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Prymostka L.

*Doctor of Economics, Professor,
Head of the Department of Banking and Insurance,
Kyiv National Economic University named after Vadym Hetman, Ukraine;
e-mail: priml@ukr.net; ORCID ID: 0000-0001-5490-2112*

Krasnova I.

*Doctor of Economics, Associate Professor,
Professor of the Department of Banking and Insurance,
Kyiv National Economic University named after Vadym Hetman, Ukraine;
e-mail: iryna_krasnova@i.ua; ORCID ID: 0000-0002-4507-6629*

Prymostka O.

*Doctor of Economics, Professor,
Professor of the Department of International Management,
Kyiv National Economic University named after Vadym Hetman, Ukraine;
e-mail: hprimostka@gmail.com; ORCID ID: 0000-0002-5887-7951*

Biloshapka V.

*Ph. D. in Economics, Associate Professor,
Professor of the Department of Banking and Insurance,
Kyiv National Economic University named after Vadym Hetman, Ukraine;
e-mail: biloshapka.viktoriiia@kneu.edu.ua; ORCID ID: 0000-0002-0398-4418*

Lavreniuk A.

*Ph. D. student,
Department of Banking and Insurance,
Kyiv National Economic University named after Vadym Hetman, Ukraine;
e-mail: maksimeyko@gmail.com; ORCID ID: 0000-0002-0256-3136*

INTEGRATED EVALUATION OF FINANCIAL INCLUSION IN UKRAINE

Abstract. Low level of financial literacy and coverage of the population with banking services is one of the urgent problems of Ukrainian society. Methodical approaches to a comprehensive integrated assessment of the level of financial inclusion are proposed. The key components of financial inclusion (FI) have been identified, which include: welfare, awareness, accessibility, involvement and usage. Their economic meaning, logical sequence and interconnectedness are revealed. An algorithm for evaluation is proposed, which includes successive stages: substantiation of FI components; selection of analytical indicators for each component; calculation of sub-indexes of components and their normalization; weighing sub-indexes based on professional judgments; calculation of the resulting indicator — the integrated index of financial inclusion (IFI). For each component of financial inclusion, a primary set of analytical indicators-indicators is formed, which are divided into stimulators and disincentives. For all components, their standardized value and significance factor are calculated. A «thermal» mapping of the dynamics of sub-indexes by components for 2000—2019 was carried out. It was found that the intensification of the development of non-cash payments and digital banking services contributed to the growth of the component of usage, and the reduction in the number of banking institutions led to a decrease in the level of availability of banking services. A comprehensive economic and statistical assessment of the level of financial inclusion in Ukraine has been carried out. Integral IFI is calculated as the geometric mean of individual sub-indexes. A composite map of financial inclusion of the population of Ukraine is constructed. The map clearly shows the low indicators of the basic components of financial inclusion — well-being and awareness. The directions of improvement of the methodology by expanding the list of analytical indicators are substantiated. The main problems and destructive factors that reduce the level of financial inclusion in the country are highlighted. It is substantiated that the method of assessing the level of financial inclusion is necessary for monitoring and preventive identification of possible problems.

Keywords: financial inclusion, components of financial inclusion, accessibility, involvement, usage, analytical indicators, indices of financial inclusion, map of financial inclusion, integrated indicator of financial inclusion.

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Примостка Л. О.

доктор економічних наук, професор,
завідувач кафедри банківської справи та страхування,
Київський національний економічний університет імені Вадима Гетьмана, Україна;
e-mail: priml@ukr.net; ORCID ID: 0000-0001-5490-2112

Краснова І. В.

доктор економічних наук, доцент,
професор кафедри банківської справи та страхування,
Київський національний економічний університет імені Вадима Гетьмана, Україна;
e-mail: iryna_krasnova@i.ua; ORCID ID: 0000-0002-4507-6629

Примостка О. О.

