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Empirical Analysis of the Effectiveness of Fiscal and Monetary Policy Tools in Stabilizing Economy: Evidence from Pakistan

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Abstract: *Fiscal and monetary policy plays a vital role in macroeconomic stability. The Keynesians have emphasized the fiscal policy whereas the Monetarists supported interventions under monetary policy. In fact, these policies are interrelated and influence each other. The expansionary fiscal policy overheats the economy and reduce the effectiveness of monetary policy. The use of the appropriate mix of tools under fiscal and monetary policy is of immense importance for economic stability under country specific economic conditions. Therefore, the instant study was meant to look at the effectiveness of monetary and fiscal policy instruments in stabilization of Pakistan's economy. The data was collected from secondary sources of Government of Pakistan from 1986 to 2022. The government expenditure was analyzed to be a proxy for fiscal policy whereas money supply for monetary policy. The study employed Impulse Response Function (IRF) and Variance Decomposition (VDC) in Vector Autoregressive (VAR) Model. The findings of IRF confirmed the impact of money supply on economic growth in Pakistan. At first, the money supply affected the GDP negatively but after 3rd year, its impact was changed to be positive and it was rising sharply. It indicated that the expansionary monetary policy was effective in the medium and long run in Pakistan. It was concluded that the fiscal policy appeared to be relatively more effective for its contribution towards economic growth as compared with monetary policy.*

Key Words: Fiscal Policy, Monetary Policy, Vector Autoregressive Model, Impulse Response Function, Macroeconomic Stability, Pakistan

Introduction

The importance of stable and reliable macroeconomics policies for the sustainable economic growth has duly been realized by developing countries. The purpose of macroeconomics policies is to create an environment for faster growth in every sector of the economy. The monetary policy and fiscal policy are the main drivers to achieve sustainable economic growth. The key for the success of any economy lies in the good coordination between these policies, whereas, the absence of this coordination may lead to poor economic growth. These policies are usually controlled by different government authorities in the country. Because these policies are mutually dependent upon each other, it is extremely important to design persistent and sustainable mix of policy framework. Such policy framework will help to implement sustainable monetary and fiscal policy.

It is the goal of any government to provide better living conditions for its people by implementing better economic policy either through its monetary or fiscal policy (Adeeb, 2013). Fiscal policy is implemented by two tools like government spendings and taxes. Meanwhile, monetary policy is conducted by managing the supply of money, interest rate and the foreign exchange rate adjustments (Gregory Mankiw, 2007). Poor monetary and fiscal policy can create uncertainty in the economy that may reduce investment and economic growth (Pastor and Veronesi, 2012). Lucas (1972), Caballero (1991) and Arrow (2017) have also concluded that the incomplete and uncertain economic policies decline economic growth.

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Monetary and fiscal policies have been described to have important role in the economic growth within developing as well as developed countries. However, the Keynesians and the Monetarists have had long debate over the usefulness of these policies. The Keynesian believed that fiscal policy was the main driver of any economy and the Monetarists considered the monetary policy to have greater influence on economic activity. Actually, there are certain conditions when monetary policy is effective and during other conditions fiscal policy leads to better economic performance (Chowdhury & Afzal, 2015).

The following are the major research questions which were focused for the instant study:

1. Is monetary policy helpful to achieve the economic growth in Pakistan?
2. Are fiscal policy instruments useful to achieve economic growth in Pakistan?
3. Which policy instrument is relatively more effective in stabilization of Pakistan's economy?

Hypothesis

H_1: Monetary policy is relatively more effectiveness than fiscal policy with respect to GDP growth of Pakistan. For this purpose, the Variance Decomposition (VDC) and Impulse Response Functions (IRFs) derived from the unrestricted Vector Autorepression (VAR) was used to evaluate the hypothesis of the instant study.

Fiscal versus Monetary Policy

The monetary and fiscal policies are an essential constituent of national macroeconomic stabilization. The objective of these policies is to overcome the fluctuations in the economy. In the national macroeconomics policy framework, the main objective of monetary policy is to maintain the supply of money and stabilize the price level with higher economic growth. The monetary policy is the main policy of any central government with respect to the quantity of money supply, exchange rate and interest rate. The monetary policy is very important for pursuing aggregate demand and economic growth (Aghion, Caroli & Garcia-Penalosa, 1999).

