

Tools for Assessing the Level of Adaptivity of the Financial Architecture of Economy to Financial Globalization Conditions based on the Capacity of Banks, Non-Banking Financial Institutions and Stock Market

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Abstract:- The article introduces scientific and methodical tools for assessing the level of adaptivity of the financial architecture of economy in the context of financial globalization based on the defined areas of assessment: a level of adaptivity of the financial architecture based on the capacity of banks (monetary component, resource component, value component, macroeconomic component); a level of adaptivity of the financial architecture based on the capacity of banks; a level of adaptivity of the financial architecture based on the capacity of non-banking financial institutions. It defines areas of increasing the level of adaptivity of the financial architecture of Ukrainian economy in the context of financial globalization: adoption of the balanced autonomous fund system of the public finance system; optimization of public debt management; improvement of the investment climate; updated exchange arrangement, etc.

Keywords: - Financial architecture, financial globalization, banks, financial institutions, stock market, level of adaptivity.

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1 Introduction

The financial support of economy is impossible without the functioning and developed financial architecture that, in the entirety of potential participants, can adaptively respond to emerging needs of different recipients of financial resources,

not provoke but smooth challenges of globalized breakthroughs. In this regard, the assessment of the possible potential regarding the adaptive response of the financial architecture of national economy during its passing through various stages of globalization and disbalances (different external or

internal shocks), such as crisis states, revivals, corresponding economic growth, is quite a relevant subject for scientific research [1,3,7].

2 Literature Review

Various theoretical and methodological aspects of the development of the financial architecture of economic systems are described in scientific works by Cinaj V., Meçe M., Ribaj A., Kadrimi I. Chima M., Babajide A., Omankhanlen A., Adejumo B., Buckley P., Ghauri P., Hasan I., Koetter M., Wedow M., Levine R., Merton R., Bodie Z., Myers S., Rodrik D., Subramanian A., Beck T. etc. [16-17, 19-25]. Ukrainian scientists investigating problems of the designing and functioning of the financial architecture of national economy include: Yefymenko T., Mel'nyk V., Shchur R., Kryuchkova N., Solodzhuk T., Lyutyy I., Teres Y., Matsuk Z., Luk'yanenko I., Oliskevych M., Halushchak I., Kornyyev V., Onyshko S., Payentko T., Dyachenko S., Voznyak H., Lopushnyak H., Kachula S., Perchuk O., Novosolova O., etc. [2-15,18].

3 Materials and Methods

The work applies a range of methods based on contemporary theoretical and methodological approaches, allowing ensuring the conceptual unity of this research, in particular: *system and structural analysis* – used to reveal the interrelation between assessment indicators of adaptivity of the financial architecture of national economy to financial globalization conditions; *comparative and factorial analysis* – while studying the dynamics of institutional changes during the establishment of the financial architecture of domestic economy; *economic and mathematical modeling* – during the structural interpretation of the methodical approach to the assessment of the adaptivity level of the financial architecture of economy in the context of financial globalization; *mathematical and statistical method* – while analyzing and generalizing statistical data; *graphic visualization method* – for the visibility of information, etc.

4 Results and Discussions

Currently, the issue and goal of assessing the actual development state of the financial architecture of national economy, its compliance with qualitative and quantitative characteristics of economy, spark the interest of both the scientific community and practitioners. In this case, the monetary component,

the assessment of access of corresponding economic agents engaged in different activity areas to the financing process, and the capability of financial institutions to provide such access to all available financial services are obligatory components of monitoring reports of the World Bank, IMF, ECB and central banks. Meanwhile, such methods are not usually focused on specific particularities of the development of the financial architecture of national economy in the context of globalized breakthroughs and are quite aggregated.