доктор економічних наук, професор,
професор кафедри міжнародного менеджменту,
Київський національний економічний університет імені Вадима Гетьмана, Україна;
e-mail: hprimostka@gmail.com; ORCID ID: 0000-0002-5887-7951

Білошапка В. С.

кандидат економічних наук, доцент,
професор кафедри банківської справи та страхування,
Київський національний економічний університет імені Вадима Гетьмана, Україна;
e-mail: biloshapka.viktoriiia@kneu.edu.ua; ORCID ID: 0000-0002-0398-4418

Лавренюк А. В.

здобувач ступеня доктор філософії (Ph. D.),
кафедра банківської справи та страхування,
Київський національний економічний університет імені Вадима Гетьмана, Україна;
e-mail: maksimeyko@gmail.com; ORCID ID: 0000-0002-0256-3136

ІНТЕГРАЛЬНЕ ОЦІНЮВАННЯ ФІНАНСОВОЇ ІНКЛЮЗИВНОСТІ В УКРАЇНІ

Анотація. Низький рівень фінансової грамотності та охопленості населення банківськими послугами є однією з актуальних проблем українського суспільства. Запропоновано методичні підходи до комплексної інтегральної оцінки рівня фінансової інклюзивності. Виявлено ключові складові фінансової інклюзивності (ФІ), до яких віднесено: добробут, обізнаність, доступність, залученість і використання. Розкрито їхній економічний зміст, логічну послідовність і взаємопов'язаність. Для оцінювання запропоновано алгоритм, який включає послідовні етапи: обґрунтування складових ФІ; вибір аналітичних індикаторів-показників за кожною складовою; розрахунок субіндексів складових та їхня нормалізація; зважування субіндексів на основі професійних суджень; обчислення результуючого показника — інтегрального індекса фінансової інклюзії (ІФІ). Для кожної складової фінансової інклюзивності сформовано первинну сукупність аналітичних індикаторів-показників, які поділено на стимулятори і дестимулятори. Для всіх складових розраховано їх стандартизоване значення і коефіцієнт значущості. Проведено «тепловий» мепінг динаміки субіндексів за складовими за 2000—2019 рр. Виявлено, що активізація розвитку безготівкових розрахунків і цифрових банківських послуг сприяла зростанню складової використання, а скорочення кількості банківських установ зумовило зниження рівня доступності банківських послуг. Здійснено комплексну економіко-статистичну оцінку рівня фінансової інклюзивності в Україні. Інтегральний ІФІ розраховано як середнє геометричне значення індивідуальних субіндексів. Побудовано композитну карту фінансової інклюзії

населення України. Карта наочно демонструє низькі показники базових складових фінансової інклюзії — добробуту та обізнаності. Обґрунтовано напрями вдосконалення методики за рахунок розширення переліку аналітичних індикаторів-показників. Виокремлено основні проблеми й деструктивні чинники, які знижують рівень фінансової інклюзивності у країні. Обґрунтовано, що методика оцінювання рівня фінансової інклюзії необхідна для моніторингу та превентивної ідентифікації можливих проблем.

Ключові слова: фінансова інклюзія, складові фінансової інклюзивності, доступність, залученість, використання, аналітичні показники, індекси фінансової інклюзії, карта фінансової інклюзивності, інтегральний показник фінансової інклюзивності.

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Introduction. Financial inclusion is a multifaceted, multidimensional and complex phenomenon, which includes various factors from psychological, socio-cultural, geographical, economic, financial to political. The problem of financial inclusion has a social orientation, when part of the population through «financial isolation» is deprived of opportunities for self-development and ensuring a proper quality of life. The constant interest in the problem of financial inclusion is evidenced by the desire of scientists and society to find exactly the levers of influence on it and choose an algorithm that would balance interests between the needs of consumers of financial services and the potential of the financial market. Conceptual principles and analytical approaches to determining the level of financial inclusion, finding methods for its quantification remains one of the most difficult tasks. Assessing the degree of financial inclusion is important for monitoring and preventive identification of possible problems. The indicators used to calculate the level of financial inclusion should be chosen taking into consideration the peculiarities of the country, including the availability and reliability of input data. Interpretation of the resulting indicators should be simple and accessible. This determines the urgency of finding an effective methodological tool for assessing and monitoring financial inclusion, proper identification of possible problems.

