

Н.В. ТРУСОВА*

(Таврійський державний агротехнологічний університет, м. Мелітополь, Україна)

Структура сукупного фінансового потенціалу сільського господарства: регіональний аспект

Метою статті є формування архітектури сукупного фінансового потенціалу сільського господарства та обґрунтування прогнозних ресурсних параметрів фінансової безпеки регіонів агрокліматичних зон Степу України. Визначено складові сукупного фінансового потенціалу сільського господарства на регіональному рівні, які здатні за певних властивостей його об'єктів, виконувати дії з мобілізації реальних та прихованих можливостей фінансових ресурсів в обмеженому часовому періоді. Застосовано методіку індуктивного системного аналізу та імітаційного моделювання для визначення впливу системних факторів сукупного фінансового потенціалу сільського господарства на формування узагальненого інтегрального показника його рівня в регіонах агрокліматичної зони Степу України. Розроблено прогнозну імітаційну модель стабільного рівня фінансового потенціалу регіону, яка дозволяє за чистим доходом та чистим прибутком забезпечити ефективність використання фінансових ресурсів сільськогосподарських підприємств. Запропонована модель є адекватною, її статистична значущість і достовірність достатні для використання у прогнозуванні рівня фінансового потенціалу регіону. Реалізація моделі забезпечує резервування обсягу власних фінансових ресурсів, підвищує прибутковість діяльності суб'єктів господарювання, формує зовнішні і внутрішні стимули розвитку сільського господарства на регіональному рівні.

Ключові слова: фінансові ресурси, фінансовий потенціал, фінансове забезпечення, банківське кредитування, сільське господарство.

Н.В. ТРУСОВА

(Таврический государственный агротехнологический университет, г. Мелитополь, Украина)

Структура совокупного финансового потенциала сельского хозяйства: региональный аспект

Целью статьи является формирование архитектуры совокупного финансового потенциала сельского хозяйства и обоснование прогнозных ресурсных параметров финансовой безопасности регионов агроклиматических зон Степи Украины. Определены составляющие совокупного финансового потенциала сельского хозяйства на региональном уровне, которые способны с определенными свойствами его объектов, выполнять действия по мобилизации реальных и скрытых возможностей финансовых ресурсов в ограниченном временном периоде. Применена методика индуктивного системного анализа и имитационного моделирования для определения влияния системных факторов совокупного финансового потенциала сельского хозяйства на формирование обобщенного интегрального показателя его уровня в регионах агроклиматической зоны Степи Украины. Разработана прогнозная имитационная модель стабильного уровня финансового потенциала региона, которая позволяет по чистому доходу и чистой прибыли обеспечить эффективность использования финансовых ресурсов сельскохозяйственных предприятий. Предложена модель является адекватной, ее статистическая значимость и достоверность достаточны для применения в прогнозировании уровня финансового потенциала региона. Реализация модели обеспечивает резервирование объема собственных финансовых ресурсов, повышает прибыльность деятельности субъектов хозяйствования, формирует внешние и внутренние стимулы развития сельского хозяйства на региональном уровне.

Ключевые слова: финансовые ресурсы, финансовый потенциал, финансовое обеспечение, банковское кредитование, сельское хозяйство.

* Трусова Наталя Вікторівна, завідувач кафедри «Облік і оподаткування» Таврійського державного агротехнологічного університету (м. Мелітополь), доктор економічних наук, доцент.

Structure of the Total Financial Potential of Agriculture: Regional Aspect

The purpose of the article is to form the architectural structure of the total financial potential of agriculture and to substantiate the predictive resource parameters of financial security of the regions of the agro-climatic zones of the Steppe of Ukraine. The components of the aggregate financial potential of agriculture at the regional level are determined, which are capable by certain properties of its objects, to perform actions to mobilize the real and hidden possibilities of financial resources in a limited time period. The method of inductive system analysis and simulation modeling was used to determine the influence of system factors of the aggregate financial potential of agriculture on the formation of generalized integrated index of its level in the regions of the agroclimatic zone of the Steppe of Ukraine. A predictive simulation model of a stable level of financial potential of the region is developed that allows for net income and net profit to ensure the efficient use of financial resources of agricultural enterprises. The proposed model is adequate, its statistical significance and reliability are sufficient for use in forecasting the level of financial potential of the region. Realization of the model provides reserve of the volume of own financial resources, increases profitability of business entities, forms external and internal incentives for agricultural development at the regional level.

Keywords: financial resources, financial potential, financial security, bank crediting, agriculture.