The fiscal policy deals with the government revenue and government expenditure. The prime responsibility of any government is to supply the goods and services through its management as well as development projects. The government has to play its due role through government expenditure especially for all the welfare seeking programs because such financing is not possible out of private sector.

Monetary Policy in Pakistan

In any country, the central bank is responsible to formulate the monetary policy and specify some actions under this policy. These actions help in the process of decision making about how any central bank uses its monetary tools according to its economic environment. The State Bank of Pakistan was established in 1948 and, later on, the State Bank of Pakistan Act, 1956 was implemented. By using this Act, the State Bank of Pakistan, inter alia, has the authority to regulate the money market and credit system by various monetary policy tools and implementation mechanism. Meantime, this Act also gives the authority to utilize productive resources for the economic growth.

The State Bank of Pakistan has been mandated to achieve monetary stability by observing and evaluating the Federal Government's policies linked with inflation in the country. The State Bank of Pakistan is also responsible for reliable financial system for internal and external payments of country which is in line with Mishkin (1996) who underlined that inflation management and financial stability lead to economic growth. In this regard, a brief statement is issued by the State Bank of Pakistan at least eight times every year containing analysis of economic conditions and justification for various decisions taken under its monetary policy.

Fiscal Policy in Pakistan

The uncertainty in economic conditions and fiscal policy decisions is highly instrumental for economic growth in any country. Economic uncertainty results from poor fiscal policy and budget deficit (Chaudhry and Shabbir, 2005). Pakistan has struggled with continued budget deficit since its inception. The common

measures to tackle budget deficit e.g. excessive borrowing and debt accumulation play a significant role in the economic development of a country. On the other hand, meagre tax collection leads to slow rate of investment and has negative impact both in the long run as well as the +short run economic growth (Atif, Shahab & Mahmood, 2012). In Pakistan, the conventional fiscal policy entails persistent uncertainty in government expenditure which is an important factor behind the failure of this policy (Adeeb, Saeed & Ali, 2013). This uncertain government expenditure has negative impact on the rate of economic growth and accrued liability is translated in the form of increasing tax in future. Such problems are common in many developing countries (Kneller, Bleaney & Gemmell, 1999).

Monetary and Fiscal Policy Interaction and Effects

The overall economic growth of a country is dependent on the decisions taken under its fiscal and monetary policy. The interaction of these two policies has been highly emphasized and discussed in the literature. Monetary policy has both direct and indirect impact on fiscal policy. The change in interest rate under monetary policy has direct influence on servicing costs of the sustainability of debt. On the other side, the volatility of inflation rate influences the public finances. The public finance becomes more complicated and inflation causes public expenditure to increase by raising salaries of government employees. Under these conditions, the planning of fiscal policy is extremely difficult. The monetary policy has indirect impact on fiscal policy. The tools of monetary policy reduce the productivity fluctuations that helps the fiscal policy to maintain the economic efficiency. If the monetary policy does not work then fiscal policy authorizes to introduce counter policy for stabilization of economic growth. (Jawaid, Aarif & Naeemullah, 2010; Rakić, & Rađenović, 2013).

Fiscal Policy influences monetary policy as well. In case of expansionary fiscal policy, the economy overheats and reduces the monetary intervention. The tendency of this intervention is dependent upon the importance of price stability over output stability (Rakić, & Rađenović, 2013). Un-planned government expenditure reduces the economic growth, and under such condition, the restricted monetary policy is required. Whereas, non-development public expenditure and poor taxation system pull back the economy and restrict the monetary policy along with offsetting the impact of the fiscal policy. In conclusion, fiscal and monetary policies are interrelated and it is the responsibility of authorities in charge of issuing these policies to communicate with each other and use resources properly to increase the economic growth.

As discussed earlier, the debate of Keynesians - Monetarist has prevailed for many years to justify the effectiveness of fiscal and monetary policy for economic growth. But, in reality it is important to analyze the situation and use required policy which gives more better results. (Rakić, & Rađenović, 2013; Jawaid, Aarif & Naeemullah, 2010). Therefore, the present study is aimed at investigating the combined effect of fiscal and monetary policy on economic growth, and which policy is more relevant in the context of Pakistan.