Research analysis and problem statement. Scientists call the phenomenon of «financial inclusion / inclusion» an «incomplete agenda» and emphasize its importance and relevance (Beck and Demirguc-Kunt, 2008). The problem of financial inclusion is due to the fact that the financial system in general, and the banking system in particular, tends to discriminate against poor and disadvantaged groups (Leyshon & Thrift, 1995). Therefore, the issue of «financial exclusion» or «financial isolation» was first studied in 1995 (Leyshon & Thrift, 1995). The first studies of financial inclusion were focused on savings and loans (Beck & Torre, 2007; Qian & Strahan, 2007; Honohan and King, 2009). Subsequently, to get an idea of the level and state of financial inclusion, was proposed an approach where the level of coverage of banking services was determined from the standpoint of demographic and geographical penetration of banks, as well as information on credit and deposit accounts (Beck, Demirguc-Kunt, & Martinez Peria, 2007). Later, Sarma (2008) offered an index of financial inclusion to provide an aggregate representation of using measures for banking coverage and financial services extension. Other researchers include in this index such dimensions as lightness and cost (Arora, 2010; Gupte, Venkataramani, & Gupta, 2012). However, a single approach to measuring financial inclusion that can be applied in different countries has not yet been developed. The main problem that still remained is the lack or limitation of data about the using of basic financial services by households and firms (Beck, Demirguc-Kunt, & Honohan, 2009, Sarma & Pais, 2011). Another reason is that constant modifications aimed at finding a comprehensive indicator of financial inclusion (Claessens, 2006). However, the research on developing a universal approach to determining financial inclusion indicators is in progress (Ben Naceur, Barajas & Massara, 2015).

Now there is no recognized methodological approach to assessing the condition of financial inclusion at the state level in Ukraine, so it is difficult objectively to determine the level of coverage of the population with financial services in the country as a whole and in the banking sector in particular. Identifying the determinants of financial inclusion / isolation and developing a

methodology for its comprehensive assessment will help to find ways to increase the level and management of financial inclusion of the population to the responsible use of financial services. The article proposes the components of financial inclusion, a set of analytical indicators for its measurement and a map of financial inclusion.

The purpose of the article is to identify determinants and develop methodological principles for assessing and monitoring the level of financial inclusion of the population of Ukraine.

Research results. Financial inclusion is a process that provides retail consumers with convenient access, acceptable conditions and responsible use of basic financial services, which allows all members of society, regardless of income, to lead a normal social life and helps to overcome poverty.

The discussions on measuring financial inclusion consist of two main aspects: (1) magnitude and indicators, and (2) calculation of index. Study of the definitions of financial inclusion proposed in the economic literature has shown that its common elements are «affordability», «population inclusion» in «basic financial services» at «affordable prices». (L. O. Prymostka, et al., 2020) These components define a set of indicators and determinants for assessing financial inclusion (Fig. 1).

