A Quantitative Analysis of the Relative Efficiency of Monetary and Fiscal Policy in Macroeconomic Management in Nigerian Economy

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Abstract

The study explores the relative efficiency of monetary and fiscal policy in macroeconomic management in Nigeria. To this end, the paper using autoregressive distributed lag (ARDL) approach, examines the relative efficiency of the above macroeconomic policy tools in Nigeria between 1981 and 2020 using annual time series data. The results from the analysis revealed that few of the variable indicators at different lags were negatively signed contrary to theoretical expectation. This was not unexpected as most of the government expenditures do not translate to better output that will enhance improvement in the economic activities. Also, the results further demonstrate a direct relationship of more lagged periods of the variables implying a positive response to economic activities. In the same line of action, the results of the study show that fiscal policy rather than monetary policy exerts a greater impact on economic activities in Nigeria. The emphasis on monetary action on the part of the government has led to bigger distortion in the economy of Nigeria. The study hereby recommends a higher concentration on the use of fiscal policy particularly expansionary fiscal policy to induce the economic activities and complement it with contractionary fiscal policy when the economy is characterized by inflationary issues. The paper further added that the government should also compliment the use of fiscal policy with monetary policy where necessary.

Keywords: Monetary Policy, Fiscal Policy, Money Supply, Government Expenditure **JEL Classification**: B22, E52, E62

1. Introduction

There is no doubt about the relevance of the primary aims of fiscal and monetary policy, this is characterized on the needs to increase balance of payments, reduction in unemployment and inflation growth rate, increase in capital accumulation, external reserve, exchange rate stability and also increase the gross domestic product. The policy instruments put in place for the realization of the specified objectives have not yielded the desired results for the reason being that, there has been less concentration on the use of fiscal policy rather than monetary policy (Darrat, 2018).

However, emphasis was on monetary policy in the area of its basic and relevant instrument needed to reawaken the economy, hence the money market was deregulated in 1987. In recent time, macroeconomic stabilization is a function of monetary and fiscal policy in the developing countries. However, the relative importance of these policies remain an issue of serious concern to the classical economists such as

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monetarists and Keynesian. The school of thought of the monetarists is that monetary policy exerts higher impact on the economic activities relative to fiscal policy. In contrary, Keynes believed that fiscal policy rather than monetary policy has greater influence on the economy.

Today, economists in the various countries focus on how best to attain macroeconomic stability for which monetary and fiscal policy options remained the cardinal tools (Asogu, 2019). However, the application of monetary and fiscal policy helped in the reshaping of the economy, hence there exist consensus among economists that both policies individually and collectively affect the national income of a nation, but the extent of relative efficiency of these two instruments have been the reason for controversies and debates among economists. It is on the bases of these controversies and debates among scholars that warranted the present author to examine the relative efficiency of monetary and fiscal policy on national income in Nigeria using yearly time series data covering the period of forty years (1981-2020). The study uses Autoregressive Distributed Lag (ARDL) technique having found that the time series data were integrated at different order as such the ARDL technique becomes more appropriate for the study relative to Nathan (2017) who employed Error Correction Mechanism as this will not be able capture the objectives of the study as the variables are integrated in different order. The study is structured into five sections which are characterized by having the next section Literature Review, after the Introduction, followed by Methodology, section four is Results and Discussion of Findings and five is the Conclusion and Policy Recommendations.

2. Literature Review

The reviewed literature focused on the related topics to the relative efficiency of monetary and fiscal policy in the developed and the developing countries. However, there has been difference in opinions among scholars on which of the policy between the two exert higher influence on the macroeconomic management in Nigeria. Below are accounts for the reviewed literature in this regard. Being the contrasting opinions on which of the two policies exert greater influence on economic activity. This section hereby critically reviews previous related studies. Ajavi, (2004) opined that in the developing country like Nigeria, emphasis is placed on the use of fiscal policy than monetary policy. The research, specified a model using the variables of monetary and fiscal policies for which adopted the Ordinary Least Square technique. The results obtained revealed that monetary policy exerts higher impact on the economy relative to fiscal use. Policy response is that greater reliance should be on monetary policy. Batten and Hafer (2013) examine the relative effectiveness of the two instrumental policies in some selected developed countries using the ordinary least squares technique for the period beginning from 1985 to 2010. From the results of their study, they found out that monetary policy exhibits greater impact relative to fiscal policy on the nominal GNP. However, we cannot generalize this finding to stand in the case of developing countries among which is Nigeria, for the reason being that, Nigeria for example does not possess the same economic and political structure

