

# Assessment of the performance of the financial architecture of Ukrainian economy: budgetary, stock and social aspects

VIKTOR MELNYK

Department of Finance, Kyiv National Economic University named after Vadym Hetman,  
UKRAINE

MAKSYM ZHYTAR

Department of Finance named after L.L. Taranhul, University of the State Fiscal Service of  
Ukraine, UKRAINE

ROMAN SHCHUR

Department of Finance, Vasyl Stefanyk Precarpathian National University, UKRAINE

NATALIIA KRIUCHKOVA

Department of Economics and Business, Odessa I.I. Mechnikov National University, UKRAINE

TETIANA SOLODZHUK

Department of Finance, Vasyl Stefanyk Precarpathian National University, UKRAINE

*Abstract:* - The article describes the scientific and methodological approach to assessing the effectiveness of the financial architecture of Ukraine's economy on the basis of recommended values of the system of indicators, determining their type, allowable intervals of values taking into account micro- and macrofinancial levels of the hierarchy. The comparative analysis of the corresponding indicators on the countries of the EU and Ukraine for 2009-2018 is presented. The future directions of dynamics of indicators of efficiency of functioning of financial architecture of economy of Ukraine are offered.

*Key-Words:* - Financial architecture, Efficiency, Economic indicators, Recommended value, International reserves, Level of capitalization, State budget balance, Return on assets.

Received: September 24, 2020. Revised: November 12, 2020 Accepted: January 23, 2021.

Published: January 27, 2021.

## 1 Introduction

Globalization of economic activity qualitatively and quantitatively changes the institutional environment of the world economy in general and individual national economies in particular, transforms the relevant relationships and interdependencies between the elements of the global financial system, puts forward the study of its development among the priority areas of economics. The development of the theory and methodology of modern world financial thought is based on a new paradigmatic construction, which is based on the study of relationships and interdependencies that arise in the functioning of the financial system through the study of its institutional matrix - financial architecture.

The effectiveness of financial architecture and its main components, the development of methods is the subject of discussion of many relevant studies by leading authors [1-4].

Construction and effective functioning of the financial architecture allows to ensure the

balance of the economic system, to counteract the negative trends in the economy, to actively promote its modernization and development of interstate monetary relations. The reform of the financial architecture in the post-crisis period, which is characterized by instability of macroeconomic conditions is of particular importance. The development of a methodology for studying financial architecture in modern conditions involves the disclosure of the essence of this economic phenomenon, the factors of its evolution, interaction with other economic processes, as well as the definition of development trends.

The goal of the article is to present and test the author's scientific and methodological approach to assessing the results of the financial architecture of the Ukrainian economy in terms of budgetary, stock and social aspects, taking into consideration the micro and macrofinancial levels of the hierarchy. Extrapolation of the methodology for calculating the proposed indicators to the EU will allow to obtain quantitative assessments of the effectiveness of individual components of the financial

architecture of the EU, which will lead to a promising study of theoretical and applied aspects of improving the financial architecture of Ukraine in the EU-Ukraine strategic partnership.

## 2 Data and Methodology

Improving the effectiveness of the financial architecture of the economy of Ukraine is impossible without constant analysis of its level and justification of recommendations for adjusting the state of financial relations. This actualizes the study of methodological aspects aimed at obtaining an objective and reasoned assessment of its degree.

To ensure the completeness of the assessment of the effectiveness of the financial architecture of the Ukrainian economy, it is appropriate to use certain indicators (Table 1).

Table 1. Recommended values of performance indicators functioning of the financial architecture of the state economy

No.	Indicator	Type of indicator	Recommended value
1	2	3	4
<b>Government finances</b>			
1	ratio of state budget deficit / surplus (profit) to GDP, percentage	mixed	$(\max \{x_{EC,-6}\}; 10)$ , where $X_{EC}$ – average value in EU countries
2	the level of redistribution of GDP through the consolidated budget, percentage	mixed	(18 ;37)*
3	the ratio of public and guaranteed public debt to GDP, percentage	disincentive	$[0; \min \{X_{EC,-60}\}]$ , where $X_{EC}$ – average value in EU countries
4	gross international reserves, months of import	stimulant	$(\max \{X_{EC,1.5}\}; +\infty)$ , де $X_{EC}$ – average value in EU countries
<b>Finances of the business entities</b>			
5	the level of capitalization of listed companies,	mixed	(15; 150)*

	GDP percentage		
6	ratio of non-performing loans to total gross loans, percentage	disincentive	$[0; \min \{X_{EC,7}\}]$ , where $X_{EC}$ – average value in EU countries
7	interest rate on loans, percentage	mixed	(0; 15)*
8	return on assets of enterprises, percentage	stimulant	(0; $+\infty$ )
<b>Household finances</b>			
9	share of cash income in total household resources, percentage	stimulant	100
10	the ratio of the average size of old-age pensions to the average monthly nominal salary, percentage	mixed	(67; 100)
11	share of expenditures on food and non-alcoholic beverages in total expenditures of households, percentage	disincentive	(0; 20)*

Note: \* Recommended values are established on the basis [5].

Source: developed by the authors.

