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Efficiency of financial indicators of the Romanian state budget, an objective of economic security during the epidemiological crisis

EFFICIENCY OF FINANCIAL INDICATORS OF THE ROMANIAN STATE BUDGET, AN OBJECTIVE OF ECONOMIC SECURITY DURING THE EPIDEMIOLOGICAL CRISIS

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Abstract

The financial structure of the state budget is a particularly important objective at the national level, aimed at ensuring economic security by providing resources to meet general objectives of national interest. During the - epidemiological crisis, due to changes in expenditure and revenue structures, the state budget was subject to financial pressures, accumulating deficits five times higher than in the period that followed the previous crisis of 2009-2012 and three times higher than at the beginning of the epidemiological crisis. The present scientific approach observes the main causes of vulnerability and identifies the economic and financial directions predicted based on the results of the last 10 years, taking into account the fact that economic security is a major objective that must be permanently monitored and adjusted through sustainable financial policies by institutional decision makers. This study uses prescriptive analytics methods, modelling data or financial results expressed in the national budgets from 2013 to 2021 in order to quantify the vulnerabilities that led to a large budget deficit. The results may prove to be useful to stakeholders, institutional decision makers or for the medium-term adjustment of financial policies.

Keywords

budget revenues, budget expenditures, budget deficit, financial policies, forecasting, efficiency econometric model

JEL Classification

H61, H62, O11

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Introduction

Romania has pursued a budgetary policy aiming to provide resources for current needs to the detriment of investment policies. In this respect, between 2013 and 2014, one may observe a favourable percentage ratio of current revenues and expenditures in total revenues and expenditures, current revenues holding a share of 88% in total revenues to the state budget while direct expenditures hold a share of 97% in total expenditures to the state budget. Thus, we consider that Romania is running a long-term deficit policy in the sense of neglecting strategic objectives, postponing development, an aspect complemented by poor absorption rates of European funds, which leads to Romania's ranking in the lower class in developed European countries with effects on sustainable development and on the economic capacity to sustain viable private initiatives by creating the necessary infrastructure and reforming the administrative apparatus.

In this context, we consider the scientific approach particularly important because it aims to study these systemic vulnerabilities through economic and financial correlations based on concrete financial policy data expressed in the economic and financial indicators of the state budget for the period 2013-2021.

The research objectives are:
O1 - analysis of the evolution of budget deficits in the period 2013-2021 by studying the national reports of this period;
O2 - determining the causality between the financial indicators of collection (revenue) and the financial indicators of expenditure by applying the data pair analysis method;
O3 - design of an econometric model of budget efficiency in relation to the state budget achievements;
O4 - interpretation of financial correlations in order to identify vulnerabilities and to establish a perfectible table of budgetary achievements.
The impact of the study is high because, -, the economic and financial traceability of the state budget will be carried out through the assessment of the vulnerabilities, an aspect that could be of real interest to financial decision-makers who could use the collection of these data to adjust medium-term financial policies and strategies in order to reach a new target of improved efficiency and reduce the budget deficit.

1.   Review of the scientific literature

The literature reflects the interest of Romanian researchers on these issues, which proves to be of a notable worth due their direct connection with the stability of the Romanian economy, being able to identify multiple models of budgetary adjustment that contribute to increasing the stability of the economic climate under the current challenges.

In the article on the evaluation of budgetary policies under the changing economic climate in Romania, the authors (Florea et al., 2021) show that, in relation to the alignment of national policies with the European policy, the effects of taxation of activities with environmental impact have contributed to the creation of additional pressure on the business environment, while also having - a direct effect of improving the environmental condition in the sense of reducing greenhouse gases as a result of the taxation of polluting

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activities but also in the sense of providing resources to maintain a sustainable development fund on the environmental component.

In another approach (Ibinceanu et al., 2021), regional development is seen as a factor of sustainable development, the authors proposing the revision of fiscal policies, the reduction of bureaucratic procedures and the creation of a framework for improving the conditions of activity of companies in the research and development sector.