The assessment of the level of adaptivity of the financial architecture of economy to financial globalization conditions are based on the following aspects:

1) Definition of adaptivity primarily as the resulting property for the efficient adaptation of the financial architecture to current social and economic challenges and as the buffer stock regarding the adaptive response that requires the two-dimensional evaluation of adaptivity, i.e., the shift from ex-post and ex-ante positions. The ex-post assessment evaluates the result for the adaptation or the manifestation of this adaptivity without determining how it is actually gained, i.e., due to a low level of the negative impact or the formed stock of a strength level before this impact, or the need for adaptation. Taking into account the level of adaptivity of the financial architecture of economy to financial globalization conditions, it is reasonable to use such ex-post adaptivity indicators that show the market dynamics in the context of financial globalization: duration, shifting, asymmetry, speed of recovering the structural and functional capacity of the financial architecture (efficiency, stability and access to the capital). Thus, the ex-ante adaptivity assessment analyzes corresponding adaptive possibilities or a certain reserve potential without considering the potential negative impact of the event or the rate of the demand for this adaptation.

2) Due to the fact that globalized transformations are accompanied by the diversified approach to the actualization of financial architecture development issues, performing appropriate functions, to conduct the ex-post adaptivity assessment, one is going to use the following priorities to define indicators: indicators of the financial.

3) Architecture stability are used at the stage of the financial and economic crisis; indicators of the market size, the level of access to required financial resources, its viability are used at the revival stage; indicators of the efficient interaction

between the financial architecture and businesses of national economy, volumes or depth of the financial architecture are used at the boom stage (Fig. 1);

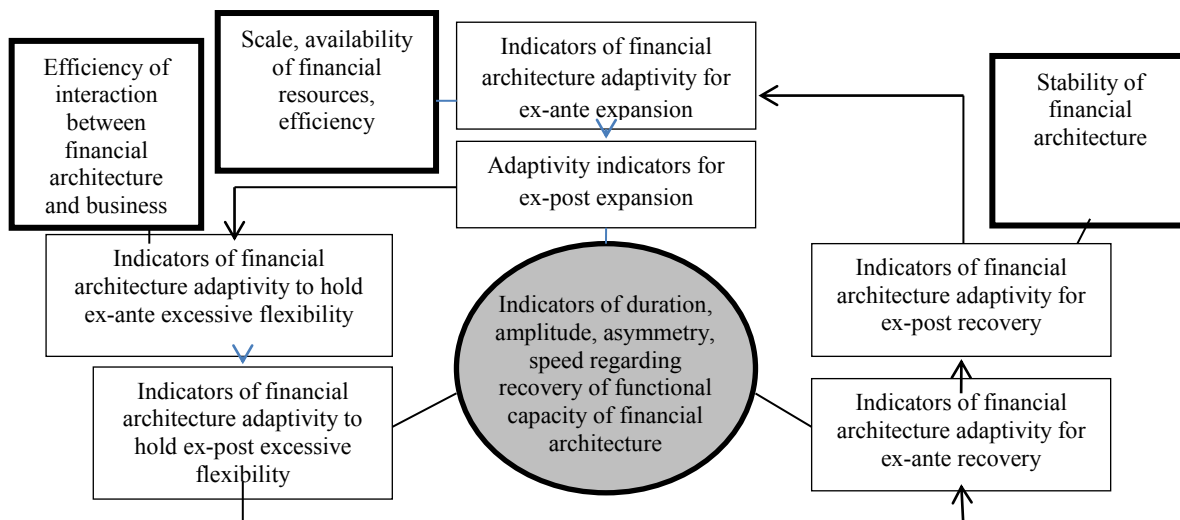


Fig. 1: Interrelation between assessment indicators of adaptivity of the financial architecture of national economy to financial globalization conditions*

*Source: designed by the author

4) to conduct the integrated assessment of adaptivity of the financial architecture, one should use composite indicators that have become popular in current conditions among corresponding national and supernational financial institutions of the state. To carry out the standardization of the given initial indicators, let's calculate maximum and minimum values and their variability, taking into account indicators of different countries. Thus, at the stage of the economic boom accompanied by the credit expansion, we can see the indicator of the asymmetry for the crediting dynamics in regard to GDP with the given value of more than two (provided that the growth rate of credits of more than twice in regard to GDP at the boom stage exceeds the growth rate of this indicator at the stage of credit recession);

5) keeping the cumulateness of globalization processes, namely the direct impact of the state of national economy and financial architecture on the depth and amplitude of the next stages of financial and economic globalization, makes it relevant to take into account adaptivity of the financial architecture ex-post for previous stages at the level of this adaptivity of the next ones ex-ante.