Therewith, for the vast majority of indicators, the represented values are determined in such a way that they do not constitute most of the optimal values planned by the Guidelines for assessing the level of economic security. In addition, in the group of indicators for assessing the effectiveness of the functioning of farm units, it is proposed to use the ratio of the average old-age pension to the average monthly nominal wage. In this situation, the recommended value was fixed based on the optimal values of the ratio of the

average monthly nominal wage relative to the subsistence level per employee and relative to the average old-age pension to the subsistence level of persons who have lost their ability to work. Given the importance of income for the effectiveness of households, the proposed value of cash income in the total resources of households, which was fixed at 100%. Some recommended values of indicators for assessing the effectiveness of the financial architecture of the Ukrainian economy are set from their average level for EU countries, which makes it possible to take into account all-European trends in the transformation of important macro-financial indicators. It is also proposed to evaluate the method of establishing the points of change of these indicators on the example of the way their values change this year from critical compared to the previous year:

$$y\_effekt_i = \begin{cases} 1, & \text{if } X_{it} \in (X_{i, rekom\_min}; X_{i, rekom\_max}) \text{ and, if } \\ & \Delta X_{i,t} > \Delta X_{i,t-1} \\ 0,67, & \text{if } X_{i,t} \in (X_{i, rekom\_min}; X_{i, rekom\_max}) \text{ and, } \\ & \text{if } \Delta X_{i,t} \leq \Delta X_{i,t-1} \\ 0,33, & \text{if } X_{i,t} \notin (X_{i, rekom\_min}; X_{i, rekom\_max}) \text{ and, } \\ & \text{if } \Delta X_{i,t} > \Delta X_{i,t-1} \\ 0, & \text{if } X_{i,t} \notin (X_{i, rekom\_min}; X_{i, rekom\_max}) \text{ and, if } \\ & \Delta X_{i,t} \leq \Delta X_{i,t-1} \end{cases}, \quad (1)$$

where  $y\_effekt_i$  – the point price of the efficiency of the indicator;

$X_i; x_{i,t}; x_{i,t-1}$  – the actual values of  $X_i$  in the current  $t$  and in the previous  $t-1$  periods,

$X_{i, rekom\_min};$  and  $X_{i, rekom\_max}$  – the minimum and maximum recommended values of  $X_i$ , respectively,

$$\Delta X_{i,t} = \min \{ x_{i,t} - X_{i, rekom\_min}; X_{i, rekom\_max} - x_{i,t} \},$$

$$\Delta X_{i,t-1} = \min \{ X_{i,t-1} - x_{i, rekom\_min}; X_{i, rekom\_max} - X_{i,t-1} \}.$$

This approach makes it possible to assess the dynamics of mixed indicators: their increase to a certain level indicates a positive trend (as in the case of stimulant indicators), and further increase gives grounds to assert a negative trend (as in the case of disincentive indicators).

The application of the scoring of the actual values of the indicators represented and

their changes makes it possible to calculate the overall efficiency of a particular component of the financial architecture of the country as the arithmetic mean of the score of all indicators:

$$y\_effekt = \frac{1}{n} \sum_{i=1}^n y\_effekt_i,$$

(2) where  $y\_effekt$  – the general indicator of efficiency of the corresponding component of financial architecture of economy of Ukraine;

$n$  – the number of indicators of the effectiveness of the formation and use of the relevant component of the financial architecture.

Based on the data, using the share of the relevant component in the financial architecture, the integrated performance indicator of the financial architecture of the economy of Ukraine is calculated  $Z$ :

$$Z = y\_effekt_G \cdot W_G + y\_effekt_F \cdot W_F + y\_effekt_H \cdot W_H, \quad (3)$$

where  $y\_effekt_G; y\_effekt_F; y\_effekt_H$  – general indicator of efficiency of functioning of financial architecture of authorities, business entities, establishments and households, value  $W_G, W_F, W_H$  – the share of financial architecture of authorities, economic entities, institutions and households in the overall financial architecture.

The scale of values of the integrated indicator of the effectiveness of the financial architecture of the economy is in the range from 0 to 1. Analyzing the approach used in the Guidelines for calculating the level of economic security of Ukraine, five intervals are identified, which attempts to outline the rating of financial architecture of Ukraine (tbl. 2).

Table 2. The scale of rating assessments of the level of effectiveness of the financial architecture of the economy of Ukraine

No.	Value Z	Rating
1	[0,8;1]	A (optimal level of effectiveness of the financial architecture of the economy)
2	[0,6;0,8]	B (sufficient level of effectiveness of the financial architecture of the economy)
3	[0,4;0,6]	C (satisfactory level of efficiency of the financial architecture of the economy)
4	[0,2;0,4]	D (unsatisfactory level of efficiency of functioning of financial architecture of economy)
5	[0;0,2]	F (critical level of effectiveness of the financial architecture of

the economy)

Source: developed by the authors.

In accordance with the described scientific and methodological way, using a certain information base, the calculation of several indicators of the state and performance of the financial architecture of the economy, their scoring, summation of scores for each share, calculation of the integrated performance of the financial architecture of the economy and rating assessment of the country's financial architecture

with substantiation of conclusions and offers [6-8].