Nathan (2017) investigated the effect of money supply, fiscal deficits and exports on the relative effectiveness of fiscal policy in Nigeria using annual time series data ranging from the period of 1970 to 2014. The study used Error Correction Mechanism and a two band recursive least square to ascertain the stability of the model. The results found out that the existence of a significant causal relationship between the gross domestic product and the exogenous variables used in our model. Iyeli, Uda and Akpan (2018)

investigated the relative effectiveness of Broad Money Supply and Government Fiscal Deficit with respect to their influence on the economic activities. Annual time series data covering the period of 1970 to 2015 were used. The study used co-integration which enabled the authors to determine, the existence of the long-run equilibrium relationship among the variables employed. The study then employs ECM technique to ascertain the relative impact of the variables used and to correct the sort-run disequilibrium. The findings showed that, the broad money supply to economic activities in the areas of inflationary impact on the economy is weak. The lagged oneyear value of it indicates stronger impact. The results confirmed that, the role of fiscal policy (particularly Fiscal Deficits) though positive, is negligible and in some cases among the lagged values appeared not significant in influencing cyclical economic activities in Nigeria within the period under study. Yakubu and Shehu (2019) using vector autoregressive technique from which impulse response and variance decomposition were used to ascertain the magnitude of the effectiveness of monetary and fiscal policy behavior in price and output growth in Nigeria. The results found out that, money supply and government revenue have direct relationship on price and output growth in Nigeria mostly in the long-run. The estimated model had it that, both the monetary and fiscal policy demonstrated greater effectiveness on the real GDP and inflation in Nigeria.Sanni, Amusa and Agbeyangi (2019) examined the superiority of fiscal and monetary policies on the economic activities in Nigeria for the period of thirty-one years i.e. 1985 to 2016. The study employed the Ordinary Least Squares (OLS) technique and the empirical results revealed that none is superior to the other hence the recommendation is that policy mix will induce the economy. Elliot, (2020) investigated the relative importance of money supply changes compared to changes in government expenditure to explain fluctuations in nominal Gross National Product (GNP). The study used the St. Louis equation taking the OLS into consideration. Findings support the conclusion that fluctuation in the nominal GNP is attached to monetary use than government expenditure.

Taking a look at the literature review, Batten & Hafer (2013) examined the relative effectiveness of monetary and fiscal policy in some selected developed countries using the ordinary least square technique for the period beginning from 1985 to 2010. In contrary, the present author did not agree to generalize the results obtained to hold for the developing countries like Nigeria for the reason being that, there exist differences in economic and political structure between the developed and the developing countries. In addition, from the study of Sanni, Amusa&Agbeyangi (2019) where the authors examined the superiority of fiscal and monetary policies on the economic activities in Nigeria for the period of thirty- one years i.e. 1985 to 2016. The study employed the Ordinary Least Square (OLS) technique, though the time series data used were not stationary at level. However, the present author attached the study area of interest by examining the relative efficiency of these two macroeconomic policy instruments in Nigeria and in addition employed the autoregressive distributed lag (ARDL) approach covering the period 1981 to 2020 as having found out that the time series data were only stationary at level and at first difference as required by the rule. By this, the present authors of this study would have been able to determine whether or not Keynesian and monetarists school of thought which is characterized by positive relationship between economic activities and these macroeconomic variable tools (fiscal policy and monetary policy) hold in this regard.

3. Methodology

The study uses the yearly time series data covering the period of thirty-nine years ie (1981 to 2020. The data were obtained from various sources that is Annual and statement of Accounts, National Bureau of Statistics and other documents of the Central Bank of Nigeria. Fisher 1947 established the equation for exchange, where MV = PY, therefore, the equation of exchange had it that Aggregate Income is explained by nominal money supply where the a priori expectation resulting from nominal money supply to Aggregate Income is positive while Keynesian model addressed the issue of whether or not the use of expansionary monetary or fiscal policy will generate a rise in output in the economy. In like manner, an increase in government monetary policy spending or expansionary will result to increase in output through a rise in investment. This is similar to Fisher's idea because a rise in output due to increase in investment is also explained by the nominal money supply. Keynesian school of thought states that the use of fiscal policy can induce income through a rise in output, while the monetarists are of the opinion that only monetary policy can assist in that direction. Iganigan (2017) in his lecture, pointed out that, the application of either is determined by the nature of the economy at each point in time.