The level of adaptivity of the financial architecture of national economy is calculated using the following formula:

$$G_{lex-ante} = \frac{\sum_{i=1}^n g'_{li} + G_{(l-1)ex-post}}{n+1}, \quad (1)$$

where $G_{lex-ante}$ is the level of adaptivity of the financial architecture of national economy at a certain stage of globalization l as the stock regarding the adaptive response (ex-ante);

g'_{li} is a standardized indicator i of adaptivity; $G_{(l-1)ex-post}$ is the level of adaptivity of the financial architecture of national economy at the previous stage of financial globalization $(l - 1)$ as an important resulting characteristic of the efficient adaptation of the financial architecture to financial globalization conditions;

n is the total amount of the given adaptivity indicators at a certain stage of globalization.

Carrying out the standardization of adaptivity indicators for those whose increase results in the growth of adaptivity:

$$g'_{li} = \frac{g_{li} - \min \bar{g}_{li}}{\max \bar{g}_{li} - \min \bar{g}_{li}}, \quad (2)$$

$\min \bar{g}_{li}$ is an average weighted minimum value of indicator i according to the given list of countries;

$max\bar{g}_{li}$ is an average weighted maximum value of indicator i according to the given list of countries.

Carrying out the standardization of adaptivity indicators for those whose increase results in the decrease in the level of adaptivity:

$$g'_{li} = \frac{g_{li} - max\bar{g}_{li}}{min\bar{g}_{li} - max\bar{g}_{li}} \quad (3)$$

At the first stage of the comprehensive assessment of adaptivity adequate to the corresponding response of the financial architecture to conditions for meeting the financial globalization requirements in terms of the support and recovery of business activities by the financial architecture of national economy, one evaluates the level of adaptivity to the direct expansion of the structural and functional capacity of the financial architecture ex-ante. To design an efficient methodology, let's apply the logic of taking a methodical approach for the Bank for International Settlements (BIS) to determine the level for global liquidity that is defined as a kind of simplicity for financing national economy in the contemporary global space [1-3]. The methodical approach implies that liquidity of the financial architecture is not just a representation of central banks' actions but also an object affected by the business sector from the perspective of its prompt perception by a corresponding participant in the potential risk. This aspect plays a crucial role in proving negative impacts of the financial globalization process and crisis manifestations on the globalized financial architecture [3-5].

During the implementation of BIS approach, the defined global liquidity is divided into two subtypes: official or public one based on the principles of monetary operations at the central bank level and private one that is a well-considered result for operations conducted by different state institutions and for the financial architecture in its narrower sense. Well, the given integrated indicators for defining global liquidity include: stock and resource liquidity, monetary and market liquidity, and potential perception of risks by different market players defined by volume and value indicators.

Integrating the logic of BIS approach implementation, let's focus on the fact that the conducted assessment of the stock of adaptivity to potential expansion of the resource and organizational capacity of the financial architecture of national economy will be based not only on the evaluation of its liquidity indicators but also on indicators of the development level of the

corresponding expansion potential, fulfilling the needs of national economy in long-term resources at the stage of exiting the recession process and gradual recovery of the level of business activities [6-8].

The conducted assessment of the level of adaptivity of the financial architecture of national economy to financial globalization conditions ex-ante is defined by carrying out the consecutive calculation of corresponding levels of adaptivity of financial architecture institutions (G_{RB} and G_{RN} – banking and non-banking financial institutions) and the financial architecture (G_{RF}) in a broader sense:

$$G_{Rex-ante} = \gamma_{RB}G_{RB} + \gamma_{RN}G_{RN} + \gamma_{RF}G_{RF}, \quad (4)$$

where γ_{RB} , γ_{RN} , γ_{RF} are relative shares of assets of banks, various non-banking financial institutions and the trading volume on the domestic stock market to the total sum of such indicators.