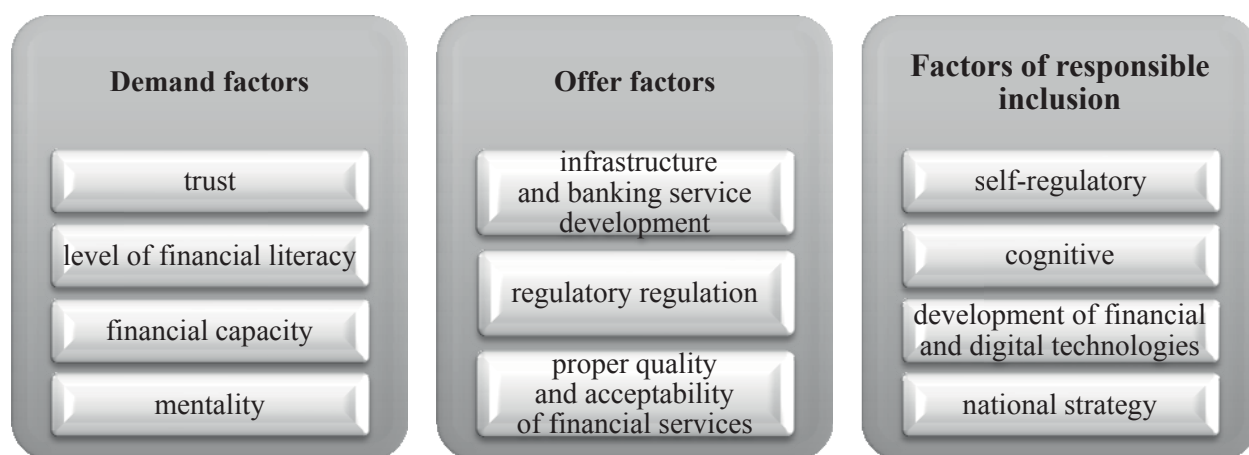


Fig. 1. **Determinants of financial inclusion**

Source: compiled by the authors.

The documents of the European Commission (2008) state that restrictions on access and / or use of financial services are caused by: first, the features of the offered products / services and conditions of their provision (supply factors), and secondly, the condition and financial capacity of the user (factors demand). These two groups of factors are complemented by a group of factors of responsible inclusion. Responsible inclusion means coordinated public and private sector policies, a national strategy that stimulates and promotes understanding and development of approaches, practices and behaviors to create transparent, inclusive and equitable conditions for access to financial services for all groups of consumers with different income levels. Among the factors of «financial isolation» we additionally highlight: unfavorable risk assessment; unacceptable conditions for using banking services; unacceptable prices; exclusion of certain groups of the population from the target market of sales of banking services; self-exclusion; lack of discretionary income to save for the future.

Based on world experience and domestic practice, given the availability of relevant information for analysis and given the availability of databases, the authors developed a comprehensive methodology for assessing the level of financial inclusion, based on integrated analysis of its components and calculation of the resulting indicator — integrated index of financial inclusion (IFI). The proposed method of calculating the index of financial inclusion uses statistical methods for constructing indices and integrated indicators, which are adjusted to take into account the peculiarities of the financial system of Ukraine. The level of financial inclusion in Ukraine was

assessed using the World Bank's Global Findex database, the Financial Accessibility Alliance and the National Bank of Ukraine. The methodology for assessing the level of financial inclusion in the country based on the calculation of IFI includes successive stages (Fig. 2).

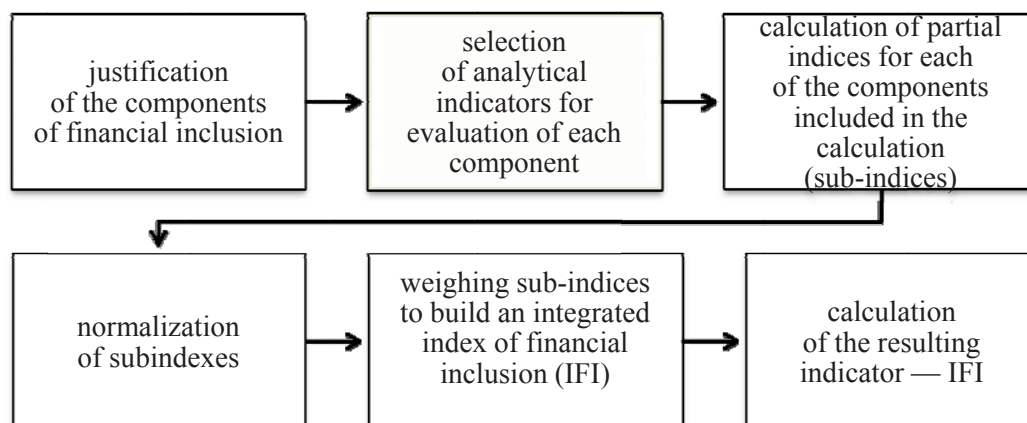


Fig. 2. Stages of the calculation of IFI

Source: compiled by the authors.