Introduction. Changing the economic conditions of agriculture is the factor of changing the functions of financial instruments so that it can monitor the implementation cycle of financial potential, control the movement of each of its elements on the initial phase – the accumulation and formation, and on the final phase – distribution and use, and accordingly influence these processes, establish rational limits of raising funds and create the necessary reserves.

Important factor for the formation of architectonics of total financial potential of agriculture is its component capable in certain characteristics or properties of its objects to take action to mobilize real and hidden possibilities of financial resources in a limited period. Ensuring a functional system of interrelated elements to effectively mobilize financial resources and distribute them in areas of agricultural enterprises in the conditions of possible dynamic changes in external and internal environment allows realizing the financial potential of agriculture and directing a significant share of financial resources in the cycle of financial investment chain of the region. The feasibility of this solution of the problems is caused by the vector reorientation of agriculture of Ukraine in the direction of creating a favorable financial and credit support to agricultural producers by the necessary financial resources, financial stability and innovative development of the national economy.

Literature Review. The development of the directions of improving the structure of financial potential of business entities and agriculture, in particular, is the subject of many studies by both domestic and foreign scientists. Thus, among foreign scientists, whose works were devoted to development of theoretical and methodological principles of formation of financial potential, it should be noted R. McGrath & I. Macmillan (McGrath, Macmillan, 1995) [1], Carl J. Lagerkvist (Lagerkvist, 2005) [2], H. Chesbrough (Chesbrough, 2009) [3], J. Gaspar, P. Vasconcelos & O. Alonzo (Gaspar, Vasconcelos, Alonzo, 2013) [4], L. Joe (Joe,

2014) [5] and others. The methodological basis of financial and economic systems, their nature, structure, principles for the formation of financial potential from the position of predictions of possible financial status of the state and industries is represented in the works by domestic scientists: N. Demyanenko [6], V. Kornyejev [7], M. Laktionov [8], G. Prosvyvetov [9]; forecasting the financial market condition and activities of financial institutions is examined in the works by N. Kostina [10], O. Nepochatenko [11], L. Vdovenko [12]. However, there are still many questions that are controversial in nature; in particular, there is no single methodological position to determine the resource settings of financial security in the total financial potential of agriculture at regional level.

The aim of the study is the formation of architectonics of the total financial potential of agriculture and development of predictive resource parameters of financial security of the regions of agro-climatic zones of Steppe of Ukrainian.

Results. The importance of formation of architectonics of financial potential of agriculture in Ukraine is due to the need to reduce the resonance effect between the internal crisis processes in the country and the effects of financial globalization. The driving force of this process is, above all, sustainable financial relationship with the transformation of financial and credit support of the farms in regions. This is due to the fact that this financial system is the most significant regulatory component of economic infrastructure in general. However, the special role of financial relationships is growing in a market economy because the existence of many forms of ownership, free competition is not possible without concentration, redistribution of financial resources, effective use, and protection of sources of financing the agricultural enterprises.

Exploring the features of financial and credit support for the purpose of summarizing the financial relations in agriculture, most researchers somehow touch the issues

of attracting financial resources by agricultural enterprises. This is because, firstly, external factors are not influenced by the individual enterprise that is they are unmanageable. And, secondly, the results of activity and financial condition of the enterprise are directly dependent on the behavior of the state in the field of economy, financial institutions, consumers who are outside, but ensure the flow of financial resources [11].

Prominent scientists [13, p. 45-46] believe that the financial and credit system software of enterprises is the factor that affects the organization and the results of their financial activities. Depending on the nature of the possible control of the company in their structure there are two types of factors – of direct and indirect effects. The first type it is the factors, which can be influenced through communication links. The second type of factors has individual characteristics in relation to a particular company. In particular, this is state support and state regulation of financial activity [14, p. 10-14]. A combination of the factors, the direction of action in financial relations is dynamically changing and at different stages of business operation, their impact is manifested in different ways. Thus, external financial factors are of fundamental importance for enterprises and have the greatest impact on effective economic conditions in the situation of the existing production competition [15, p. 15-16].