### 3 Results

Analyzing the finances of the authorities, there are firstly compared the ratios of the state budget balance with the GDP of Ukraine and the European Union (tabl. 3).

Table 3. The ratio of the state budget balance to GDP in Ukraine and EU countries in 2009–2018,%

Country	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Austria	-1,5	-5,3	-4,4	-2,6	-2,2	-2,0	-2,7	-1,0	-1,6	-0,8
Belgium	-1,1	-5,4	-4,0	-4,2	-4,2	-3,1	-3,1	-2,5	-2,4	-0,9
Bulgaria	1,6	-4,1	-3,1	-2,0	-0,3	-0,4	-5,4	-1,7	0,2	1,1
Great Britain	-5,2	-10,1	-9,3	-7,5	-8,1	-5,4	-5,4	-4,2	-2,9	-1,8
Greece	-10,2	-15,1	-11,2	-10,3	-8,9	-13,2	-3,6	-5,6	0,5	0,8
Denmark	3,2	-2,8	-2,7	-2,1	-3,5	-1,2	1,1	-1,5	-0,4	1,1
Estonia	-2,7	-2,2	0,2	1,2	-0,3	-0,2	0,7	0,1	-0,3	-0,4
Ireland	-7,0	-13,8	-32,0	-12,8	-8,1	-6,1	-3,6	-1,9	-0,5	-0,2
Spain	-4,4	-11,0	-9,4	-9,6	-10,5	-7,0	-6,0	-5,3	-4,5	-3,1
Italy	-2,6	-5,2	-4,2	-3,7	-2,9	-2,9	-3,0	-2,6	-2,5	-2,4
Cyprus	0,9	-5,4	-4,7	-5,7	-5,6	-5,1	-9,0	-1,3	0,3	1,8
Latvia	-4,2	-9,1	-8,7	-4,3	-1,2	-1,2	-1,5	-1,4	0,3	1,8
Lithuania	-3,1	-9,1	-6,9	-8,9	-3,1	-2,6	-0,6	-0,3	0,3	0,5
Luxembourg	3,3	-0,7	-0,7	0,5	0,3	1,0	1,3	1,3	1,6	1,4
Malta	-4,2	-3,2	-2,4	-2,4	-3,5	-2,4	-1,7	-1,0	0,9	3,5
The Netherlands	0,2	-5,1	-5,2	-4,4	-3,9	-2,9	-2,2	-2,0	0,0	1,2
Germany	-0,2	-3,2	-4,2	-1,0	0,0	-0,1	0,6	0,8	0,9	1,0
Poland	-3,6	-7,3	-7,3	-4,8	-3,7	-4,1	-3,7	-2,7	-2,2	-1,4
Portugal	-3,8	-9,8	-11,2	-7,4	-5,7	-4,8	-7,2	-4,4	-2,0	-3,0
Romania	-5,4	-9,1	-6,9	-5,4	-3,7	-2,2	-1,3	-0,7	-2,9	-2,9
Slovak	-2,4	-7,8	-7,5	-4,3	-4,3	-2,7	-2,7	-2,6	-2,2	-0,8
Slovenia	21,8	34,6	38,4	46,6	53,8	70,4	80,4	82,6	78,7	74,1
Hungary	-3,7	-4,5	-4,5	-5,4	-2,4	-2,6	-2,6	-1,9	-1,6	-2,2
Finland	4,2	-2,5	-2,6	-1,0	-2,2	-2,6	-3,2	-2,8	-1,7	-0,7
France	-3,3	-7,2	-6,9	-5,2	-5,0	-4,1	-3,9	-3,6	-3,5	-2,7
Croatia	-2,8	-6,0	-6,3	-7,9	-5,3	-5,3	-5,1	-3,4	-0,9	0,9
Czech Republic	-2,0	-5,5	-4,2	-2,7	-3,9	-1,2	-2,1	-0,6	0,7	1,5
Sweden	1,9	-0,7	0,0	-0,2	-1,0	-1,4	-1,6	0,2	1,1	1,6
<b>EU average</b>	<b>-2,5</b>	<b>-6,6</b>	<b>-6,4</b>	<b>-4,6</b>	<b>-4,3</b>	<b>-3,3</b>	<b>-2,9</b>	<b>-2,3</b>	<b>-1,7</b>	<b>-1,0</b>
<b>Ukraine</b>	<b>-1,3</b>	<b>-3,9</b>	<b>-5,9</b>	<b>-1,8</b>	<b>-3,8</b>	<b>-4,4</b>	<b>-5,0</b>	<b>-2,3</b>	<b>-2,9</b>	<b>-1,6</b>
<b>Deviation from the average</b>	<b>+1,2</b>	<b>+2,7</b>	<b>+0,5</b>	<b>+2,8</b>	<b>+0,5</b>	<b>-1,1</b>	<b>-2,1</b>	<b>0</b>	<b>-1,2</b>	<b>-0,6</b>

Source: developed by the authors, using data from the State Statistics Service of Ukraine, the Ministry of Finance of Ukraine, Eurostat.

