (2024) [20] investigated the dynamic linkages among government expenditure, informality and economic growth in 15 Eastern and Southern African countries, using secondary data between 1991 and 2015. The researcher used Panel Vector Autoregressive model for the study and the findings showed that both government consumption and investment expenditure have positive significant effects on real per capita GDP. The findings also revealed that informality has a direct negative impact on real per capita GDP, while informal sector dampened the impact of government expenditure on real per capita GDP.

Dudzeviciute (2023) [11] examined the dependence of economic growth on government spending in the Baltic countries between 1996 and 2020, using Automatic linear modelling (ALM) technique. The findings revealed that the growth of Latvian and Estonian economies depended on government general spending. In Lithuania, 57.7% of fluctuations in economic growth were explained by spending on social protection. But in Latvia, the influence of spending on social protection and economic affairs amounted to 63.4% of the economic growth. In addition, spending on social protection and health explained 78.1% of the fluctuations in economic growth in Estonia, whereas Nwude, Nwaeze, and Nwude (2023) [25] examined the impact of government expenditure on education, health, agriculture, pensions and gratuities and public debt servicing on economic growth of Nigeria for the period of 42 years (1981-2020), using Johansen cointegration test and Vector Error Correction Model. The findings revealed that expenditure on education

had short and long-run positive and significant impacts on economic growth. Expenditure on health and agriculture had positive and significant impacts, while pensions/gratuities and public debt servicing had negative and insignificant impacts on economic growth in the long run but all positive and insignificant impact in the short run.

Girma (2023) [14] examined the correlation between government spending and economic growth in Ethiopia between 1980 and 2018, using Johansen cointegration test and the vector error correction model (VECM). The findings showed that economic growth was positively and significantly impacted by government spending on education both in long and short terms, but economic growth was negatively impacted by government expenditure on agriculture in the long-run, while short-term effects were negatively impacted and significant. The findings revealed that investment spending had a positive but negligible impact on economic growth in the long run within the period of study. However, it resulted in a negative but large effect in the short run. Defense spending by the government showed a positive and insignificant effect on economic growth in both terms, whereas spending on health revealed a positive and significant impact on economic growth in both short and long terms. In addition, Michael and Kenneth (2023) [21] empirically investigated the impacts of government consumption on economic growth in Tanzania between the period of 1967 and 2020, using Autoregressive Distributed Lag (ARDL) bounds cointegration and Granger causality test. The findings revealed a small but statistically significant positive long-run effect of government size on economic growth. The pairwise Granger causality test rejected the null hypothesis of no unidirectional or bidirectional causality between the government size and economic growth. The study also established the long run effect of inflation on economic growth. The findings showed that the effect of private investment on economic growth was positive but insignificant. Besides, the short run effect of human capital on economic growth was negative and weakly significant.

Buthelezi (2023) [7] investigated the impact of long-run government expenditure and economic growth in different States in South Africa between 1994 and 2021, using Vector-error correction (VEC) and Markov-switching dynamic regression. The findings showed that more government expenditure in South Africa has not amounted to the nation's economic growth which is contradictory to the view of Keynes. In addition, government spending shocks were exhibited to be detrimental to economic growth among the States, while Kocevska (2023) [18] examined the impact of public education expenditure on GDP per capita in North Macedonia from 1991 to 2020, using Autoregressive Distributed Lag (ARDL) model. The findings showed in the short-run the relationship between public spending on education and GDP per capita in North Macedonia which was negative and statistically significant. The long-run relationship between the variables remained insignificant negative. The results suggested that government expenditures on education did not contribute to economic growth in North Macedonia in the analyzed period.

Musa and Ismail examined the impact of government expenditure and economic growth in Nigeria between the period of 1970 and 2020, using Ordinary Least Square (OLS). The findings showed a positive association between the log GDP (LGDP) and recurrent government expenditure, but there was a negative relationship between LGDP and capital government expenditure (CGE) within the period of study. In addition, Chindengwike (2023) [9] examined the relationship between public expenditure and economic development in Sub-Saharan nations from 1970 to 2021, using Vector Error Correction Model (VECM) and Granger Causality approach. The findings showed that government expenditure had a negative impact on economic development in both short and long-run within the period of study. Also, a bidirectional causality was established between economic development and government spending.