The financial system of Ukraine allows more detailed presentation of the changes in the external financial environment and of the nature of the processes that they reflect. For example, in the framework of “civilization” process the changing in the financial infrastructure is the essence of modern external financial environment in the world [16, p. 41-52, 60-82]. Another process of changing the financial system is associated with changes in financial and credit support, characterized by the following sequence of their display:

First, any non-cyclic change in the financial and credit support can be seen as a break in habitual patterns of expanded reproduction [17, p. 6, 15];

Second, the pace and level of expanded reproduction leads to the transformation of financial resources. Since in the structure of reproduction the «effects of locking / unlocking» act, the financial market is not able to provide more or less clear price signals regarding the creditworthiness of agricultural enterprises, which essentially leads to inefficient redistribution of financial resources [18, p. 27];

Third, disorientation of financial markets continues until there will be new institutions that can overcome the arisen changes in the structure of sources of financing the agricultural enterprises. This condition determines the process of changing the structure of financial and credit support in Ukraine [19, p. 33].

Among the main factors that contribute to the emergence of non-cyclic fracture of financial and credit support to agriculture are: restructuring of budget funding in an interbranch redistribution of financial resources, the emergence of new forms of financial relationships, a fundamental change in the legal framework and legal environment, changes in ownership structure, changing of

technological type of farm enterprises, strategic changes in the areas of integration, diversification, specialization, management and so on [19, p. 178]. In other words, during the change of financial and credit support the agricultural sector can be considered as the process of formation of architectonics of the total financial potential of agriculture, which we believe is appropriate to disclose in the context of economic development of agricultural enterprises. This is due to the fact that a certain type of financing the agricultural enterprises is caused by a change in the objective function of producers when the output gap is independent of the movement of income and expenses. Along with this, there is a consensus on the definition of the main directions of financial and credit support of agricultural enterprises somehow connected with the external financial environment, the stabilization of the financial system, which solves the problem of providing agricultural credit; gradual abolition of existing restrictions on pricing policies; expansion of economic activity of agricultural enterprises, lifting the restrictions on financial activities; restructuring the production [20, p. 137].

We suggest that the terms of financing the economic activities are defined by the parameters of the total potential return (added value), which takes the form of the current period net income (profit) and meets the threshold levels of financial capability. Net income is measured proportion of gross income that remains after the deduction from the gross domestic product of material costs and wages and shows the level of business activity. Much of the net income is realized in the form of profit. However, net income is the largest newly created value (main sources of financial resources), that is the part of the net income, formed by additional product and, therefore, revenue and net income is single-valued for determining the total financial potential of agriculture.

Sectoral and regional aspects of efficient activity of farms have a significant influence on the formation of architectonics of the total financial potential. This effect was studied in dynamics during 2009-2015 years, based on its close relationship with the processes of financial security of agro-climatic regions of Ukrainian steppe zone. Dynamic analysis was carried out based on the fact that the macroeconomic and global developments differently affected the financial stability of agricultural enterprises. The sample included internal relationships of 2,276 farms located in Zaporizhia, Kherson and Mykolaiv regions that specialize in crop production. While the study found that changes in the price of financial market conditions and other factors lead to a breach rhythm of raising funds in the operating cycle and synchronization of payments, which in turn reduces the income (profit) of entities and impairs the ability of financial resources to meet the needs of the latter.

The study found that during 2009-2015 years agriculture of agro-climatic regions in the steppe zone of Ukraine is secured by their own financial resources of 71.6 %, net income is 52.7 %. Financing regional industry by borrowing funds with short-term action is formed within 15.2 %, long-term – within 84.8 %. The distribution of state subsidies for the industry direction is formed as a percentage of the volume of crop production

and livestock as 70:30. Due to the accumulation of funds VAT, the support of agricultural producers under the special taxation regime increased in 3.2 times in 2009-2015 years.

The subject of our study has the following characteristic feature - sufficient information about the object of study can be absent in such calculations. Therefore, to solve this task we propose the method of inductive system analysis that forms the incoming information basis for advanced modeling procedures. According to this method, we do not need a set of numbers on affiliation of research objects to certain groups - inductive algorithm automatically performs the work and it significantly increases the objectivity of the results. In addition, regions of agro-climatic zones can be modeled independently to periods of observations, which are available for the most accurate and complete information. The modelling procedure allows describing the criteria for integrated financial and crediting support for each module and determining the optimum size of the total financial potential of agriculture at the regional level in numerical form. We note that the modules are

components of interrelated elements between entities. This allows you to identify and enhance the effect of financing, which is an effective tool for improving business activity, avoiding risks of separate entities and of the regions in particular. In addition, the module includes facilities with financial indicators approximate to the average values of these parameters defined within a particular module.