The lowest level of this indicator among EU countries was observed in Greece

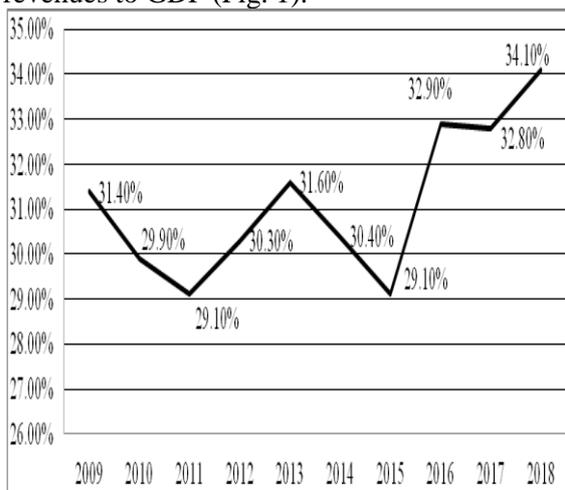
(2008–2009, 2015), Ireland (2010–2011), Spain (2012, 2016–2017), and Slovenia (2013) and Cyprus (2014), and the maximum in Finland (2008), Luxembourg (2009, 2012–2016), Estonia (2010–2011) and Malta (2017).

As for the situation in Ukraine, it was in line with European trends, as evidenced by a slight gap in values. In addition, during the last years of the analyzed period there was a positive trend in the level of the state budget deficit, although in 2013-2017 its indicators were outside the recommended ones.

Among the criteria for candidates for accession to the euro area, we can highlight - limiting the amount of public debt (not more than 60% of GDP). With a focus on the European direction of development of Ukraine, this norm is approved in Article 18 of the Budget Code of Ukraine. At the same time, among European countries, the most difficult situation was in Greece, where the level of public debt was the highest for the entire analyzed period. Less dependent on creditors was Estonia, whose public debt was the lowest among all countries in 2009-2018.

In general, the level of public debt in Ukraine during the analyzed period did not exceed the EU average, while the authority of the state as a borrower is very low compared to other European countries, and the price of debt service is higher.

The importance of the state in redistributive relations in society can be analyzed using the share of consolidated budget revenues to GDP (Fig. 1).



**Fig. 1.** The level of redistribution of GDP through the consolidated budget in 2009–2018, %

Source: calculated by data from the State Statistics Service of Ukraine and the Ministry of Finance of Ukraine.

In the period 2009–2018, the values of this indicator ranged from 29.1 to 34.1% and did not exceed the critically acceptable level (37%). However, they were significant, and the budget accumulated about a third of GDP. Given the importance of the authorities in overcoming the consequences of the military conflict and in financing certain measures, as evidenced by foreign experience, we can assume that the level of budget centralization of GDP will continue to grow slightly.

Given the high dependence of the development of the national economy on foreign trade, the question of studying the adequacy of gold and foreign exchange reserves to finance imports in conditions of limited exports deserves special attention.

When comparing this indicator in Ukraine and EU countries, it is advisable to single out (Table 4):

1) a gradual decrease in domestic gold and foreign exchange reserves compared to imports of goods and services, and the critical value of the indicator was recorded in 2015 (1, 2 months of imports) and since then their growth has been observed;

2) the highest among the EU countries, this ratio was observed in Romania (2009-2013), Croatia (2014-2015), Bulgaria (2016-2017), as well as in the Czech Republic (2018);

3) the minimum level of this indicator was in Luxembourg (within 0.02-0.05 months of import);

4) in the EU as a whole, gold and foreign exchange reserves averaged 2-3 months of imports;

5) the largest deviation of Ukraine's indicators from the EU average in the analyzed period was in 2011, and the lowest - in 2016.

**Table 4.** Gold and foreign exchange reserves of Ukraine and EU countries in 2009–2018, months of imports

Country	Year									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
1	2	3	4	5	6	7	8	9	10	11
Austria	0,77	1,03	1,20	1,11	1,30	1,15	1,19	1,27	1,25	1,06
Belgium	0,36	0,70	0,75	0,70	0,78	0,66	0,61	0,70	0,64	0,67
Bulgaria	4,77	7,42	7,10	5,59	6,68	6,02	6,10	7,61	8,46	8,71
Great Britain	0,54	0,98	1,15	1,15	1,23	1,21	1,24	1,60	1,54	1,66
Greece	0,29	0,64	0,79	0,79	1,13	0,78	0,82	1,09	1,31	1,31
Denmark	2,38	5,77	5,69	5,47	6,05	5,70	4,79	4,69	4,67	5,09
Estonia	2,32	3,78	1,98	0,12	0,17	0,17	0,23	0,27	0,22	0,20
Ireland	0,04	0,09	0,09	0,07	0,07	0,07	0,06	0,07	0,10	0,12
Spain	0,38	0,74	0,81	1,05	1,31	1,19	1,23	1,51	1,75	1,75
Italy	1,58	2,63	2,87	2,72	3,34	2,70	2,62	2,78	2,90	2,93
Cyprus	0,42	0,60	0,49	0,51	0,65	0,54	0,52	0,32	0,47	0,34