An interesting model (Bălțățeanu et al., 2021) is presented in a research focusing on the analysis of budget revenues between 1995 and 2020, whose results show that by improving the modelling of the tax system with direct traceability to the Romanian Tax Code - tax forecasting can be increased by calculating the tax collection measurement coefficient. However, the accuracy of the model is diminished in the case of direct taxes due to the non-stationary coefficients of the data series which contributes to the premise from which we started, namely that the capacity to generate budget revenues is all the greater when economic conditions are stable and not as severe as the economic crisis.

A study of the impact of direct and indirect taxation on economic growth (Bâzgan, 2018) presents a vector autoregressive model explaining the rate of economic growth in relation to direct taxation and indirect taxation. The model presented indicates a seasonally adjusted growth of gross domestic product under the tax forecast condition and highlights the direct proportionality relationship of indirect taxation on both direct taxation and economic growth.

Another study (Oprea et al., 2022) on regional output and its influence on regional development assumes that there is a significant positive relationship between the regional development index and local budget indicators. The authors propose an adjustment of fiscal policy to optimize local budget indicators in order to ensure a sustainable basis for economic development.

The financing, organising and providing medical care under different national health models are analysed by (Plotnic and Ciochină, 2018) and cover EU Member States. The authors try to find the most appropriate way to finance the health care. The final conclusion of this research is very controversial: "Privatisation can lead to the violation of the principles of social justice and equal access to services."

The influence of tax variation on the national economy between 2008 and 2018 is analysed - by a group of researchers (Pitu, Ciocanea and Voda, 2019) who show that the change in tax policy implies changes in economic development even during the crisis period. Also, the increase in collection efficiency brings about the halt or slowdown of evasion phenomena in post-crisis periods thus leading to increased sustainable development.

An OECD study (O'Reilly, Perret and Van Dender, 2020) analyses fiscal policy in Romania as a response to the pandemic crisis, the role of government in taking decisive action to combat the disease and the impact of fiscal policies to support health policies. Moreover, in the context of an unprecedented downturn, it is assessed that adapting fiscal

policies to the pandemic phenomenon is the key to keeping the economy in a viable structure and ensuring its recovery in the post-crisis period.

Thus, the main objective proposed is the preservation of the business cash-flow as the main objective of fiscal policy with all the adjacent aspects that derive from it, namely, the support of enterprises to overcome difficulties in finding human resources, maintaining the investment policy, etc.

A questionnaire-based study (Nichita et al., 2019) analyses a sample of 358 taxpayers through an objective of studying tax completeness and voluntary compliance. The study showed that there is a differentiation among taxpayers in Romania between taxes and social contributions. This aspect shows that the Romanian tax system has reached a certain maturity in relation to the taxpayer. Tax compliance is assessed by the authors as having a medium impact on taxpayers and as having a direct influence on their perceptions of the role of taxation in society. Contributions are presented in the same manner, the authors concluding that considerable financial resources can be saved from the provision of efficient public services in exchange for reduced monitoring of tax non-compliance.

In another study (Alexandru and Guziejewska, 2020), administrative capacity in relation to fiscal decentralisation is analysed through a comparative study of Poland and Romania. For Romania the authors indicate the limited fiscal independence of local bodies which means that the principle of subsidiarity is insufficiently ensured so as to guarantee adequate sustainability.

Another approach examines fiscal budget policy in Romania as an attribute of the tax administration for the forecast period 2020-2023. The authors (Oprișan, 2020) show that the general macroeconomic framework will be changing until 2023 and the main fiscal approach will be the fight against - budget deficit. On the same topic (Turan and Karakas, 2018), the asymmetry in the double deficit hypothesis is presented through a model the authors present for Romania much more non homogeneous values than for the other countries (Croatia, Czech Republic, Slovakia and Slovenia), the results indicating negative and positive shocks for the budget deficit, significant positive coefficients in Poland and Romania for the long-term forecast horizon, and a reverse causality that depreciates the double deficit hypothesis in the case of the two countries.

Some authors (Andrei and Brezeanu, 2019) focus in their research on financial optimization policies that contribute to sustainable economic development. According to authors (Andrei and Brezeanu, 2019) these could consist of: modernizing government financial management, improving operational and liquidity risk management, increasing the impact of public funds on bank liquidity.