Sulemana and Aloysius (2023) [30] examined the impact of public sector spending and governance on economic growth among 31selected Sub-Saharan Africa (SSA) countries between 2002 and 2020, using Panel Corrected Standard Errors (PCSE) estimator and Dumitrescu and Hurlin Panel Non-causality test. The findings showed that spending in the public sectors alone, such as education and health, did not always yield the needed outcome for enhancing economic growth. It was revealed that Government education expenditure stimulated economic growth in SSA, although the effect was statistically insignificant, whereas government health expenditure has a growth-limiting effect in SSA. In contrary, Nwankwo, Nwakoby, Anyanwu, and Ananwude (2022) [24] examined the effect of federal government expenditure on economic growth in Nigeria during the period 1986 – 2020, using Autoregressive Distributed Lag (ARDL) model. The findings revealed that government recurrent expenditure had negative significant effect on real gross domestic product, gross fixed capital formation and savings and that government capital expenditure has positive relationship with gross fixed capital formation and manufacturing capacity utilization.

Ali investigated the non-monotonic view of the government spending-growth nexus from 19 countries in the Eastern Europe and Central Asia (EECA) between 1995 and 2019, using a nonlinear quadratic estimator and cubic nonlinear estimator. The findings showed a negative linear nexus between government spending and economic growth, while the nonlinear model indicated an evidence of nonlinearity in the nexus among EECA over the period of study. Meanwhile, Kolapo, Azeez, Mokuolu, Oluwaleye, and Alabi (2021) [19] investigated the impact of government expenditure on economic growth with special inclination to test the Wagner's law in Sub-Saharan Africa between 1986 and 2018, adopting the panel first generation tests, the panel autoregressive distributed lag (ARDL) and pairwise causality techniques. It was revealed that government expenditure caused economic growth rendering the Wagner's law invalid in the Sub-Saharan region. The findings discovered that capital and recurrent expenditure exerted negative effect on economic growth while total expenditure had positive effect on economic growth in the region.

3. Methodology

3.1. Model Specification

Based on the theoretical review and empirical considerations in this study, the basic functional models which incorporated Keynesian theory of public expenditure as considered on some social and economic expenditure variables. The model for the work of Girma (2023) [14] is as follows, which was adapted and modified to be;

$$RGDP_{it} = f(GEXPDS_{it,} GEFFT_{it,} EMPT_{it,} INFR_{it,} POP_{it,} TOP_{it}) \quad (1)$$

Where:

RGDP	=	Real gross domestic product
GEXPDS	=	Government expenditure
		On public debt servicing
GEFFT	=	Government effectiveness

EMPT = Employment proxy by labour force
INFR = Inflation rate
POP = Population
TOP = Trade openness
i = Cross-sectional series (1 – 16)
t = Time series (2000 – 2023)

The explicit econometric model of equation 1 was formulated as thus;

$$l_nRGDP_{it} = \beta_0 + \beta_1 GEFFT_{it} + \beta_2 EMPT_{it} + \beta_3 INFR_{it} + \beta_4 l_nPOP_{it} + \beta_5 TOP_{it} + v_{it}) \ldots\ldots\ldots (2)$$

Where:
β_1 to β_5 = regression coefficients and parameters to be estimated
u_{it} = residual trend
l_n = natural logarithm
Vit = error term

4. Results

4.1. Descriptive Statistics

Table 1: Descriptive statistics of variables in selected SSA countries from 2000 - 2023

Variable	Mean	Std. Dev.	Max.	Min.	Skewness	Kurtosis	Jarque-Bera	P-value
RGDP ($Billion)	43.81	98.70	570.0	0.490	3.252	12.77	3170.073	0.000
GEXPDS	3.558	5.433	46.34	0.166	3.982	23.08	10735.11	0.000
GEFFT	-0.565	0.543	0.877	-1.541	0.656	2.976	39.60442	0.000
EMPT (% total pop)	63.07	11.87	85.87	39.72	0.292	1.870	37.22923	0.000
POP (million)	26.71	37.78	220.0	0.458	2.908	12.02	2649.909	0.000
TOP	48.11	24.99	152.7	12.71	1.844	7.049	689.8448	0.000
INFLR	8.875	22.08	418.0	-16.76	13.20	226.1	1160467	0.000

***Source*:** Authors' computation, 2024

Table 1 showed that the real GDP has a mean of $43.81 billion with a substantial standard deviation of 98.70, reflecting significant economic inequalities among SSA countries. Moreover, the maximum real GDP is $570 billion, while the minimum is $0.49 billion, indicating a wide range in economic output within the periods of study. Expenditure on debt servicing has a mean of 3.558% of GNI, with a high standard deviation of 5.433. Within the period considered, the maximum debt servicing expenditure has reached 46.34%, while the minimum debt servicing is 0.166%, indicating considerable differences in debt burden among SSA countries, with some heavily burdened by debt payments. The information showed that government effectiveness index has an average of -0.565 and a standard deviation of 0.543, with values ranging from -1.541 to 0.877. Employment has an average mean of 63.07%, with a standard deviation of 11.87. The inflation rate exhibits a moderate level of variability with a mean of 8.875% and a standard deviation of 22.08. Population showed an average mean of 26.71 million people with a large standard deviation of 37.78. Trade openness is having an average mean of 48.11% with a standard deviation of 24.99.
It was shown that all the variables have positive skewness and kurtosis. Based on the p-value linked to the Jarque-Bera, none of the variables are normally distributed since the p-values are less than 5% significance level.