Latvia	2,95	7,25	6,44	3,95	4,45	4,49	1,83	2,29	2,35	2,68
Lithuania	2,14	3,91	2,96	2,68	2,76	2,37	2,62	0,60	0,92	1,33
Luxembourg	0,02	0,05	0,05	0,04	0,03	0,03	0,03	0,03	0,04	0,03
Malta	0,16	0,27	0,28	0,21	0,30	0,24	0,25	0,27	0,31	0,38
The Netherlands	0,37	0,64	0,67	0,65	0,75	0,61	0,53	0,53	0,51	0,53
Germany	1,00	1,65	1,77	1,64	1,88	1,44	1,38	1,43	1,49	1,48
Poland	2,91	4,97	4,87	4,37	5,11	4,82	4,22	4,55	5,29	4,54
Portugal	1,05	1,78	2,20	2,11	2,73	2,08	2,21	2,50	3,19	2,97
Romania	5,12	8,68	8,44	6,88	7,15	6,88	5,83	5,75	5,48	5,26
Slovak	2,51	0,33	0,34	0,32	0,35	0,28	0,33	0,41	0,40	0,46
Slovenia	0,27	0,43	0,40	0,31	0,34	0,32	0,34	0,32	0,26	0,28
Hungary	2,65	4,52	4,30	4,29	4,34	4,41	3,76	3,43	2,63	2,52
Finland	0,69	1,36	1,05	0,95	1,07	1,08	1,03	1,19	1,21	1,11
France	1,14	1,86	2,20	1,95	2,24	1,72	1,67	1,81	1,90	1,91
Croatia	4,17	6,51	6,56	6,05	6,73	7,91	6,52	7,37	6,40	7,29
Czech Republic	2,70	3,79	3,40	2,78	3,21	4,00	3,67	4,90	6,47	3
Sweden	1,26	2,74	2,38	2,10	2,32	2,86	2,66	2,88	2,92	2,86
EU average	1,75	2,96	2,90	2,60	2,94	2,82	2,49	2,70	2,97	3,46
Ukraine	3,65	5,20	5,43	3,70	2,66	2,26	1,17	2,87	3,22	3,26
Deviation from the average	-1,9	-2,24	-2,53	-1,1	0,28	0,56	1,3	-0,17	-0,25	0,2

Source: World Bank Group [9-10]

In general, the financial architecture of the authorities has shown sensitivity to the effects of the global financial crisis, as well as the crisis in early 2014, which covered radical changes in many aspects of society. The calculation of the overall performance of the financial architecture of the authorities of Ukraine in the period 2009-2018 is indicated in table 5.

Table 5. Evaluation of financial performance indicators architecture of the authorities of Ukraine in 2009–2018

Indicator	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
ratio of state budget deficit / surplus (profit) to GDP.	1	0,67	0,67	1	0,67	0	0	0,33	0	0,33
the ratio of public and guaranteed public debt to GDP	1	1	0,67	1	0,67	0,67	0	0	0	0,33
the level of redistribution of GDP through the consolidated budget	0,67	1	1	0,67	0,67	1	1	0,67	1	0,67
gross international reserves	0,67	1	1	0,67	0	0	0	1	1	0,33
The general indicator of efficiency of functioning of financial architecture of authorities	0,835	0,918	0,835	0,835	0,503	0,418	0,25	0,5	0,5	0,415

The next step is determination of the overall performance of the financial architecture of economic entities.

Estimation of interest rate fluctuations on loans is shown in Fig. 2. Interest rates for the analyzed period remained at a relatively stable level in the range of 15.87-21.82%. However, they reached a much higher level than the average in the EU, which ranged from 6.1 to 7.6 %.

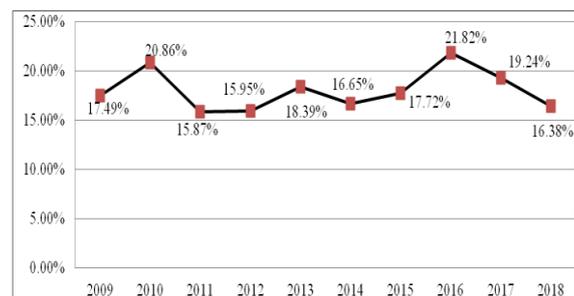


Fig. 2. Interest rates on loans/credits in Ukraine in 2009–2018. Source: World Bank Group [9-10]

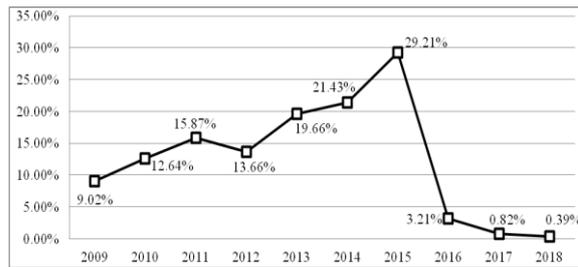
The high level of interest rates in Ukraine is associated with a high level of risk and difficult financial condition of borrowers. Also in this regard, the ratio of non-performing loans and gross total loans for the period from 2009 to 2018 has been analyzed (table 6).