However, Keynesian theory emphasized on the liquidity trap, the aftermath effect is that, at a certain minimum level of interest rate, liquidity trap will set in. Therefore, a further rise in money supply will not result to a reduction in interest rate, hence the level of investment at this point is still not enough to provide the amount of expenditure that will be equal to full employment output, then monetary policy is constrained to induce investment thereby restoring the full employment output. By and large, in liquidity trap, a rise in government spending will still result to increase in output for the reason being that an increase in government spending will have a positive effect on the level of income predicted by the multiplier, hence interest rates no longer rise and there is no investment crowding out. By such, the support is for the fiscal action to boost the economy.

Where V represents income velocity of money in circulation, M denotes nominal money supply, P is the price level, Y is the total output produced while PY is the aggregate income in the economy. Therefore, the equation of exchange established the fact that Aggregate Income is explained by nominal money supply. The a priori expectation resulting from nominal money supply to Aggregate Income is positive. The interpretation of this is that increase in nominal money supply warrants a rise in the Aggregate Income in the economy and this is in line with monetary policy objective. Given the above discussion, the tendency now is for the monetarists to say that Keynesians believe only in fiscal policy and for the Keynesians to accuse monetarists of believing only in monetary policy. The issue now is to determine which view is more relevant to the Nigerian economy. From here we built our theoretical framework for this study.

In line with deep reasoning, those whose thoughts were in variance with Keynesian school of thought, now believed that fiscal policy is the tool and that monetary policy is affected by the inefficiency of pointing out the extreme unlikelihood of liquidity trap and is constrained by the evidence(s) that it has ever occurred. It then follows that the overall theoretical framework believed by Keynesian revealed the fact that provided the economy is not characterized by liquidity trap and again the existence of

investment-interest rate sensitivity, monetary policy would affect output. This is empirically important. The reverse case whereby, monetary policy can affect income while fiscal policy remain powerless and also did not occur in Keynesian model. This is referred to as the monetarists' view making reference to "Quantity Theory of Money given in equation (1):

Given in equation (1), if V is constant then it tells us that there exist one-to one relationship between changes in money stock and the value of national income

$$M = kPY \dots 2$$

By reason of our study, let's keep the price level (P) constant, and make Y to change as M changes. The implication here is that any other changes such as a change in government spending will not affect the level of income. Hence, the justification of fiscal policy being powerless while monetary policy induce output. Taking a look at equation (3) below, this explained that if there exist a rise in one of the components of aggregate demand for reason of increase in expenditure i.e. government spending, the implication is that there will be a rise in the demand for money, hence a rise in the interest rate in the financial market. Therefore, enough investment is required to crow out the incessant increase in interest rate. This is however clear from the result of the dynamic process given in equation (3) below:

$$Y = C + I + G \qquad 3$$

A rise in government expenditure will result to a decrease in private investment of equal magnitude hence, having the total expenditure and output unchanged. One can now say, taking a look at equation (4), an increase in 'G' will result to a fall in 'I' therefore, there exist investment crowding out. By this, fiscal policy cannot have positive effect particularly where the demand for money is completely interest rate insensitive. From the above explanation, the monetarists can now say that for Keynesian to accuse them for believing only in the use of monetary policy is out of context. Therefore, the need arises for this study to examine the two schools of thought with the hope of determining which one is more relevant to macroeconomic management in Nigerian economy. In line with theoretical framework of this study, the reviewed literature and also based on the objective of this study, it is therefore possible to specify our model in the form below:

Where Y_t is used to capture the amount of economic activity which is characterized by Gross Domestic Product (GDP) used as proxy, MSS measures of monetary and fiscal policy used by government hence they serve as proxy, and TGE denotes Total Government Expenditure. Considering a log-linear equation (double log), equation (4) becomes