4.2. Unit Root Test

Table 2: Summary of the panel unit root test results at level I(0) and first difference I(1)

Variable	Common unit root		Individual unit root			Order of integration
	LLC	BRG	IPS	ADF	PP	
$\Delta\ln(RGDP_{it})$	-13.10***	-8.331***	-12.39***	217.0***	254.0***	I(1)
$GEXPDS_{it}$	-4.567***	-0.341	-3.310***	86.55***	91.79***	I(0)
$\Delta(GEXPDS_{it})$	-15.37***	-7.415***	-18.32***	331.6***	1942.2***	I(1)
$GEFFT_{it}$	-3.007***	-1.781**	-2.044**	67.67**	57.99	I(0)
$\Delta(GEFFT_{it})$	-12.33***	-11.07***	-13.17***	226.4***	318.4***	I(1)
$EMPT_{it}$	-1.556*	1.142	-0.203	68.76*	45.952	I(0)
$\Delta(EMPT_{it})$	-8.723***	0.733***	-5.258***	149.7***	408.9***	I(1)
$\ln(POP_{it})$	-5.758***	0.526	-12.90***	259.7***	412.2***	I(0)
$\Delta\ln(POP_{it})$	-14.11***	-4.781***	-27.27***	587.1***	3108.4***	I(1)
$OPEN_{it}$	-5.512***	-2.615***	-5.390***	115.9***	102.7***	I(0)
$\Delta(OPEN_{it})$	-15.81***	-8.035***	-16.73***	292.7***	398.0***	I(1)
$INFLR_{it}$	-12.70***	-7.034***	-5.258***	149.7***	408.9***	I(0)
$\Delta(INFLR_{it})$	-22.68***	-11.10***	-10.93***	204.4***	227.5***	I(1)

Note: ***p < 1%, **p < 5%, *p < 10%.
Source: Authors' computation, 2024.

Table 2 presents the results of the panel unit root test at both levels, testing for the stationarity of the variables through the Levin-Lin-Chu (LLC), Breitung (BRG), Im-Pesaran-Shin (IPS), Augmented Dickey-Fuller (ADF), and Phillips-Perron (PP) tests. The results showed that ln(RGDP) is not stationary at level, but after differencing, all tests indicated a significance value at 1% level, implying that RGDP is stationary at 1st difference. For public Debt Servicing (GEXPDS), it has its stationarity after the first difference, I(1). The government effectiveness (GEFFT) shows no stationarity at levels, I(0). But after first differencing, it becomes strongly stationary across all the tests. Employment (EMPT), inflation rate (INFR), population (POP), and trade openness (OPEN) showed similar patterns: non-stationarity at levels, with only a few tests showing significance. However, all variables become stationary after differencing, with high significance levels across all tests, indicating that these variables are integrated of order one, I(1). Therefore, it

can be concluded from the results that most variables here are non-stationary at levels but become stationary after first differencing, making them integrated of order one, (I(1)), which supports the appropriateness of using Panel ARDL technique.

Table 3: Panel cointegration test results, capturing government effectiveness and economic growth

Pedroni				Kao
Common AR Coefficient		Individual AR Coefficient		
ADF t-stat	PP t-stat	ADF t-stat	PP t-stat	ADF t-stat
-3.726***	-4.154***	-2.334***	-1.203	-4.549***

Note: *** p < 1%, ** p < 5%, * p < 10%
***Source*:** Author's computation, 2024

Table 3 showed the Pedroni test where the ADF t-stat and PP t-stat results for the Common AR Coefficient are both statistically significant at the 1% level (values of -3.726*** and -4.154***, respectively), showing the existence of cointegration. Thus, there is a stable long-term relationship between governance effectiveness and economic growth. The Individual AR Coefficient for the Pedroni test also shows a significant ADF t-stat (-2.334***), which supports cointegration, though the PP t-stat (-1.203) is not statistically significant. Based on the mixture of the results, it implies some changeability in the relationship between governance effectiveness and economic growth at the individual country level. The significance of the ADF t-stat suggests in individual country differences, there is still evidence of a long-term relationship across countries, though it might be less consistent. For Kao test, the ADF t-stat is -4.549***, which is statistically significant at 1% level of significance. This result confirms the existence of a long-term relationship between governance quality (GEFFT) and economic growth in the panel, reinforcing the Pedroni and the Kao tests.