Empirical Literature Review

There are plenty of research which is focused on assessing the effectiveness of fiscal and monetary policy on economic growth. The role of fiscal policy was highlighted in Keynesian era. It was underlined that the expansionary fiscal policy aimed at increasing government spendings or reducing tax may be implemented because it would lead to increase disposable income and consumption of the people. The positive effect of government expenditure and income on economy's output have already been confirmed in empirical research (Blanchard & Perotti, 2002; Fatás, & Mihov, 2003 and Mountford & Uhlig, 2009).

The relative impact of monetary and fiscal policy was studied in a detailed study conducted in US economy during 1968. The quarterly data was used and the effect of fiscal policy relative to monetary policy on economic growth was assessed. In this study, government expenditure was taken as proxy of fiscal policy and money supply as proxy of monetary policy. According to this research, the monetary policy was assessed to have more and faster effect on economic growth as compare with fiscal policy. Further, monetary policy was recommended for economic stabilization (Andersen & Jordan, 1968)

Similarly, Keran (1969) wrote an article to check the effectiveness of fiscal and monetary policy for economic growth. He took eight developed countries and inquired the differences in administrative

institutions and differences in the objectives of policy makers. He concluded that the money supply was more relevant with economic growth as compared with government expenditure.

Another research conducted by Teigen (1975) focused three Scandinavian countries i.e. Denmark, Finland and Norway. The objective of the research was to examine the effectiveness of money supply and government expenditure on output of the country. It was concluded regarding all three countries that the government expenditure had dominant effect on gross domestic product as compare with money supply. These results were opposite to the findings of Andersen & Jordan (1968) and Keran (1969). Moreover, the role of fiscal and monetary policies was studied in a depressed economy of Nigeria. In this research, the improved form of St. Louis equation was presented and the time series data from 1986 to 1991 was used to analyze the fiscal and monetary policy. The results showed that fiscal policy was more effective during the economic recession as compare to monetary policy. Therefore, government expenditure was found to be an appropriate measure of the fiscal policy (Olaloye & Ikhide, 1995).

Research Methodology

In this research, the data on the prescribed variables under the research objectives was derived from secondary sources published by Government of Pakistan (Government of Pakistan, 2023). The time series annually data was used from 1980 to 2022. The Vector Autoregression (VAR) model was employed to test to research hypothesis.

The functional form of the model describing the relationship among the dependent and independent variables with the help of mathematical and statistical equations is given as under:

$GDP = f(GE, M2)$ ..... (1)

In log form, it can be written as under:

$lnGDP = f(lnGE, lnM2)$ ..... (2)

Now, in the econometric form of the model is given in Equation 3.

$GDP_t = \beta_o + \beta_1 GE_t + \beta_2 M2_t + \epsilon_t$ ..... (3)

All the dependent and independent variables are in log form.

$lnGDP_t = \beta_o + \beta_1 lnGE_t + \beta_2 lnM2_t + \epsilon_t$ ..... (4)

Where:

ln = Natural Logarithm
GDP = Gross Domestic Product as proxy of economic growth
GE = Government Expenditure
M2 = Money Supply

Theoretical Framework

Unit Root Rest

The Augmented Dickey Fuller Test (ADF) and Philip Perron (PP) tests were performed to test the unit root or stationarity of the variables. The critical values for rejection of hypothesis of unit root test are usually taken from MacKinnon, 2010.

Vector Auto-Regressive (VAR) Model

It is very common in empirical macroeconomic analysis to use vector autoregressive (VAR) model. The main purpose of VAR model is to investigate the linear interdependence among variables. The variance decomposition and impulse response are its main components to forecast any policy in the short run as well as long run (Ivanov & Kilian, 2005; Stock, 2001). The VAR model employs the lagged values of the variables which are best suited for the analysis. There are many evidences about monetary policy when findings were affected by using considerable lag (Friedman, 2008; Sims, 1980). In the instant research, the VAR model was used to estimate the causality among macroeconomic variables like Gross Domestic Product (GDP), Government Expenditure (GE) and Money Supply (M2). The variables are replaced in the base model to empirically estimate their individual effects on economic growth.