So, the assessment of adaptivity of the financial architecture of national economy based on the current capacity of banks to the process of their expansion of corresponding offers of longstanding credit resources (G_{RB}) is interpreted by its efficient monetary, value, resource and macroeconomic components (Fig. 2).

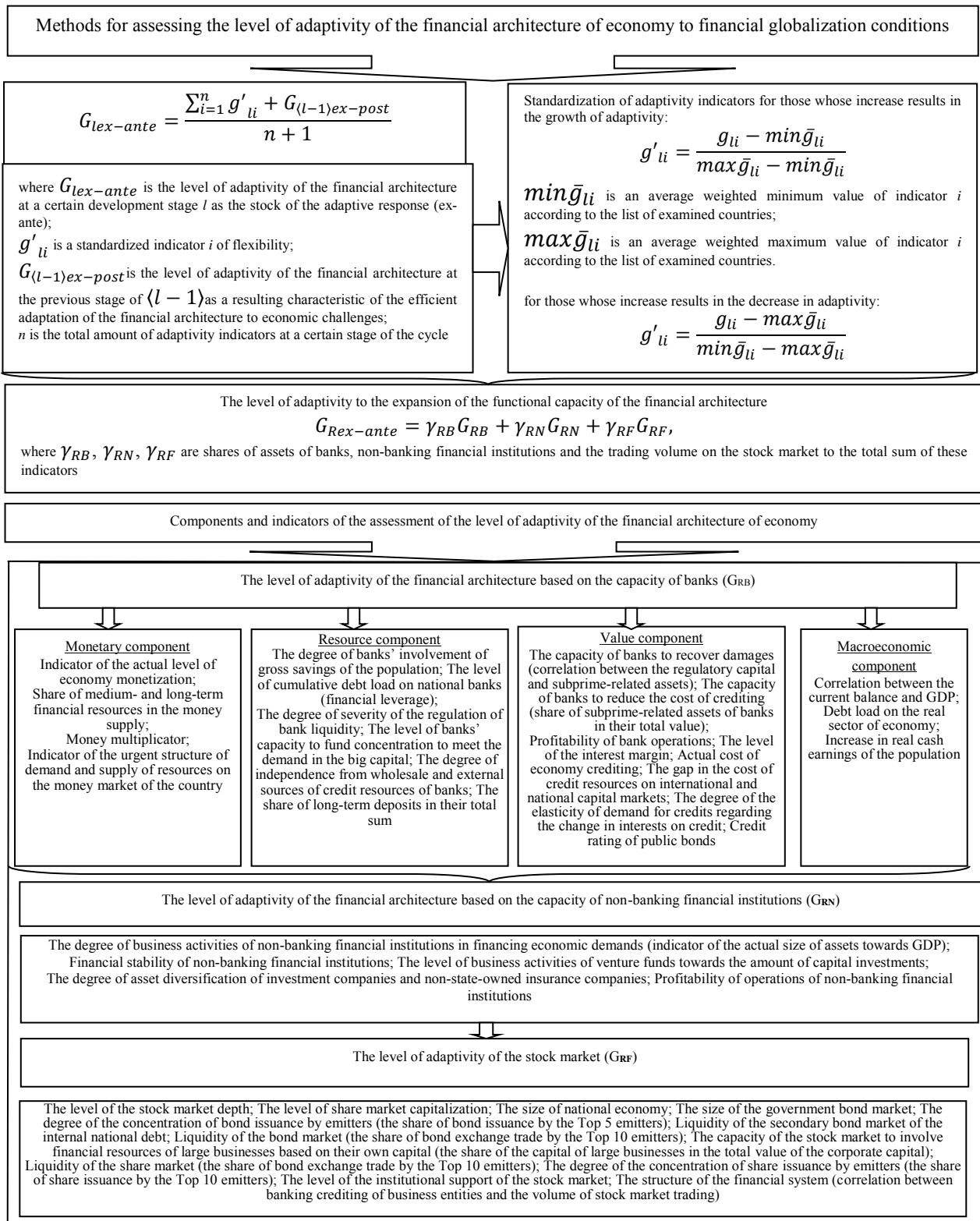


Fig. 2: Structural interpretation of the methodical approach to the assessment of the level of adaptivity of the financial architecture of economy in the context of financial globalization (designed by the authors)