Green (Green and Loualiche, 2021) demonstrates that the local public administrations in USA faced losses in revenues and increased expenditures as a result of the pandemics . These are the result of increasing public aids for the employment and decreasing the tax pressure. The authors conclude that local governments balanced budget requirements a better procyclicality of public service provision.

The experience of the most affected country by the pandemic (China) and its budgetary responses to COVID-19 is presented by (Wu and Lin, 2020). The authors are focused on those budgetary measures able to support pandemic prevention and control, social stability and economic recovery. These measures are connected to special financial resources. The main conclusion of this research is quite atypical: if the public management is not able to support a performant fiscal and organizational leadership, the economic and social costs due to pandemic will be greater than the monetary costs of budgetary responses.

An interesting analysis regarding the implementation of the EU CCCTB Directive was realised by (Balaban, 2021) as a result of the need for a unitary and fair tax system in the European Union. The analysis is focused on the Romanian budget and it points out the connection between the public health budget and the national legislation. The authors argue that the Romanian representatives in the European Council have to support a veto on unitary tax regulations for the health system.

The official point of view of the Romanian Fiscal Council - on the Social Security Budget Law on 2021 was presented in (Fiscal Council of Romania, 2021). Moreover, this document also covers the 2021-2023 Fiscal Strategy. The analysis started form the idea that the impact of the pandemic on budget is greater than that of the recession. In order to decrease the negative impact of these two negative impacts (pandemic and recession), the Council takes into consideration a gradual correction of the budget.

A good practise from Poland was presented by (Kańduła and Przybylska, 2021) taking into account the Polish municipalities, which are considered in the first line of combat against pandemic. The authors demonstrate that at least two main factors influence the capacity of the municipalities to face the impact of the pandemics: income per capita and the population size. On the other hand, the municipalities can finance their measure using the reserves provided by the previous budget and decreasing other unnecessary current expenditure.

The budgetary responses to the pandemics in France are analysed by (Cho, Jérôme and Maurice, 2021) in order to identify the connections between the public measures and their political, economic, social and environmental implications. The analysis covers the first 7 months from 2020 and follows the budget flexibility. A distinct direction of the analysis is that regarding the connection between the increase of participatory budgets in local communities and the need of decentralization. Finally, the authors point out the budgetary paradox: the existence of massive funding of polluting industries versus ecological issues.

A study request by the European Council takes into consideration the fiscal policies and capacity in the states of Euro area post-Covid 19 (Marimon and Wicht, 2021). The authors consider that the better option to face the pandemics is to develop an integrated fiscal policy. This policy has to be supported by a permanent and independent Fiscal Fund in the general framework of the Stability and Growth Pact. Moreover, the authors consider that this approach can be used by the entire EU.

The analysed approaches explicitly show that there are a number of vulnerabilities affecting fiscal stability in Romania and these vulnerabilities need to be managed and reduced through sustainable fiscal policies. In this respect, our approach is oriented towards monitoring the effectiveness of fiscal indicators and identifying a perfectible picture of budgetary performance, which will be presented below.

2. Research methodology

We used official sources (Romanian Ministry of Public Finance, 2022) to consolidate the database for the period 2013-2021, which covers the budget executions of the state budget component by the following categories of income and expenditure:

TISB   - Total Incomes
CISB - Current Income
KISB - Capital income
TESB - Total Expenses
CESB - Current expenses
KESB - Capital expenditures
SD - Surplus (+) / Deficit (-)

The data thus obtained were converted from million lei into million euro using the exchange rates reported by the NBR for the last day of each analysed year. The database was consolidated in millions of euro in a matrix format that allowed the application of pairwise data analysis and econometric modelling.

We proceeded to formulate the following working hypotheses:
According to some authors (Turan and Karakas, 2018; Oprișan, 2020), fiscal policy should be oriented forecasting and limiting the effects induced by the budget deficit. In this respect we define working hypothesis H1: the dynamics of expenditures and revenues show a direct dependence correlation, so according to the system's willingness to generate revenues in one budget category the expenditures in the same budget category are forecast.