According to the results of the study (L. O. Prymostka, et al., 2020), a set of components that most significantly determine the content of financial inclusion, and therefore are its components, is theoretically substantiated. There are five components: well-being, awareness, accessibility, involvement / penetration, and use. The study of each component showed that together they can be considered as successive stages of development and implementation of financial inclusion in the country. Based on theoretical and practical generalizations, as well as taking into account the availability of databases to assess each component, a set of analytical indicators that best characterize it is substantiated (Table 1).

Table 1

Analytical indicators of financial inclusion by components

Welfare Index	Awareness Index	Availability Index	Attraction / Penetration Index	Usage Index
Income (UAH million)	Unemployed (thousands)	Number of ATMs	Interest rates on loans	Deposits / income
Expenses (UAH million)	Expenditures on education, %	Number of payment card holders (thousand people)	Interest rates on deposits	Loans / income
Salary (UAH million)	Expenditures on high education, %	Number of structural subdivisions of banks	Term deposits	Loans / deposits
Inflation Index	Savings before retirement age for the last 12 months	Number of operating banks	Deposits on demand	Deposits / per capita
GDP / Population	Sources of emergency funds, %	Number of terminals	Depositors of commercial banks (per 1,000 adults)	Cashless payments
Gini index	Fee for mobile services, %	Number of banks per 100,000 people	Saving in financial institutions, %	Receiving cash
The number of poor at \$ 5.5. USA per day, %	-	Branch of commercial banks (per 100,000 adults)	Receipt of salary on the account, %	Number of active payment cards (thousands)

Source: compiled by the authors.

Since the index for each component is an indicator of the first level, we further call them sub-indexes. Each sub-index is calculated as the geometric mean of the values of the selected analytical indicators, normalized on the basis of the method of minimax normalization of the range. Depending on the nature of the effect on the object of study, analytical parameters were defined as a

stimulant or disincentive. A stimulant is an indicator that increases the condition of a subject. Accordingly, the disincentive is an indicator that causes a deterioration in the evaluation of the object of study. Each analytical indicator is normalized using the formulas:

a) for indicators-stimulants:

$$z_{il} = \frac{x_{il} - x_{\min l}}{x_{\max l} - x_{\min l}}, \tag{1}$$

where x_{il} — the actual value of the l -th separate indicator of the i -th component of financial inclusion;

$x_{\min l}$ i $x_{\max l}$ — respectively, the minimum and maximum value of the l -th separate indicator of the i -th component of financial inclusion;

b) for indicators-disincentives:

$$z_{il} = \frac{x_{\max l} - x_{il}}{x_{\max l} - x_{\min l}}. \tag{2}$$

According to the results of the normalization process we obtain values from zero to one. The closer the value is to 1, the higher the level of financial inclusion at the time of the study.

Banking performance indicators were used for the study, as we agree that it is the banking institutions that provide a better environment for promoting financial inclusion (Beck and Levin, 2002; Mehrotra, Puhazhendhi, Nair, & Sahoo, 2009). Each component of financial inclusion in the dynamics for the period 2000-2019 is analyzed. (Table 2). Annual time series have been used to calculate the indexes for 46 individual indicators since 2000. If no metric data is available, the last available value is used.