For the phased procedure of modeling the optimal value of total financial potential of agro-climatic regions of the steppe zone of Ukraine we selected the following factors: financial resources, net income as the main source of financing; long-term loans (borrowed funds for development) short-term loans (borrowed funds for replenishment of working capital) and government financial support (as a necessary element of the structure of financing the agricultural enterprises). The results of modeling under average data for the specified factors for the period of 2009-2015 years show that the total financial potential of agro-climatic regions of the Steppe zone of Ukraine, which entered into 6 modules decreased almost 2 times (Tab. 1).

Table 1

Characteristics of modular sections (regions) of agro-climatic zones of Steppe of Ukrainian under average data for 2009-2015 years, bln. UAH

Indicators	Module					
	1	2	3	4	5	6
Financial resources	1.94	3.35	2.41	1.38	2.26	0.910
Net income	1.43	4.07	3.64	2.49	3.29	2.18
Long-term bank credit	2.73	4.67	4.05	2.74	3.12	1.76
Short-term bank credit	0.360	1.04	0.276	0.325	0.331	0.396
State support	0.175	0.354	0.282	0.206	0.098	0.205
The overall indicator of the total financial potential	3.66	7.13	5.97	3.97	5.08	2.98

Source: author's own calculations.

The overall indicators for modular profiles 1 and 4 differ compared with the value of units 2-3 and 5-6. Kherson, Mykolaiv and Zaporizhia region entered module 2, which, compared to other regions are characterized by better conditions of financial and credit support, including state financial support and lending regime.

Further research was connected with substitution of net income to net revenue (performs functional role of its own sources of funding), which reflects a more objective data on farm financial conditions. With regard to this change, the interaction of factors illustrate the data, which can be seen in modeling the results of the total financial potential of agriculture in regional terms, the larger the absolute value of impact factors, the higher level of integral index over the study period.

Simulation of agro-climatic regions of Steppe zone of Ukrainian in terms of business activity of agricultural enterprises enables to define a standard module of stable level of financial potential as interdependent modular profiles in length of the vector of integral index, calculated as follows [21]:

$$IFP = \sqrt{\sum_{i=1}^n X_i^2}, \quad (1)$$

where x_i – factors (financial indicators) of length of integral indicator, $i = 1, \dots, n$ – modular profiles (of regions) of financial potential (in this case $n = 6$).

It is worth noting that in some cases the length of the integral index of uniformity in the supervision vectors can have meaningful interpretation. For example, with the set n of modular elements, matrix of inter elements

balance $\{S_{ij}\}_{n \times n}$ is used, where S_{ij} – annual funding from i-source to j-region; thus it is commonly accepted the following [21]:

$$r_{ij} = \frac{\sum_{j \in J} S_{ij}}{\sum_{i \in I} S_{ij}} + \frac{S_{ji}}{\sum_{i \in I} S_{ji}}, \quad (2)$$

The proposed methodological approach of forecasting simulation of stable financial potential of agriculture at the regional level as a “standard” financial stability of farms enables a hierarchical process of simulation, which

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determines the relative value of the aggregate element module and the matrix of distances between them. The reference module of stable level of financial potential is defined as interdependent modular profiles in length of the vector of integral index. After determination of impact of each factor (the largest, the smallest) on the formation of integral index of the financial potential of agriculture in the regional context, a reference module

(index of effective performance of financial resources) is chosen, the value of which is optimal.

Calculation of efficiency of financial resources from the position of components of the financial potential of agro-climatic regions of Steppe zone of Ukrainian showed that Module 3 is acceptable (reference) which indicators compared with the module 6 are the highest (Tab. 2).

Table 2

Selection of the module reference in terms of financial potential of agro-climatic zone of Steppe in 2016, bln. UAH

Indicator	Module					
	1	2	3	4	5	6
Efficiency of use of financial resources (f_{fr})	0.401	0.477	0.976	0.589	0.608	0.688
Efficiency of long-term bank credits (f_{lbc})	0.392	0.335	0.548	0.989	0.524	0.898
Efficiency of short-term bank credits (f_{sbc})	0.277	0.297	0.327	0.227	0.350	0.286
Efficiency of state financial support (f_{sfs})	1.55	1.07	2.78	1.79	0.977	1.82
Overall integral indicator of financial potential	0.402	0.410	0.866	0.555	0.513	0.705

Source: author's own calculations.

According to the methodological approach, proposed simulation model of sustainable financial potential of the region for modules 1, 2, 4, 5 and 6, which is presented as a functional relationship:

$$I_{TFP} = f(x_1; x_2; x_3; x_4), \quad (3)$$

where I_{TFP} – the output variable (generalizing integral indicator of financial potential); x_1, x_n – input variables

(efficient use of financial resources, the effectiveness of long-term bank loans, the effectiveness of short-term bank loans, the effectiveness of state financial support).