VAR Model Equations

The VAR model of order p(VAR_p) can be written as:

$Y_t = C + A_iY_{(t-1)} + A_2Y_{(t-2)} + \cdots + A_pY_{(t-p)} + \epsilon_t$ ..... (4)

Where:

Y_t is a vector of endogenous variables at time t.

C is a vector of intercept term (Constant).

A_i is matrix of coefficients for each lag i (i = 1, 2, ..., p).

ϵ_t is a vector of error terms (innovations or shocks) at time t.

Variance Decomposition (VD)

Variance decomposition is also known as Forecast Error Variance Decomposition (FEVD). The purpose of this technique is to measure the shocks in Vector Autoregressive (VAR) model. This technique quantifies the forecast error variance of each variable attributed to shocks in each variable over different times.

Impulse Response Function (IRFs)

It is important in empirical studies of macroeconomics to apply vector autoregressive (VAR) model and also estimate the impulse response function. This explains the shocks to one variable in different times (Ivanov & Kilian, 2005). The main reason of using impulse response analysis is to investigate the dynamic effects of endogenous variable on the other independent variables. In impulse response function, the impulse variables are those which experience the shocks and response variables are those for which reaction of the shocks is measured. The direction of the curve shows the negative and positive effect of shocks on response variables. The height of the curve shows how large is the response. It means higher curve shows strong response.

Empirical Analysis

Unit Root Rest

The Augmented Dickey Fuller Test (ADF) and Philip Perron (PP) tests were performed to test the stationarity in the variables. All variables were estimated on trend and intercept. The critical values for rejection of hypothesis of unit root test were derived from MacKinnon, 2010. All variables were found to be non-stationary at level and stationary at first difference. The results are shown below in the Table 1.

Table 1

Testing for stationarity or Unit Root Test of the variables

Variables	Augmented Dickey Fuller (ADF)			Phillip Perron (PP)		
	Intercept	Trend and Intercept	Unit Root	Intercept	Trend and Intercept	Unit Root
LGDP	-0.48561 (-0.8826)	-2.214001 (0.4676)		-0.5451 (0.8704)	-2.214 (0.4679)	
LGDP(I)	-5.95851 (0.0000)	-5.95851 (0.0000)	(I)	-5.9934 (0.0000)	-6.00768 (0.0001)	(I)
LGE	0.479382 (0.9836)	-1.83133 (0.6685)		0.55976 (0.9865)	-1.8858 (0.6411)	
LGE(I)	-6.79798 (0.0000)	-6.7625 (0.0000)	(I)	-6.7531 (0.0000)	-6.7214 (0.0000)	(I)
M2	0.84656 (-0.9935)	-2.46322 (-0.3432)		0.38940 (0.9797)	-2.46322 (0.0007)	
M2(I)	-4.5359 (0.0009)	-5.26493 (-0.0007)	(I)	-4.5793 (0.0008)	-5.2762 (0.0007)	(I)

Vector Autoregression Estimates

Vector Autoregression (VAR) was used to measure the linear interdependencies among multiple time series. It was observed in the Table 2 that the GDP was strongly influenced by its own variable which was also highly significant. The lag of government expenditure and lag of money supply did not yield significant

results. In the case of LnGE as endogenous variable, it was evaluated that it was strongly influenced by its own lagged variable. The lags of GDP and lag of money supply were strongly exogenous which showed weak influence by government expenditure. The value of t-statistics was low as compared with the lag of LnGE. The same was the case with money supply. As endogenous variable of money supply was strongly influenced by its own lag but insignificantly influenced by lag of LnGE.

Table 2

Vector Autoregression (VAR) estimates

Variables	LnGDP	LnGE	LnM2
LnGDP(-1)	0.948092 (0.06140) [15.4406]	0.197146 (0.08217) [2.39910]	0.471658 (0.17713) [2.66279]
LnGE(-1)	0.060690 (0.07176) [0.84573]	0.756886 (0.09604) [7.88127]	-0.383896 (0.20701) [-1.85450]
LNM2(-1)	-0.012347 (0.01864) [-0.66706]	0.056087 (0.02495) [2.24777]	0.928782 (0.05379) [17.2683]
C	0.281085 (0.16827) [1.67044]	-0.385700 (0.22520) [-1.73825]	-0.843776 (0.48542) [-1.73825]
R-Square	0.998119	0.976118	0.996162
Adj. R-Square	0.997943	0.973879	0.995802
Sum Sq. equation	0.130944	1.089678	0.234528
S.E equation	0.063969	0.184533	0.085610
F-Statistic	5661.469	435.9781	2768.737
Log Likelihood	50.01524	11.87567	39.52481
Akaike AIC	-2.556402	-0.437537	-1.973601
Schwarz SC	-2.380456	-0.261591	-1.797654
Mean Dependent	15.68905	15.07303	14.10027
S.D. Dependent	1.410485	1.141779	1.321371