Table 4: Panel Mean-Group (PMG) estimates on public debt servicing, quality of governance (GEFFT) and on economic growth

Independent Variables Long-run (pooled) estimates	Coeff.	Std. Error	T-Stat.	Prob.
$GEXPDS_{it}$	-0.075	0.022	-3.342	0.001***
$GEFFT_{it}$	0.432	0.159	2.727	0.007***
$EMPT_{it}$	0.013	0.014	0.933	0.352
$In(POP_{it})$	1.616	0.281	5.747	0.000***
TOP_{it}	0.019	0.005	3.913	0.000***
$INFLR_{it}$	0.062	0.011	5.847	0.000***
Short-run (mean group) estimates				
$\Delta(GEXPDS_{it})$	-0.020	0.011	-1.803	0.072*
$\Delta(GEFFT_{it})$	0.233	0.112	2.078	0.038**
$\Delta(EMPT_{it})$	0.012	0.013	0.954	0.341
$\Delta(In(POP_{it})$	-0.974	1.051	-0.927	0.354
$\Delta(OPEN_{it})$	-0.002	0.001	-3.188	0.002***
$\Delta(INFLR_{it})$	-0.004	0.002	-2.015	0.044**
Constant	-0.490	0.067	-7.327	0.000***
Adjustment coefficient estimate				
Ect_{it-1}	-0.115	0.015	-7.545	0.000***

Note: *** p < 1%, ** p < 5%, * p < 10%
Source: Authors' computation, 2024

Table 4 showed that government public debt servicing is negatively significant in the both short- and long-runs, which indicated serious adverse effects on the economy in SSA. It was shown that government effectiveness (GEFFT) has a positive short-run coefficient (0.233) that is statistically significant at the 5% level. In the long run, the coefficient for government effectiveness remains positive (0.432) and statistically significant at the 1% level, indicating that sustained governance improvements have a substantial and lasting impact on economic growth, as supported by Kaufmann, Kraay and Mastruzzi (2009) [15].

The inflation rate and trade openness displayed a negative but statistically significant influence on economic growth in the short-run. But in the long run, they exhibited positive and statistically significant on the economic growth over time. The findings are aligned with Barro and Sala-i-Martin (2004) and supported by Frankel and Romer (1999). The error correction term (ECT) is negative (-0.115) and statistically significant at the 1% level, indicating a moderate speed of adjustment of 11.5% towards the long-run equilibrium. The significance of this term confirms the stability of the model, capturing both short-run dynamics and long-term equilibrium relationship among the variables.

4.4. Panel Granger causality test

Table 5: Panel Granger causality test result based on Stacked (common coefficient), Dumitrescu-Hurlin (individual coefficient), and the panel VAR model

No	Null Hypothesis	Stacked	D-H	PVAR	Decision
1	GEXDEF does not Granger Cause RGDP	0.292	3.986	1.074	Unicausality
2	RGDP does not Granger Cause GEXDEF	4.220	6.968***	11.53***	
3	GEXPDS does not Granger Cause RGDP	0.698	4.462	1.872	Unicausality
4	RGDP does not Granger Cause GEXPDS	2.781	5.478***	8.474**	
5	GEFFT does not Granger Cause RGDP	3.060**	4.342**	8.634**	Unicausality
6	RGDP does not Granger Cause GEFFT	0.196	0.451	0.609	

Note: *** p < 1%, ** p < 5%, * p < 10%
***Source*:** Authors' computation, 2024

Table 5 showed the panel granger causality of the variables employed. Findings showed that a unidirectional causality was established between economic growth and government expenditure on defence, and also between government effectiveness and economic growth in SSA. Therefore, real GDP granger caused government expenditure of public debt servicing, and government effectiveness granger caused real GDP.

5. Conclusion

The research examined the relationship among public debt servicing, government effectiveness and economic growth in Sub-Saharan Africa, using panel ARDL technique. Findings revealed that a long-run relationship was established among public debt servicing, government effectiveness and economic growth within the period of study in SSA. Obviously, public debt servicing has negative significant influence on economic growth in both the short- and long-runs, while government effectiveness has positive and significant influence on economic growth in both the short- and long-runs. In addition, inflation, population, and trade openness have positive and significant effects on the economy in SSA. However, economic growth granger caused public debt servicing, and that government effectiveness granger caused economic growth in Sub-Saharan Africa within the period of study. Therefore, the study recommends that government should reduce borrowing from internal and external banks to finance public projects in order to reduce the burden of debt servicing and create investments that could drive economic performance in Sub-Saharan Africa.

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