Therefore, obtained monetary conditions for establishing offers of the activation of money supply flows in the financial architecture are initial. So, the response of the financial architecture to the needs of national economy for required financial resources will be quite adaptive, i.e., the higher the given initial indicator for the actual level of national economy monetization (g_{RBM1}), relative shares of medium- and long-term financial resources in the money supply (g_{RBM2}), a corresponding money multiplier (g_{RBM3}), urgency of the structure of demand and supply of resources on the corresponding money market (g_{RBM4}), the increase in money supply according to the defined aggregate M2 (g_{RBM5}).

It is viable to carry out the assessment of adaptivity of the financial architecture of national economy to financial globalization conditions *ex-post* as a clearly resulting characteristic of the efficient adaptation of the financial architecture to current social and economic challenges, which is based on principles of assessing the dynamics of a range of indicators characterizing the process of recovery and the corresponding gradual expansion of the level of the financial support of national economy – the size of the financial architecture in its broader sense and the viability of its interaction with businesses.

To show properties that will be the foundation for the assessment of adaptivity *ex-post*, let's use the asymmetry of the duration of the growth in comparison with the decline of the value of a corresponding indicator in the context of rapid financial globalization; the amplitude asymmetry regarding the increase towards the decline and the stability of the obtained position:

$$G_{\text{Rex-post}} = \frac{(\sum_{i=1}^n 0,4AS_{TRi} + 0,4AS_{ARi} + 0,2ST_i)/n}{AS_{TRi} = \frac{T_{Di}}{T_{Ri}}, \quad AS_{ARi} = A_{Ri}/A_{Di}, \quad ST_i = \frac{\overline{F_{Ri}}}{F_{mini}}}$$

where AS_{TRi} is the corresponding asymmetry of the duration of the growth of indicator i ;

AS_{ACi} is the volume of the amplitude asymmetry for the increase towards the decline in indicator i ;

ST_i is the stability of the defined position with indicator i ;

T_{Di} is the timeframe of the decrease in indicator i from the period of its maximum (the best) value to a corresponding moment of the worst value within a certain period;

T_{Ri} is the timeframe of reaching the maximum value of indicator i from the period of its

maximum decline to the highest level within a certain period;

A_{Di} are changes in the decrease in indicator i ; A_{Ri} are changes in the total recovery of the certain level of indicator i and taking into account its maximum level gained after the decline;

$\overline{F_{Ri}}$ is an average value of indicator i in the defined period after its decrease;

F_{mini} is the worst value of the indicator within the corresponding period.

The results of the conducted assessment are provided in Table 1. Following the results of the conducted assessment, we can confirm the inability to carry out the adequate, appropriate adaptation of the financial architecture of national economy to financial globalization conditions, which is proved by *ex-ante* adaptivity obtained during the analysis, i.e., the average value of adaptivity as the result of the adaption within the examined period of 2014–2020 was 0.97. Thus, the failure of the given indicators to gain their positive values or trends, the average value of the change in the decline duration towards the recovery process resulted in the value lower than one – 0.65, i.e., the recovery of properties of the financial architecture of national economy was 35 % longer than their decline. The change in the growth amplitude towards the decline in indicators is also lower than one – 0.92. The given indicators implying the partial recovery or the significant expansion of the structural and functional capacity of the financial architecture of national economy include the indicator of country's monetization, a relative share of crediting for the manufacturing industry to corresponding volumes of crediting, a share of long-term crediting of businesses in the total sum of their crediting, trends in the issuance of shares by corresponding non-financial corporations. Therefore, it is reasonable to define the inability to promptly and efficiently recover the viability of the functioning of the financial architecture of national economy: the definition of the correlation between GDP and granted credits to businesses was just 35% from the previous value, hence the similar level of the recovery due to the given indicator of ensuring required credit resources for investments, the rate of recovering the amount of trading on the contemporary stock market, a particular level of capitalization towards GDP, was quite slow as well. So, the obtained integrated value of adaptivity of the financial architecture of national economy to financial globalization conditions *ex-ante* is a slightly decreasing trend primarily because of the weak and undeveloped stock market in Ukraine.