Note that all variables have been defined above, but u_t is the error term. In this case, β_1 gives the elasticity of GDP with respect to MSS_t while β_2 also gives the elasticity of GDP with respect to TGE_t. The a priori expectations of the parameter estimate are that: β_1 & $\beta_2 > 0$ from which we ascertain whether coefficient of the parameter estimates satisfy the a priori restriction imposed by the theory. The study uses annual time series data for the period of 1981 to 2020. The general form of ARDL is presented in equation (6) below;

Where Z_t represents vector of stationary variable, Φ equals a constant vector, \ni denotes the coefficients of the estimated variables, K accounts for the numbers of lags, Ψ is the long-run variable and \forall holds for the vector of error term. The underneath equation (7) accounts for the ARDL operational model for this study represented as:

$$\Delta \ln \text{GDP}_{t} = \varphi + \sum_{j=1}^{k} \partial i \Delta \ln \text{GDP}_{t-1} + \sum_{j=1}^{i} \omega i \Delta \ln \text{MSS}_{t-1} + \sum_{j=1}^{m} 3i \Delta \ln \text{TGE}_{t-1} + 3 \ln \text{GDP}_{t-1} + 3 \ln \text{MSS}_{t-1} + 4 \ln \text{TGE}_{t-1} + E_{t}$$

Below equation (8) is the error correction model for the ARDL

$$\Delta \text{lnGDP}_t = \Phi_0 + \sum_{j=1}^k \partial \text{i} \Delta \text{lnGDP}_{t-1} + \sum_{j=1}^p \omega \text{i} \Delta \text{lnMSS}_{t-1} + \sum_{j=1}^y \text{si} \Delta \text{lnTGE}_{t-1} + \alpha \text{e}_{t-1} + \sigma$$

where $e_{t\text{-}1}$ denotes the error correction term which represents the ordinary least squares residual series emanating from the long run co-integration results.

Where

$$e_{t\text{-}1} = (GDP_{t\text{-}1} - \Phi_{o} - \omega_{i}MSS_{t\text{-}1} - \ni_{i}TGE_{t\text{-}1}. \\ 9$$

Therefore, Equation (9) accounts for the linear combination of all variables used in the model which requires to be stationary at level in order that the stochastic error term to be statistically significant at the 0.05 per cent level.

4 Results

Descriptive Statistic

Table 1: Descriptive Result

	LNGDP	LNMSS	LNTGE
Mean	8.694240	8.149330	6.118309
Median	8.921368	8.384189	6.889811
Maximum	11.79090	11.53117	9.024264
Minimum	4.975561	4.014580	2.265921
Std. Dev.	2.382586	2.591653	2.228534
Skewness	-0.246848	-0.160489	-0.478898
Kurtosis	1.611736	1.580560	1.807197
Jarque-Bera	3.618356	3.529728	3.900252
Probability	0.163789	0.171210	0.142256
Sum	347.7696	325.9732	244.7324
Sum Sq. Dev.	221.3918	261.9500	193.6883
-			
Observations	40	40	40

Source: Author's Computation

One of the preliminary investigations of this study includes the analysis of the descriptive statistics (mean, median, standard deviation, skewness kurtosis and Jarque-Bera) of the variables, for the sample period of forty (40) years. The standard deviation which is a measure of variability or a measure which enable researchers to understand how the data are around the mean: This reveals that the data points are not far from their mean. The more concentrated the mean, the smaller the standard deviation. Thus, the null hypothesis (H_o) that the variables are normally distributed or the joint hypothesis that the skewness, S=0 and kurtosis K=3 is however rejected. Note that JB is equal to

zero (0) if the distribution is normal and that the probability values imply that the JB statistics is significantly different from zero, (Jarque-Bera, 1987).

Unit Root Outputs

For us to proceed to the use of ARDL, we are required to test for stationarity status of the variables that was used in the model, to enable the study determine the order of integration. By this, researchers of the study ensure that the variables are not integrated at under two, ieI(2) in order to avoid the results being spurious. Bound test is based on the assumption that variables are integrated at under zero and one ie I(0) and I(1) respectively. However, the use of unit root test in ARDL model might still remain relevant for us to ensure that none of the variables are integrated at under two or above. We now applied the Augmented Dickey Fuller (ADF) test to ascertain our findings. Given the statistical underpinnings of a modern time series analysis demands data to be stationary. Therefore, the stationarity status of the time series data used in our findings was examined using the Augmented Dickey Fuller (ADF) test. The results revealed that one of the variables employed ie LNTGE was found stationary at level I(0). The other variables such as LNMSS and LNGDP were stationary at first difference ieI(1) given in table 2 below.