Some authors (Pitu, Ciocanea and Voda, 2019) state that fiscal policy changes directly induce changes in economic development, an aspect that is also evident in times of economic crisis and which allows us to define working hypothesis H2: in conditions of economic and epidemiological crisis, the ability of the system to generate revenue is affected in proportion to the increase in the impact of direct expenditure in total expenditure incurred.

As the current scientific literature (Băltățeanu et al., 2021) shows that there is a direct influence of taxation on the capacity to generate budget revenues under conditions of uncertainty in the sense of decreasing some predictable factors and increasing the pressure on components with direct impact, we define working hypothesis H3 as follows: under conditions of economic and epidemiological crisis, investment-related revenues have an inverted trend curve with that of investment spending, due to the seasonality of spending and its planning through multi-year budgets.

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Aspects of the budget deficit and its direct relationship with sustainable development are often encountered in the literature as direct causal relationships that need to be modelled, optimised and predicted to ensure that negative effects are limited (Bâzgan, 2018; Turan and Karakas, 2018; O'Reilly, Perret and Van Dender, 2020; Oprișan, 2020; Băltățeanu et al., 2021). In view of these considerations, we define working hypothesis H4: under conditions of economic and epidemiological crisis, the budget deficit is maximized on the basis of the inflexible curve of expenditure relative to revenue.

The design of the econometric model used the multiple linear regression technique and the least squares method to determine the correlation of the budget outcome (deficit) with the regressors TISB, CISB, KISB, TESB, CESB, KESB; a shape regression model was obtained:

$$SD = \alpha_1 * TISB + \alpha_2 * CISB + \alpha_3 * KISB + \alpha_4 * TESB + \alpha_5 * CESB + \alpha_6 * KESB + \varepsilon$$
(1)

where:
− SD - dependent variable - Surplus (+) / Deficit (-) of Romanian State Budget 2013-2021 (milion euros);
− TISB - independent variable - Total Incomes of Romanian State Budget 2013-2021 (milion.euros);
− CISB - independent variable - Current Income of Romanian State Budget 2013-2021 (milion.euros);
− KISB - independent variable - Capital income of Romanian State Budget 2013-2021 (milion.euros);
− TESB - independent variable - Total Expenses of Romanian State Budget 2013-2021 (milion.euros);
− CESB - independent variable - Current expenses of Romanian State Budget 2013-2021 (milion.euros);
− KESB - independent variable - Capital expenditures of Romanian State Budget 2013-2021 (milion.euros);
− $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6$ – regression's coefficients;
− ε – residual variable.

Based on the processed data, the obtained coefficients of the regression function allowed for accurate sizing, namely:

$$SD = 1 * TISB - 3.5298e^{-10} * CISB + 1.7522e^{-12} * KISB - 1 * TESB + 1.4225e^{-13} * CESB + 12690e^{-13} * KESB + 3.1287e^{-10}$$
(2)

The model results are validated based on the homogeneity test and on the application of the enter method (Table no. 1) which allowed all the proposed variables to be modelled, no variable being excluded.

Table no. 1. Application of the enter method for selecting included or excluded variables

Variable included/excluded			
Model	Variables included	Variables excluded	Method
1	KESB, KISB, CESB, CISB, TISB, TESBb	.	Enter
a. Dependent Variable: SD			
b. All requested variables entered.			

Source: Authors' calculations using SPSS v 25

The model summary (Table no. 2) indicates a unitary R^2 coefficient of determination, which means that the efficiency of the budget result is 100% determined by the change in the selected independent variables with a sig. coefficient of the F function lower than the chosen significance threshold of 0.05 and a Durbin-Watson coefficient of 3.42, higher than the minimum level 2, which allows to validate the statistical significance of the model.

Table no. 2. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	1.000a	1.000	1.000	0.00019	1.000	1501199875790165.000

Model	Change Statistics			
	df1	df2	Sig. F Change	Durbin-Watson
1	6	2	0.000	3.418
a. Predictors: (Constant), KESB, KISB, CESB, CISB, TISB, TESB				
b. Dependent Variable: SD				

Source: Authors' calculations using SPSS v 25

According to the ANOVA test (Table no. 3) we observed that the alternative hypothesis is validated and the null hypothesis is rejected by the one-sided critical probability test, the Sig. coefficient being below the selected significance level 0.05.