The weakness and insufficient level of establishing and fulfilling the potential of the financial architecture allows us to ground the hypothesis about certain regularities of obtained trends for further substantial decline of its structural and functional capacity since 2014.

It is also reasonable to assess adaptivity of the financial architecture *ex-post* as a particular resulting characteristic of the prompt adaptation of the financial architecture of national economy to financial globalization conditions by evaluating the dynamics of a range of indicators characterizing the recovery of its necessary stability [9-11].

Thus, such an approach to the assessment of adaptivity for the gradual recovery of financial stability is based on the well-known idea of C. Reinhart and K. Rogoff. They offered to present the complexity of the recovery of national economies after banking crises by calculating a corresponding index calculated as a particular addition to the amplitude of the decline in indicators of the economic growth and duration of its crisis recovery to the process of reaching a required level recorded in the corresponding peak period [12-16]. So, we should note the difference in the examined approach: conducting the assessment of adaptivity, it is important to take into account not only the duration of this crisis but also its correlation with the period of recovery, changes in the amplitude for recovery with the amplitude of destabilization. At the same time, the viability of including the loss of the required level of stability for the whole examined period (taking into account lower indicators in terms of the level of their decline) provides a significant basis for the integration of the duration of certain crisis phenomena within the examined period into the aggregated index of adaptivity. The indicator of adaptivity is calculated as follows:

$$G = (\sum_{i=1}^n 0,5AS_{TCi} + 0,5AS_{ACi} + (1 - TT_i))/n \quad (7)$$

$$AS_{TCi} = T_{Ci}/T_{Vi}, \quad AS_{ACi} = A_{Ci}/A_{Vi},$$

$$A_{Ci} = 1 - F_{tCi}/F_{tPi},$$

$$A_{Vi} = F_{tVi}/F_{tPi}$$

where AS_{TCi} is the level of the asymmetry towards the duration of the recovery proves to crisis phenomena;

AS_{ACi} is the asymmetry of recovery changes to crisis phenomena;

TT_i are timeframes of crisis phenomena for the analyzed period (Fig. 3);

T_{Ci} is the duration of the decline in indicator i from its best value $-t_{pi}$ to the period of maximum destabilization $-t_{ci}$ – the duration of the decline in indicator i from the time of its maximum destabilization $-t_{ci}$ and to the moment of its practical achievement of the best level $-t_{vi}$;

A_{Ci} is the amplitude to the decrease in indicator i ;

A_{Vi} is the amplitude for the full recovery of the defined level of indicator i , taking into account its maximum level in point t_{vi} ;

F_{tCi} is the value of indicator i in the point of maximum destabilization;

F_{tPi} is indicator i in the point of its maximum positive level;

F_{tVi} is indicator i in the point of its best level;
 n is the number of indicators.

Table 1. Indicators of adaptivity of the financial architecture of national economy to financial globalization conditions as a resulting characteristic of its development (ex-post) [1, 3, 7, 17-18]