Table 2: Unit Root Test Results at level

Variables	Level	First Difference	Order of Integration
LNGDP	-1.5362	-3.0050	I(1)
LNMSS	-1.7895	-3.1805	I(1)
LNTGE	-3.9658	Nil	I(0)
5% at critical values	-2.9484	-2.9411	

Source: Author's Computation

Lag Order Selection Criteria

The lag order is chosen by using the information criteria approach. Only an appropriate lag selection will enable us to identify the true dynamics of the model (Bahmani, Oskooee and Sungwon, 2012) Akaike information criterion (AIC), Hanna-Quin information criterion (HQ), Scharz information criterion (SC), Final Prediction Error (FPE), and Sequential modified LR were used to determine the lag order of this study. Therefore, the results presented in table 2 below revealed that the lag length for this study is three (3) as indicated by Akaike information criterion (AIC) denoting the minimum value among the competing lag length

Table 2: Lag order Selection Criteria

Lag	Logl	LR	FPE	AIC	SC	HQ
0	22.5185	NA	0.0204	-1.0551	-0.9244	-1.0090
1	39.4607	30.2213	0/0086	-1.9168	-1.7426	-1.8554
2	44.2466	8.2781*	0.0070	-2.1214	-1.9037*	-2.0576
3	45.7687	2.5506	0.0068*	-2.1497*	-1.8884	-2.0576*

Note: * Indicates lag order selected by the criterion

Source: Author's Computation

Bounds Test for Co-integration

There exist a long-run equilibrium relationship among the variables used in this study as indicated in table 3 below where the F-Statistic of 7.2725 exceeds critical values of 3.79 and 4.85 at the 5 per cent significance level, hence, we can soundly reject the null hypothesis (H_0) of no long-run relationship.

Table3: ARDL Bounds Test for Co-integration Analysis

Test Statistic	Value	K
F-Statistic	7.2725	2
Critical Value Bound		
Significance	10 Bounds	11 Bounds
5%	3.79	4.85

Source: Author's Computation

The Long-run Estimate

The long-run test statistic (table 4) shows that money supply (MSS) and total government expenditure (TGE) which were used to proxy monetary and fiscal policy respectively, remained the key determinants of GDP. The coefficients of these variables stood at 0.7829 for MSS and 0.1604 for TGE. And they are statistically significant at the 5 per cent level. Importantly, the coefficient of LNMSS had it that in the long-run, and increase of 1 per cent in money supply is accompanied with a rise of 0.782 per cent in Gross Domestic Product. LNTGE had a similar positive impact on GDP. These results further emphasized that increase in money supply and government expenditure will translate into more economic activities (Obeto, 2016). In order to further verify the relative efficiency of monetary and fiscal policy (money supply and total government expenditure) in macroeconomic management, the ARDL error correction version is estimated for equation (8). The long-run equation from equation (5)

Table 4: The Long-run ARDL Estimate

Variables	Coefficient	Sts. Error	t-statistic	Prob.
С	1.3329	0.0770	17.3130	0.0000
LNMASS	0.7824	0.0376	20.7997	0.0000
LNTGE	0.1604	0.0438	3.6640	0.0000

Note: LN represents the logarithm of the various variables while, GDP is the dependent variables Source: Author's Computation

Short-run Parsimonious Model

In order to account for the deviations that might have occurred in estimating our longrun co-integrating equation; a dynamic error correction model is hereby estimated with the results presented in table 5 below.