Variance Decomposition of lnGDP

The results of variance decomposition of lnGDP have been provided in Table 3. It can be observed that each value explains the percentage of error variance with respect to the endogenous variable. Period shows the variable's variance decomposition from short run to long run. It is evident that the 1st year lnGDP was 100% influenced by its own value but with the passage of time, lnGDP had decreasing trends. However, lnGE and lnM2 had increasing trend. In other words, lnGDP was strong endogenous variable and lnGE and LnM2 appeared to be strong exogenous variables.

Table 3

Variance Decomposition of lnGDP

Period	Standard Error	lnGDP	lnGE	lnM2
1	0.063969	100.000	0.0000	0.0000
2	0.089492	99.53143	0.174386	0.294189
3	0.108666	98.71507	0.450608	0.834322
4	0.124567	97.76499	0.739184	1.495826
5	0.138367	96.81382	0.993727	2.192450
6	0.150659	95.93539	1.195443	2.869166
7	0.161796	95.16442	1.341495	3.494083
8	0.172011	94.51140	1.437216	4.051382
9	0.181474	93.97289	1.491289	4.535822
10	0.190312	93.53826	1.513007	4.948737

Variance Decomposition M2

The variance decomposition of money supply in the Table 4 revealed that it was strongly influenced by its own in 1st year i.e. 93.91% but in the long run its variance had decreasing trend. In 1st year, lnGE was not influenced by lnGDP i.e. 0.00 % but its variance started to increase and reached up to 7.46 % till 5th year and 11.12% till 10th year depicting that it was least exogenous variable in the long run. lnGDP was influenced by lnM2 in 1st year with a value of 6.09%. It appeared to have decreasing trend up to 5th year but then increasing trend.

Table 4

Variance Decomposition of M2

Period	Standard Error	lnGDP	lnGE	lnM2
1	0.184533	6.086547	0.00000	93.91345
2	0.257312	3.668664	1.423888	94.90745
3	0.309545	2.543547	3.537729	93.91872
4	0.349249	2.332106	5.648176	92.01972
5	0.379670	2.758512	7.460958	89.78053
6	0.402870	3.632017	8.880409	87.48757
7	0.420460	4.817755	9.905413	85.27683
8	0.433782	6.215076	10.57879	83.20613
9	0.443951	7.744706	10.96225	81.29305
10	0.451862	9.342304	11.12286	79.53484

Variance Decomposition lnGE

The results of variance decomposition of government expenditure (lnGE) are given in the Table 5. The value of own shock of lnGE in the 1st year i.e. 87.28% indicated that lnGE was strong endogenous variable which was strongly influenced by its own in the 1st year. It was observed that it had continuously decreasing trend. It was influenced up to 48.52% in the 10th year. In the case of lnGDP, it was observed that lnGDP was influenced by lnGE variable up to 4.24% in the 1st year. lnGDP was least exogenous variable in the long run. In the 5th year, lnGE shock was contributed by 22.72% and in 10th year its value had increased up to 44.55%. The behavior of money supply was very fluctuating. In the 1st year, it was influenced by government expenditure up to 8.48% and in the 5th year and 10th years, its influence took a swing from 5.27% to 6.93%.