Indicators	Average value of increase for the period	Duration of decline, years	Duration of recovery, years	Amplitude of decline	Amplitude of expansion	Asymmetry of expansion duration	Asymmetry of expansion towards decline	Steadiness of position	Flexibility to expansion of financial support
GDP monetization	0.56	4	2	0.023	0.098	2	4.24	1.05	2.71
Gross value added to credits for the real sector	1.13	3	4	0.70	0.24	0.75	0.34	1.16	0.67
Dynamics of enterprise crediting	1.11	1	4	0.66	0.11	0.25	0.16	1.06	0.38
Credits for the real sector to investments	0.24	1	4	0.66	0.23	0.25	0.34	1.93	0.62
Long-term credits for the real sector to investments	0.08	1	4	0.43	0.03	0.25	0.08	1.29	0.39
The share of manufacturing crediting in the total sum of crediting of the real sector	0.27	1	1	0.01	0.03	1	3.28	1.02	1.92
The share of long-term crediting of the real sector in the total sum of credited granted to it	0.55	1	4	0.01	0.02	0.25	1.07	0.96	0.72
The share of small business crediting in credits for the real sector	0.05	1	4	0.02	0	0.25	0.00	0.71	0.24
Increase in deposits	1.20	2	4	0.55	0.30	0.5	0.55	1.22	0.66
Bond issue to the value of investments in the real sector of economy	0.12	3	2	0.13	0.13	1.5	0.99	0.46	1.09
Dynamics of bond trading volumes	1.18	3	4	1.76	1.10	0.75	0.62	3.00	1.15
Dynamics of share trading volumes		5	5	0.33	0	1	0.00	0.00	0.40
Dynamics of the share issue by non-financial corporations	0.08	3	3	0.53	0.73	1	1.37	2.06	1.36
Correlation between capitalization and GDP	0.15	1	5	0.69	0.10	0.2	0.15	1.68	0.48
Share issue to the value of investments	0.17	1	2	0.64	0.25	0.5	0.39	6.16	1.59
Average values	0.55	2.07	3.47	0.48	0.22	0.70	0.91	1.58	0.96

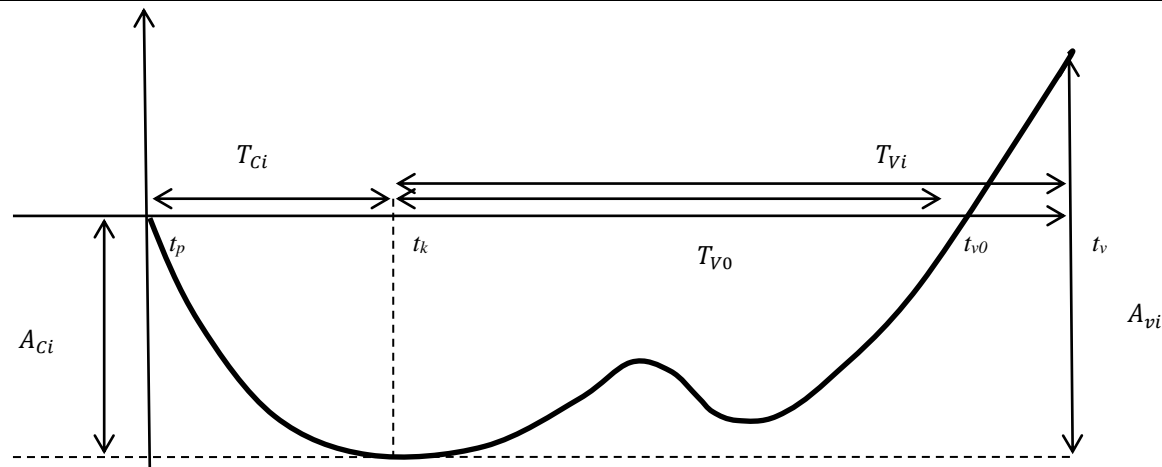


Fig. 3: Parameters of the recovery of the financial architecture state in case of crisis. Source: designed by the author

5 Conclusions

The conducted analysis of the recovery of the development indicator of the financial architecture of national economy for the examined period allows concluding the following:

- an average level of the asymmetry regarding the duration of the corresponding decline in the level of indicators or the loss of its stability to its gradual recovery was 0.58. It means that the recovery of the viability of the financial architecture is gained almost twice longer than their rapid decline;

- the amplitude of the recovery to globalization conditions was 5.35. Initially, a positive role belonged to the increase in deposits, almost twice, and the growth of national economy crediting. Meanwhile, one failed to gain the profitability of banking operations and medium-term liquidity;

- generally, the decline in indicators was also noticed within the whole period, almost more than 2 years. The longstanding destabilization also occurred in terms of defined indicators of capital imports, bank profitability, remaining balance and the share of unprofitable banks.

Based on the conducted assessment of the level of adaptivity of the financial architecture of economy in the context of financial globalization, the article reveals a range of urgent crucial issues: expansion of the financial potential of national economy; establishment of the mechanism for self-development and self-organization of components of country's financial architecture.

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