The given data suggest that in Ukraine during the analyzed period there was a clear trend to increase the share of non-performing loans in total gross loans from 3.88% in 2009 to 54.54% in 2018, while among EU countries their component ranged from 2 to 6%.

Along with a bank loan, an important place in the capital increase of enterprises can be occupied by raising funds due to the issue of securities, especially stocks and bonds. One of the leverages of the efficiency of the stock market in the formation of financial resources is the level of capitalization of listed companies (the ratio of capitalization of listed companies and GDP).

A study of the relevant indicator conducted in 2009–2018 (Fig. 3) shows its increase to 29.21% in 2015 and a sharp decline after 2015: to 3.21% in 2016 and 0.39 % in 2018. Also, the value of this indicator was in the critical zone (up to 15%) in 2009–2010, 2012,

2018



Note. For 2018, the data are submitted as of April 30, 2018

Fig. 3. Capitalization ratio of listed companies with the GDP of Ukraine in 2009–2018, %

Table 6. Ratio of non-performing loans/credits and gross total loans for the period from 2009 to 2018

No	Countries	Years										
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	
1	Austria	1,90	2,25	2,83	2,71	2081	2,87	3,47	3,39	2,70	2,37	
2	Belgium	1,65	3,08	2,80	3,30	3,74	4,24	4,18	3,79	3,43	2,92	
3	Bulgaria	2,40	6,42	11,92	14,97	16,63	16,88	16,75	14,61	13,17	10,43	
4	Great Britain	1,56	3,51	3,95	3,96	3,59	3,11	1,65	1,01	0,94	0,73	
5	Greece	4,67	6,95	9,12	14,43	23,27	31,90	33,78	36,65	36,30	45,57	
6	Denmark	No data	No data	4,07	3,66	5,95	4,62	4,40	3,69	3,21	2,48	
7	Estonia	1,94	5,20	5,38	4,05	2,62	1,47	1,39	0,98	0,87	0,70	
8	Ireland	1,92	9,80	13,05	16,12	24,99	25,71	20,65	14,93	13,61	11,46	
9	Spain	2,81	4,12	4,67	6,01	7,48	9,38	8,45	6,16	5,64	4,46	
10	Italy	6,28	9,45	10,03	11,74	13,75	16,54	18,03	18,06	17,12	14,38	
11	Cyprus	3,59	4,51	5,82	9,99	18,37	38,56	44,97	47,25	48,68	40,17	
12	Latvia	2,10	14,28	15,93	14,05	8,72	6,41	4,60	4,64	6,26	5,51	
13	Lithuania	6,08	23,99	23,33	18,84	14,80	11,59	8,19	4,95	3,66	3,18	
14	Luxembourg	no data	0,67	0,25	0,38	0,15	0,21	no data	no data	0,90	0,79	
15	Malta	5,01	5,78	7,02	7,09	7,75	8,95	9,05	6,77	5,32	4,07	
16	The Netherlands	1,68	3,20	2,83	2,71	3,10	3,23	2,98	2,71	2,54	2,31	
17	Germany	2,85	3,31	3,20	3,03	2,86	2,70	2,34	1,97	1,71	1,50	
18	Poland	2,82	4,29	4,91	4,66	5,20	4,98	4,82	4,34	4,05	3,94	
19	Portugal	3,60	5,13	5,31	7,47	9,74	10,62	11,91	17,48	17,18	13,27	
20	Romania	2,75	7,89	11,85	14,33	18,24	21,87	13,94	13,51	9,62	6,41	
21	Slovak	2,49	5,29	5,84	5,61	5,22	5,14	5,35	4,87	4,44	3,70	
22	Slovenia	4,22	5,79	8,21	11,81	15,18	13,31	11,73	9,96	5,07	3,20	
23	Hungary	3,23	8,24	10,04	13,68	16,04	16,83	15,62	11,66	7,42	4,17	
24	Finland	no data	1,30	1,34	1,52	1,67						
25	France	2,82	4,02	3,76	4,29	4,29	4,50	4,16	3,98	3,64	3,08	
26	Croatia	4,87	7,66	11,09	12,27	13,76	15,43	16,71	16,33	13,61	11,20	
27	Czech Republic	2,81	4,58	5,39	5,22	5,24	5,20	5,61	5,48	4,59	3,74	
28	Sweden	0,46	0,83	0,78	0,65	0,70	0,61	1,24	1,17	1,06	1,12	
29	<b>EU average</b>	2,81	5,17	5,39	6,01	7,48	6,41	5,48	4,91	4,52	3,72	
30	<b>Ukraine</b>	3,88	13,70	15,27	14,73	16,54	12,89	18,98	28,03	30,47	54,54	
31	<b>Deviation from the average</b>	-1,07	-8,53	-9,88	-8,72	-9,06	-6,48	13,50	-23,12	-25,95	-50,82	

Source: World Bank Group [9-10]

No less important indicator of assessing the effectiveness of the financial architecture of economic entities is the return on assets. For its analysis, the ratio of net profit to the average annual value of assets on the balance sheets of enterprises (%) was calculated (Fig.

4).