Table 5

Variance Decomposition of lnGE

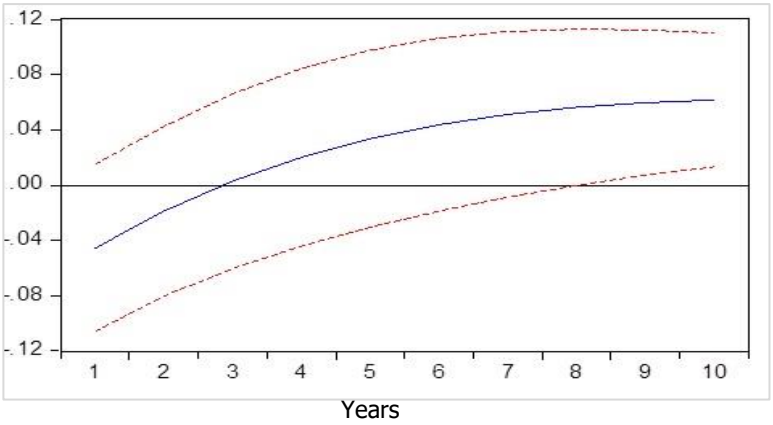
Period	Standard Error	lnGDP	lnGE	lnM2
1	0.085610	4.237967	87.28170	8.480329
2	0.107792	7.384531	86.59388	6.021585
3	0.120382	11.69570	83.43575	4.868551
4	0.129759	16.94182	78.29249	4.765692
5	0.138214	22.72028	72.01322	5.266503
6	0.146568	28.61919	65.43967	5.941142
7	0.155032	34.32951	59.16410	6.506395
8	0.163585	39.664846	53.49208	6.839456
9	0.172140	44.55126	48.51972	6.929023
10	0.180615	48.95355	44.22691	6.819546

Impulse Response of lnM2 to lnGDP

The impulse response of lnM2 to lnDGP was analyzed. The variable of lnM2 was taken as impulse variable whereas lnGDP was taken as response variable. It was observed that the change in lnM2 created a shock in lnGDP. The result is presented in the Figure 1.

Figure 1

Impulse Response of lnM2 to lnGDP (Cholesky one S.D. Innovations ± S.E.)

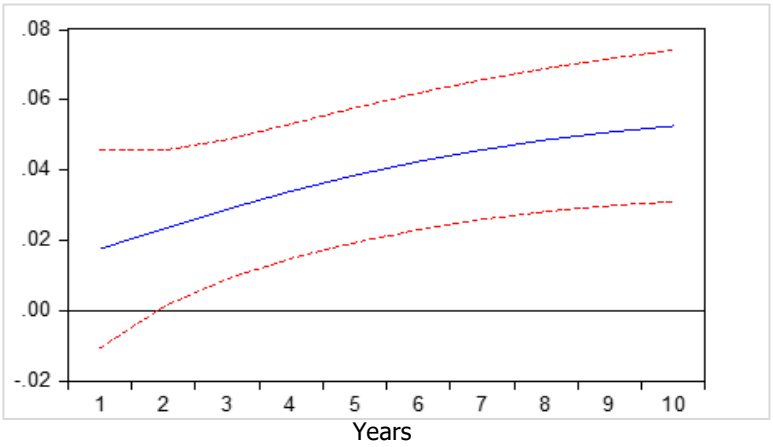


Impulse Response of lnGE to lnGDP

The variable of lnGE was taken as impulse variable and lnGDP as response variable. The change in lnGE caused an impulse in lnGDP. The result is presented in the Figure 2.

Figure 2

Impulse Response of lnGE to lnGDP (Cholesky one S.D. Innovations ± S.E.)



Conclusion and Policy Recommendations

The State Bank of Pakistan and the Government of Pakistan issue fiscal policy and monetary policy respectively in order to achieve macroeconomics stability and economic growth. The government expenditure presents a tool of the fiscal policy whereas money supply is an instrument of the monetary policy. The present study aimed to explore the linkages between these policies and to determine the effectiveness of both policies in achieving macroeconomic stability.

The Impulse Response Function (IRF) and Variance Decomposition (VD) analysis in Vector Autoregressive (VAR) model satisfied the objectives. Our findings of impulse response analysis confirmed the impact of money supply on economic growth. The money supply appeared to have positive impact with increasing trend in the long run. At first, the money supply impacted the GDP negatively but after 3rd year, its impact had changed to be positive and it was rising sharply. It indicated that the expansionary monetary policy was effective in the medium and long run in Pakistan. The impulse response function of government expenditure to GDP was positively associated in short run as well as long run with high magnitude. Finally, it was concluded that the fiscal policy appeared to be relatively more effective for its contribution towards economic growth as compared with monetary policy.

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