Table no. 3. ANOVA Test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	328986608.697	6	54831101.450	.	.b
	Residual	0.000	2	0.000		

	Total	328986608.697	8			
a. Dependent Variable: SD						
b. Predictors: (Constant), KESB, KISB, CESB, CISB, TISB, TESB						

Source: Authors' calculations using SPSS v 25

The histogram of the dependent variable (Figure no. 1) shows a non-homogeneous distribution of the financial deficit result, with an accumulation point at the top of the Gaussian curve; it confirms that the evolution of the financial result of budget allocations is destabilized by periods of economic crisis and thus demonstrates working hypothesis H4 - under conditions of economic and epidemiological crisis, the budget deficit is maximized on the basis of the inflexible curve of expenditure in relation to revenue.
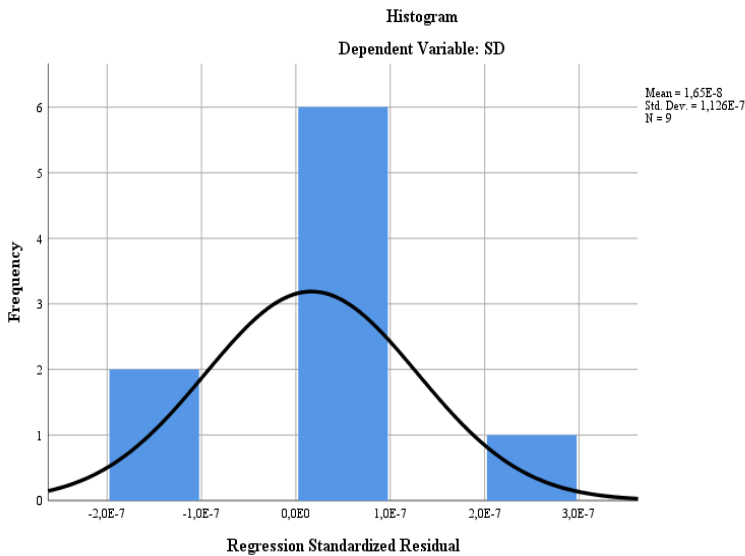

Figure no. 1: Histogram of dependent variable
Source: Elaborated by the authors

The proposed model identifies at the Pearson correlation level the variation of the financial result in relation to the allocation procedures, which is inversely correlated with all categories of income and expenditure, an aspect that denotes the non-performance of the state budget allocations, the main disturbing factor being the Current expenses of Romanian State Budget with an inverse correlation of 92.7% in relation to the budget deficit-financial result, which shows that working hypothesis H2-in conditions of economic and epidemiological crisis, the system's capacity to generate revenue is affected proportionally to the increase in the impact of direct expenditure in total expenditure incurred.

According to the Pearson correlation coefficients, the correlation coefficient of total income and total expenditures is 98.6% and the correlation coefficient of Current Income of Romanian State Budget and Current expenditures of Romanian State Budget is 87.6%, which represents a direct correlation of expenditures to income. This aspect demonstrates working hypothesis H1-the dynamics of expenditures and revenues show a direct correlation of dependence so that according to the availability of the system to generate revenues in one budget category, expenditures in the same budget category are forecast.

As regards capital revenues and expenditures, there is a very low correlation between the two sources of only 9%, which demonstrates working hypothesis H3 - in conditions of economic and epidemiological crisis, investment revenues have an inverted trend curve with investment expenditures, due to the seasonality of expenditures and their planning through multi-year budgets.