Table 5: ECM Results

Variables	Coefficient	Std. Error	t-Statistic	Prob.
С	O.0104	0.0382	0.2728	0.7874
D(LNMSS)	0.2237	0.1626	1.3763	0.1820
LNTGE	O.0156	0.0366	0.4254	0.6745
D(LNGDP(-1))	0.3298	0.1811	1.8202	0.0819
D(LNMSS(-1))	-0.0156	0.1648	-0.0949	0.9252
LNTGE(-1)	-0.0118	0.0833	-0.1416	0.8886
D(LNGDP(-2))	0.1676	0.1973	0.8497	0.4043
D(LNMSS(-2))	-0.1059	0.1720	-0.6152	0.5444
LNTGE(-2))	0.0916	0.0880	1.0405	0.3089
D(LNGDP(-3))	0.0290	0.2108	0.1375	0.8919
D(LNMSS(-3))	0.0195	0.1545	0.1263	0.9006
LNTGE(-3)	0.2024	0.0775	2,6119	0.0156
ECM(-1)	-0.3597	0.1809	-1.9883	0.0548

Source: Author's Computation

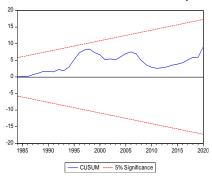
Discussion of Findings

The results of the dynamic model of this study as indicated in table 5 above show that most of the variables indicators are not statistically significant at the 5 per cent level while few others like money supply at lagged one (-1), two (-2)and total government expenditure at lagged one (-1) are inversely related contrary to the theoretical expectation. This may not be unexpected for the reason being that most of the federal government expenditures do not translate to optimal economic activities that could enhance our GDP. In addition, the level of money supply might be inadequate at the various identified lagged periods to meet the required demand for the purposes of cushioning incessant interest rate increase as this could result to low performance in economic activities.

The total government expenditure at lagged 2 and 3 has expected sign though not statistically significant at 5 per cent level. Similarly, money supply at lagged 3 had same expected sign and contrary to its statistical significant at the 5 per cent level. The coefficient of ECM which is -0.3597 is correctly signed and significant at the 5 per cent level. However, the results suggest a low adjustment process of 35 per cent disequilibrium in the gross domestic product of the previous shock which was adjusted back to the long-run equilibrium in the current period. Indeed, it also serves as a demonstration of a confirmation of gross domestic product, money supply and total government expenditure are co-integrated.

Stability Test

The stability test is conducted using the cumulative sum (CUSUM) and cumulative sum of square (CUSUM Q^2) of residual of the ARDL Model as indicated in figure 1 and 2 respectively. The existence of the parameter instability occurred if the cumulative sum of the residual extends beyond the area of the critical (dotted bounded) lines. It is estimated at the 5 per cent critical level. Therefore, looking at figure 1 and 2, it can be inferred that the model for this study has been stabled at the 5 per cent significant level.



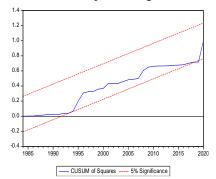


Fig.1: Plot of Cumulative Sum of Recursive Residual

Fig. 3: Plot of Cumulative Sum of Square of Recursive Output

5. Conclusion and Recommendations

This study explores the link between the gross domestic product and the major macroeconomic policy instruments such as the monetary and fiscal policies. The study examined the relationship that exist between the variables by taking a look at their long-run as well as short-run dynamics. The results of our error correction model revealed that total government expenditure at its various lag periods except lag one has far reaching impact on the economic activities and also significant at lagged three.

The negative signs of government expenditure at lagged one and two show that increasing costs of government expenditure in Nigeria do not often translate to increasing returns in economic activities for reason of inappropriate spending.

Money supply only at lagged three exhibits a direct relationship with the GDP indicating a far reaching impact on the economic activities. Therefore, from the foregoing, it is clear and believable that the results obtained hold the same view with Keynesian school of thought which state that the use of fiscal policy can induce income through a rise in economic activities and also the monetarists who are of the opinion that the use of monetary policy can assist in this direction. The study can now conclude by saying that fiscal policy has a higher impact relative to monetary policy for reason being that total government expenditure has higher numbers of lagged periods of positive impact on the economic activities relative to money supply in the study.

The study therrefore recommends that government should emphasis on the use of fiscal policy, most often expansionary fiscal policy to induce the economic activities. Secondly, the government should ensure that the various agencies that are responsible or saddle with the fiscal policy management should be properly monitored to ensure optimal results in the economy. Moreover, the Central Bank of Nigeria (CBN), which is the apex monetary authority should not undermine the contractionary fiscal policy which is also relevant to regulate the economic activities particularly when the economy is characterized by inflationary issues. Finally, the government should combine the two policy instruments when the need arises because the nature of the economy determines such.

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