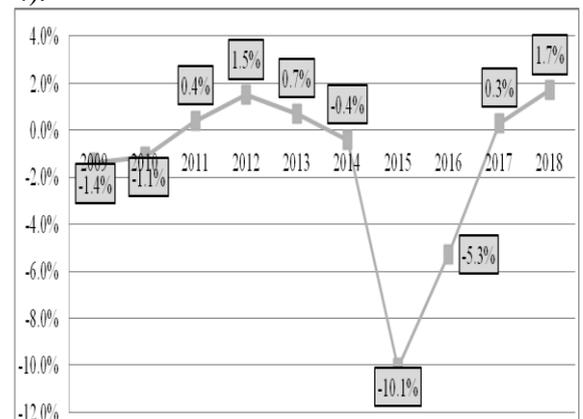


Fig. 4. Return on assets of Ukrainian enterprises in

2009–2018

Source: the State Statistics Service of Ukraine [11].

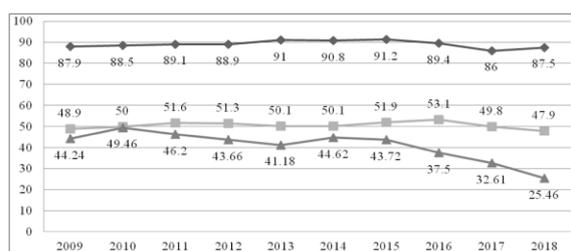
According to the data presented, it is possible to formulate a conclusion about the unsatisfactory level of use of assets of domestic enterprises in the analyzed period. Since the beginning of 2017, there has been a positive trend towards increasing the level of return on assets.

In general, the financial architecture of economic entities is insufficiently involved in terms of maximum opportunities, as evidenced by the mismatch of most of the actual values of the indicators with the recommended values, especially during the military conflict [12-14]. This is also proved by the negative dynamics of

Table 7. Evaluation of performance indicators of the financial architecture of economic entities of Ukraine in 2009–2018

Indicator	Year									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
1	2	3	4	5	6	7	8	9	10	11
The level of capitalization of listed companies, GDP percentage	0,33	0,33	1	0	1	1	1	0	0	0
Interest rate on loans	0	0	0,33	0	0	0,33	0	0	0,33	0,33
Ratio of non-performing loans to total gross loans	0,33	0	0	0,33	0	0,33	0	0	0	0
Return on assets of enterprises, percentage	0	0,33	1	1	0,67	0	0	0,33	1	1
General indicator of the effectiveness of the financial architecture of business entities	0,165	0,165	0,583	0,333	0,418	0,415	0,250	0,083	0,333	0,333

In general, the financial resources of households were not characterized by a sufficiently efficient functioning. Proof of this is the importance of the overall efficiency of the relevant part of the financial architecture (table 8).



the overall performance of the financial architecture of economic entities (table 7).

According to the calculated values of indicators for assessing the effectiveness of the financial architecture of households (Fig. 5) it can be stated that the share of monetary incomes in total household resources during the analyzed period, as well as the calculated proportion of food and non-alcoholic beverages expenditure in total household expenditure were relatively constant. However, the comparison of the average retirement pension between average nominal monthly wage showed a negative trend. All calculated indicators did not meet the recommended values.

- The share of monetary incomes in total household resources, %
- The calculated proportion of food and non-alcoholic beverages expenditure in total household resources, %
- ▲ The ratio of average retirement pension between average nominal monthly wage, %

Fig. 5. The value of indicators for assessing the effectiveness of the formation and use of financial potential of households in 2009-2018

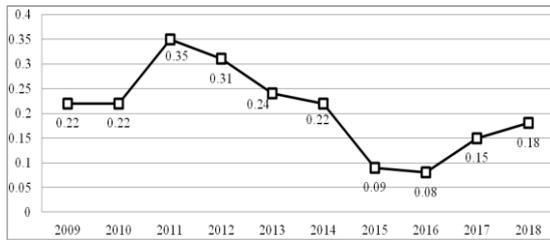
Table 8. Evaluation of performance indicators of financial architecture of households in Ukraine in 2009–2018

Indicator	Year									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Share of cash income in total household resources	0	0,33	0,33	0	0,33	0	0,33	0	0	0,33
The ratio of the average old-age pension to the average monthly nominal wage	0,33	0,33	0	0	0	0,33	0	0	0	0
Share of food and non-alcoholic beverages expenditures in total household expenditures	0,33	0	0	0,33	0,33	0	0	0	0,33	0,33
General indicator of the effectiveness of the financial architecture of households	0,22	0,22	0,11	0,11	0,22	0,11	0,11	0	0,11	0,22

Based on the values of the performance indicators of the financial architecture and

information on its composition, an integrated performance indicator of the financial

architecture of the economy of Ukraine has been calculated (fig. 6).