Table 2

Dynamics of index’s components of financial inclusion in Ukraine

Date	Sub-index welfare	Sub-index awareness	Sub-index accessibility	Sub-index involvement	Sub-index usage
2000	33,7%	39,0%	33,9%	38,2%	21,0%
2001	14,2%	42,8%	35,1%	38,4%	20,6%
2002	8,5%	45,8%	35,9%	38,8%	21,1%
2003	7,8%	34,3%	39,8%	28,4%	29,8%
2004	10,0%	40,6%	48,5%	27,1%	20,4%
2005	17,7%	51,3%	50,7%	31,0%	22,4%
2006	20,2%	51,0%	55,0%	32,5%	21,0%
2007	22,1%	47,7%	62,3%	37,7%	22,3%
2008	26,7%	52,0%	72,6%	44,4%	25,3%
2009	32,0%	51,1%	75,5%	47,2%	34,4%
2010	39,5%	53,1%	71,1%	53,7%	37,9%
2011	41,4%	49,0%	68,4%	45,8%	44,4%
2012	47,2%	53,8%	62,7%	39,1%	47,1%
2013	47,9%	56,2%	73,2%	46,6%	52,1%
2014	38,0%	56,1%	70,9%	57,5%	51,3%
2015	33,1%	48,3%	54,5%	58,4%	56,3%
2016	40,1%	47,5%	46,9%	53,1%	63,0%
2017	47,0%	52,7%	46,9%	49,3%	70,6%
2018	51,5%	54,7%	44,0%	59,6%	74,2%
2019	51,2%	50,7%	48,1%	60,0%	75,6%

Source: compiled by the authors according to the source [19; 20].

We give a brief analysis of each index and build a composite map of financial inclusion on the set of calculated indexes. The revival of the welfare index is growing nominally under the influence of rising nominal income, wages, which indirectly reduced the number of poor people. We observe a negative impact of rising costs and, consequently, a reduction in household savings,

which indicate the impoverishment of the population. Savings are needed to ensure security (material and psychological), acting as a protective net against unforeseen events, as well as to provide a cushion for your own budget during financial constraints and shocks. Thus, we note the low basis of financial inclusion. The awareness sub-index indicates a lack of capacity for ordinary citizens to understand and perceive the range of financial services offered on the market and their promotion channels, especially in the context of digital transformation and digitalization. The dynamics of the availability sub-index is due to institutional and structural changes (reduction in the number of banking institutions), functional weakness and uneven distribution of market shares of banks, which slows down the development of the banking system and creates a certain level of distrust in banking institutions. The low level of competition in the banking sector of Ukraine does not create market incentives for intensive development of banks, cost optimization and improving the quality of banking services. As a result, we observe unstable dynamics of the sub-index of involvement, which, as it was found, is most influenced by interest rates, storage volumes in financial institutions and attracted deposits. Priority for the consumer of financial services is the presence of an account for income and payments, ie current account. The dynamics of the sub-index actually embodies the previous components, taking into account the financial conditions of banking services. The sub-index of use demonstrates the positive dynamics of recent years, primarily due to the intensification of non-cash payments and innovative banking products and services. Domestic banks are not interested in forming a flexible and efficient system of interaction as close as possible to medium and small clients.

A comprehensive approach to assessing the level of financial inclusiveness of the population of Ukraine is implemented by building a composite map, which in the dynamics presents the integral values of the components of financial inclusion — well-being, awareness, accessibility, involvement, use (Fig. 3). This map clearly interprets the dynamics of the level of financial inclusion in Ukraine for 2000, 2014, 2019.