3. Results and discussion

The results of the pairwise data analysis show a homogeneous distribution in terms of standard error and deviance calculated according to the table no. 4:

Table no. 4. Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	TISB	26491.6798	9	5363.08987	1787.69662
	TESB	35688.0345	9	10837.02670	3612.34223
Pair 2	CISB	23023.2962	9	3499.43837	1166.47946
	CESB	34016.5032	9	10325.16938	3441.72313
Pair 3	KISB	72.8980	9	13.47196	4.49065
	KESB	1203.5281	9	461.46402	153.82134
Pair 4	TISB	26491.6798	9	5363.08987	1787.69662
	SD	-9196.3547	9	6412.74716	2137.58239
Pair 5	TESB	35688.0345	9	10837.02670	3612.34223
	SD	-9196.3547	9	6412.74716	2137.58239

Source: Authors' calculations using SPSS v 25

From Table no. 4 we can see that there is a significant difference of 34% between the expenditures from the state budget and the revenues, which leads to the annual increase of the budget deficit and this difference is mainly due to the imbalance of current expenditures which on average exceeds the current revenues collected from the state budget by 48%. Also, as we have demonstrated in working hypothesis H3, the deficit is accentuated by annual expenditure on investments of about 1203 million euro, compared

to annual receipts for investments of only 72.9 million euro. In these conditions, compared to the general average of 9196-million-euro annual accumulated budget deficit, the distribution of the deficit characterized by the polynomial trend curve: $y = -1915.5\ x\ 2 + 9200.9\ x - 29104$, is as shown in Figure no.2.
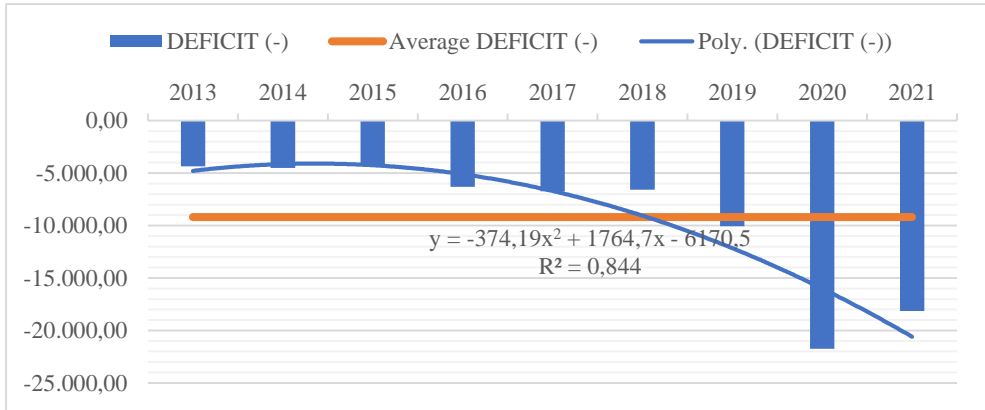

Figure no. 2: The dynamics of the budget deficit
Source: Elaborated by the authors

Based on the observations from the budget efficiency study, we draw the following picture of vulnerability (Figure no. 3):

Figure no. 3: The perfectible picture of budgetary achievements
Source: Elaborated by the authors

The issues raised represent a reason for reorienting financial policies as they are not oriented towards European sustainability objectives and generate, in the long-term, reasons for major economic vulnerability creating a distortion of national and European stability, by failing to link national financial policies with the strategic objectives of sustainable development assumed at European level.

Conclusions

The analysis carried out aims at quantifying the efficiency of the national budgets in Romania between 2013 and 2021, efficiency that has proved to be extremely low and that needs to be urgently corrected through adequate financial policies in the sense of: reducing the structural deficits of the state budget, increasing investment allocations, reducing direct expenditure and realigning with the EU budget deficit policy. In a broad sense, we observed an increase in the debt ratio, a vulnerability related to current expenditure and an extremely low investment policy. In the long term, the continuation of these shortcomings will generate major macroeconomic imbalances and a threat to the European economy.

The results of the study met the four objectives of the research, pragmatically quantifying the perfectible picture of budgetary achievements and presented the directions of evolution of the budgetary imbalance projected in the medium term to reach up to 21750 million euros, with a standard error of 6412 million euros and a Mahalanobis distance of 2.4 million euros.

Since the selection of a limited number of model variables and the design of the model over a period of only 10 years may be seen as limitations for the current study, the authors propose to extend, on the one hand the model for the study of the consolidated generated budget and, on the other, the study period so as to increase the relevance of the proposed efficiency model.

A new challenge for this approach is to quantify the budgetary responses to the new complex socio-economic situation generated by the pandemic and war in Ukraine.

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