Further modeling of financial potential involves determining the proportion of input variables of modules 1, 2, 4, 5 and 6 in accordance with the component value of overall indicator of Module 3 (Tab. 3).

Table 3

The current proportion of input variables of modules 1, 2, 4, 5 and 6, according to the component value of output variable of module 3, %

Indicator	Module					
	1	2	3	4	5	6
Efficiency of use of financial resources (x_1)	8.67	10.29	21.08	12.71	13.14	14.87
Efficiency of long-term bank credits (x_2)	8.46	7.24	11.84	21.37	11.33	19.39
Efficiency of short-term bank credits (x_3)	5.98	6.42	7.07	4.89	7.57	6.17
Efficiency of state support (x_4)	33.51	23.10	60.01	38.67	21.12	39.37

Source: author's own calculations.

The results of the input variable x_1 (efficient use of financial resources) of module 1 is 8.67 %; x_2 (efficiency of long-term bank loans) – 8.46 %; x_3 (efficiency of short-term bank loans) – 5.98 %; x_4 (efficiency of state financial support) is 33.51 %. This proportion of variable output of module 1 corresponds only to 56.62 % to input variables of module 3 (standard). Achieving the desired (reference) level of financial potential implies a need to increase the proportion of input variables relative to output variable of module 1, i.e. the formation of variable output of module 1 to the reference level is represented as follows:

I_{TFP} output variable of module 1 = I_{TFP} output variable of module 3 (standard) with increases in input variables

to: x_1 @ 12.41% \uparrow
 x_2 @ 3.38% \uparrow , will improve the level of financial
 x_3 @ 1.09% \uparrow
 x_4 @ 26.50% \uparrow

potential of agriculture at regional level and will be a reference of 0.866 bln. UAH. Increasing the proportion of

input variables of module 2 to: x_1 @ 10.79% \uparrow
 x_2 @ 4.60% \uparrow , input
 x_3 @ 0.65% \uparrow
 x_4 @ 36.91% \uparrow

variables of module 4 to: x_1 @ 8.37% \uparrow
 x_2 @ 9.53% \uparrow , input
 x_3 @ 2.18% \uparrow
 x_4 @ 21.34% \uparrow

variables of module 5 to: x_1 @ 7.94% \uparrow
 x_2 @ 0.51% \uparrow , input
 x_3 @ 0.50% \uparrow
 x_4 @ 38.89% \uparrow

variables of module 6 to: x_1 @ 6.21% \uparrow
 x_2 @ 7.55% \uparrow , will improve
 x_3 @ 0.90% \uparrow
 x_4 @ 20.64% \uparrow

the level of financial potential of agriculture at the regional level to the reference module 3.

Conclusions. Based on the fact that the process of financial and credit support causes changes in agriculture in general and in the format of its balanced distribution between the subjects of agricultural production, to calculate the total financial potential of agriculture at regional level the forecasting simulation model was proposed. The model embodies the inter elementary balance of financial resources and sources of funding to determine the reference module of stable financial potential of agro-climatic zones of the Steppe of Ukraine by net income and net profit of ensuring the effectiveness of economic development of entities. Reservation of a significant amount of financial resources in the region will develop the financial infrastructure to expand the boundaries of financial entities and stabilize their financial condition.

Our study on the basis of the proposed methodological approach to the induction system analysis and simulation showed that: there is a probability of the definition of "standard" integral indicator of stable financial potential of the region, which was identified; components of this composite indicator values approximation of indicate factors (financial performance) different from module 3 to synthesized values of the specified module; impossibility to make quick global changes necessary to direct, especially in the transition to a "neighboring" module, providing the positive dynamics of financial management companies; among the factors that can contribute most effectively to the improvement of financial management in the crossing time receivable accounts, cash, tangible current assets, profit should be defined. This will reserve financial resources, thereby increasing the profitability of businesses; implementation of external and internal stimuli formation of architectonics of the total financial potential of agriculture at regional level makes it possible to attract financial resources for agricultural enterprises.

The impact on defined indicators concerns not only means of regional financial management, and government regulation. In particular, the government tries to stabilize the financial potential and it causes: increased internal redistribution of financial resources between subjects of the market of agricultural production through implementation of state policy of financial support for agriculture; promote financial relationships of farms through leasing and other alternatives of raising funds in agriculture; the maximum risk-based financing agricultural enterprises and investment in agriculture.

4 Список використаних джерел

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