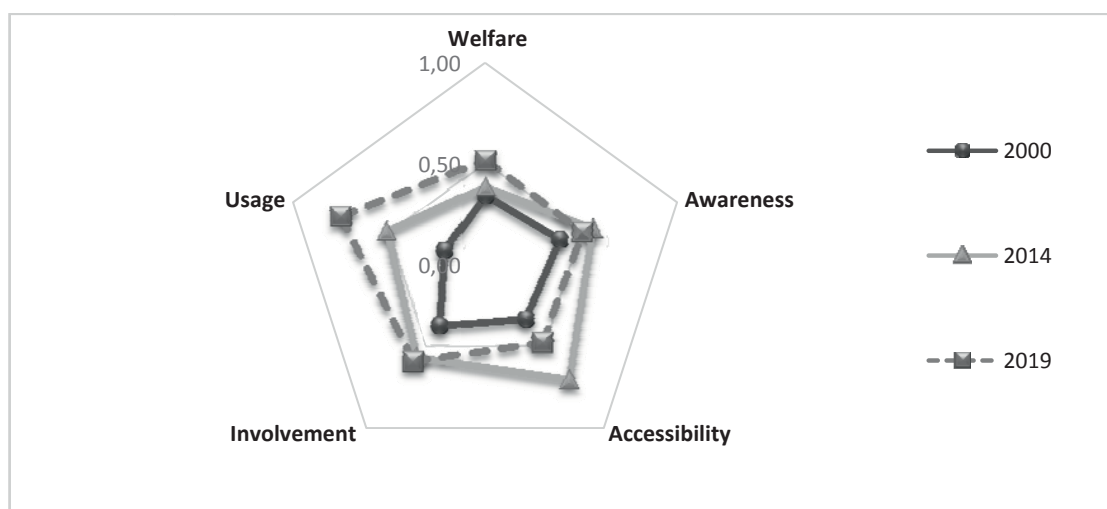


Fig. 3. Composite map of financial inclusion of the population of Ukraine

Source: compiled by the authors.

A clear analysis of the dynamics of the components of financial inclusion shows that without addressing the basic principles of financial inclusion — welfare and financial literacy — it is difficult to say about the overall growth of financial inclusion in the country. Yes, the population will have salary accounts in banks, but will immediately withdraw cash from these accounts and keep money outside the financial system. As incomes rise, people will spend more and save less, which is a universally recognized indicator of poverty. Thus, introducing high technology and innovative banking products in the era of the fourth technological revolution, we should not forget that they will be used in the vast majority of ordinary consumers of retail financial services. And the real level of financial inclusion, as a manifestation of the integration of the population and the financial system, largely depends on the quality of their life and awareness.

A multiplicative model was used to calculate the integrated index of financial inclusion (IFI). To level the possibility of the prevalence of one component of financial inclusion over another aggregate integrated indicator is calculated as the geometric mean of the sub-indices by the formula:

$$IFI = \sqrt[5]{CI_{welfare} \cdot CI_{awareness} \cdot CI_{accessibility} \cdot CI_{involvement} \cdot CI_{usage}}, \quad (3)$$

where IFI — integrated index of financial inclusion; $CI_{welfare}$, $CI_{awareness}$, $CI_{accessibility}$, $CI_{involvement}$, CI_{usage} — sub-indexes of the particular part of financial.

Since the components of financial inclusion, which are represented by sub-indices, are equivalent to society, each sub-index is assigned a weight of 20%. To interpret the IFI results, we use a compliance scale developed based on Fibonacci law and taking into account world experience (Sarma, 2008; Prathap, 2011). According to Fibonacci law, changes occur at the level of 38.2% and 61.8%.

The value of the difference between the maximum and minimum points: in this case $1 - 0 = 1$. As a result of the calculations, the values of the scale ranges were obtained 0—0,382; 0,382—0,618; 0,618—1:

1) $0 \leq IFI \leq 0,382$ — *low level of financial inclusion* — this is a «vulnerable» part of the population that deliberately does not use the bank's services for various reasons: very low income, security considerations, low level of financial literacy, etc.;

2) $0,382 < IFI \leq 0,618$ — *middle level of financial inclusion* — part of the population that moderately uses traditional banking services of a limited range, including deposit, settlement, payment, but does not actively use innovative banking products, such as remote services, Monobank, etc. This is a category of middle-income clients who may have small savings (deposit), do not actively use the services for security reasons, lack of awareness, mental views, etc.;

3) $0,618 < IFI \leq 1$ — *high level of financial inclusion* — economic entities have access to and actively use almost the full range of transactional banking services, which meets their needs and socio-economic status.

According to the results of analytical calculations, the dynamics of the level of financial inclusion for Ukraine since 2000 is presented (Fig. 4).