**Fig. 6.** An integrated indicator of the level of effectiveness of the financial architecture of the economy of Ukraine in 2009–2018

## 4 Conclusions

Thus, the applied testing of the above scientific and methodological approach made it possible to say that in 2009-2018 the effectiveness of the financial architecture of the economy of Ukraine was unsatisfactory, and in 2015-2018 - at a critical level, as evidenced by the inconsistency of key performance indicators of certain parts of financial architecture countries represented by the value. According to these data it is also possible to determine certain future directions of dynamics of indicators of efficiency of functioning of financial architecture of economy of Ukraine:

- in the future there will be a decrease in the level of efficiency of the financial architecture of government, which is associated with the persistence of inconsistency of state budget expenditures to its revenues (state budget deficit was constant at 3.3% of GDP), increase public debt and consolidated budget revenues relative to GDP, limited gold and foreign exchange reserves. This will negatively affect the rate of economic growth;
- not taking into account the increase in profitability in recent years, the reduction in the effectiveness of the financial architecture of economic entities will be the result of high interest rates on loans, a significant share of non-performing loans in total loans and falling capitalization of the national stock market;
- reduction of the average level of old-age pension compared to the average monthly nominal average wage, together with maintaining a high share of expenditures on food and non-alcoholic beverages in total household expenditures, as well as the share of cash receipts in total household resources.

## References:

- [1] Zhuo Zhang, Jia Wang, Financial Model based on Principle Component Analysis and Support Vector Machine International journal of circuits, systems and signal processing (NAUN), pp. 183-190, Volume 13, 2019.
- [2] Xia Li, Optimization of VRP for Single Distribution Center Based on Improved Saving Method International journal of circuits, systems and signal processing (NAUN), pp.213-221, Volume 13, 2019
- [3] Dennis Görlich, Katharina Lima de Miranda, Juliane Stein-Zalai. International Financial Architecture for Stability and Development, 2019. URL: [https://www.g20-insights.org/wp-content/uploads/2019/04/T20-Recommendations-Report\\_TF2-International-Financial-Architecture-for-Stability-and-Development.pdf](https://www.g20-insights.org/wp-content/uploads/2019/04/T20-Recommendations-Report_TF2-International-Financial-Architecture-for-Stability-and-Development.pdf)
- [4] Barry Eichengreen. The current crisis highlights the urgency of strengthening the global financial architecture. Finance and Development, pp. 20-24, September 2020.
- [5] On approval of Methodical recommendations for calculating the level of economic security of Ukraine. Order of the Ministry of Economic development dated October 29, 2013 No. 1277. URL: <http://www.me.gov.ua/Documents/Download?id=cf1a6236-2e54-49b5-9d46-894a4bcd481>.
- [6] Global analysis of basic macroeconomic indicators of Ukraine (2013–2018). URL: <http://publicaudit.com.ua/reports-on-audit/analiz-bazovykh-makroekonomichnykh-pokaznykiv-ukrayiny-2013-2016-rr>.
- [7] Dorrucchi, Ettore, Alexis Meyer-Cirkel and Daniel Santabarbara. Domestic Financial Development in Emerging Market Economies: Evidence and Implications. *ECB Occasional Paper* No. 102. 2009.
- [8] Steven J. Pilloff, Anthony M. Santomero. The value effects of bank mergers and acquisitions. *Financial institutions Centre*. Jul. 1997.

[9] The Financial Development Report 2012.  
Geneva, NY: World Economic Forum.

[10] Global Financial Development Report  
2017/2018: Bankers without Borders.

[11] State Statistics Service of Ukraine. URL:  
<http://www.ukrstat.gov.ua>.

[12] Halushchak I., Kuzheliev M., Melnyk V.,  
Myhovykh T., Zhytar M. Methodical Aspects of  
Evaluation of Financial Architecture of  
Economy. *WSEAS Transactions on Business  
and Economics*, Vol. 17, 2020, Art. #27, pp.  
260-268.

[13] Melnyk V.M., Bychkova N.V. Financial  
architecture of national corporations and its  
impact on the efficiency of financial activities:  
a monograph. Ternopil: Aston, 2012, 244 p.

[14] Kuzheliev M., Rekunenko I., Boldova A.,  
Zhytar M. Modeling of structural and temporal  
characteristics in the corporate securities market  
of Ukraine. *Investment Management and  
Financial Innovations*. № 2. 2019, 260-269.

### Authors' Contribution

Victor Melnyk, Maksym Zhytar proposed and  
substantiated indicators functioning of the  
financial architecture of the state economy.  
Roman Shchur, Tetianf Solodzhuk analyzed the  
finances of the authorities, compared the  
balance of the state budget with the GDP of  
Ukraine and the European Union.  
Natalia Kriuchkova analyzed evaluation of  
performance indicators of the financial  
architecture of economic entities of Ukraine.

Creative Commons Attribution License 4.0  
(Attribution 4.0 International, CC BY 4.0) This  
article is published under the terms of the  
Creative Commons Attribution License 4.0  
[https://creativecommons.org/licenses/by/4.0/de  
ed.en\\_US](https://creativecommons.org/licenses/by/4.0/deed.en_US)

### Creative Commons Attribution License 4.0 (Attribution 4.0 International, CC BY 4.0)

This article is published under the terms of the Creative  
Commons Attribution License 4.0  
[https://creativecommons.org/licenses/by/4.0/deed.en\\_US](https://creativecommons.org/licenses/by/4.0/deed.en_US)