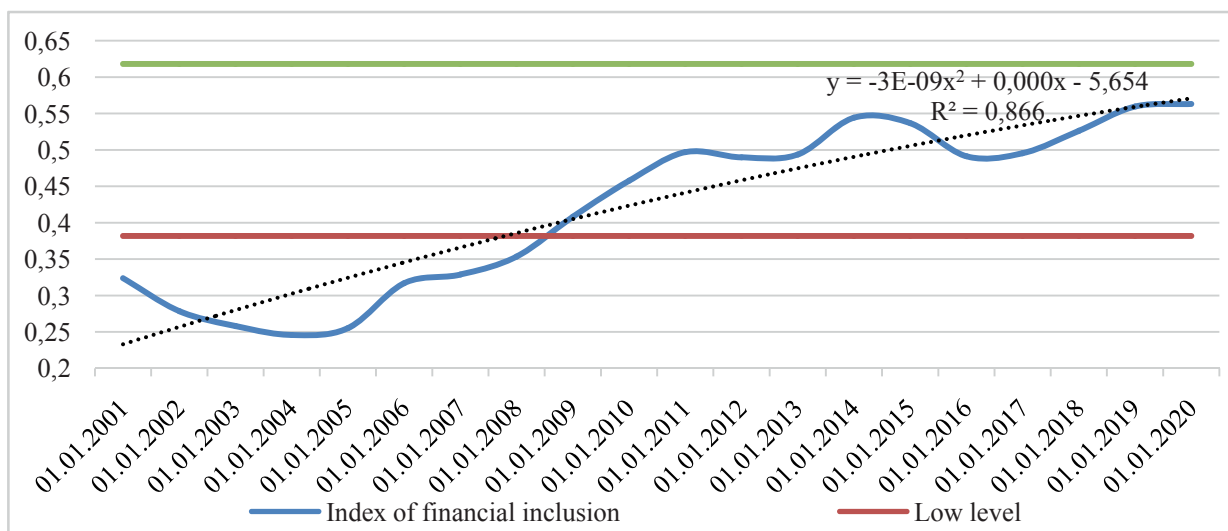


Fig. 4. Integrated index of financial inclusion in Ukraine

Source: compiled by the authors.

The presence of the integrated index of financial inclusion in the corridor of fluctuations «average level of financial inclusion» indicates that this process is still in the bifurcation phase, in which a change in the trajectory of development is possible, and there is no clearly defined upward trend.

Conclusions. The coverage of the widest possible sections of the population, rural people, middle-income and low-income people, the elderly and people with disabilities is an integral part of the stability and sustainable economic development of each country. A high level of financial inclusion has a social orientation, stimulates competition between banks, helps to overcome poverty, improves living standards and socializes economic growth. The method of complex assessment of the level of financial inclusion proposed in the work allows to build an integrated indicator that includes all the main components. This approach can be used to:

- assessing the level of financial inclusion;
- determining the depth and duration of periods of recession associated with financial inclusion;
- identifying the nature of shocks for financial inclusion and the channels of their transmission to the financial system or its individual components;
- assistance in choosing adequate monetary policy instruments in the decision-making process of the financial market regulator (regulators);
- identifying the level of public confidence in the financial system and the effectiveness of anti-crisis measures;
- trend building and forecasting financial inclusion in Ukraine.

The calculated values of the integrated index allow us to monitor the dynamics of the level of financial inclusion in the country and can be used as a tool to reform the financial market in order to reduce poverty and ensure economic growth. Thus, a decrease in the value of the integrated index may be the basis for additional monitoring of each component of financial inclusion. First of all, it concerns the downward dynamics of such a component as the welfare of the population. Based on the establishment of the fact of reducing the level of financial inclusion (or at a low level) it is possible to prevent the strengthening of the negative factors and take measures to minimize the potential negative impact on the economy.

The COVID crisis has made adjustments to the processes of increasing the level of financial inclusiveness of the population of Ukraine. On the one hand, the growth rate of individual FI sub-indices decreased significantly due to the reduction of lending volumes. On the other hand, the crisis has given impetus to the rapid development of remote banking and non-cash payments. It is important that these positive changes are not situational, but become the basis for the implementation of the state strategy for the development of financial inclusion.

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