

## АНАЛІТИЧНЕ МОДЕЛЮВАННЯ СІЛЬСЬКОГОСПОДАРСЬКИХ ПІДПРИЄМСТВ: ЗАРУБІЖНИЙ ДОСВІД

Лисецький А.С.,  
Тірбах Л.В.,  
Чабан Г.В.

**Предмет роботи:** моделювання відтворювальних процесів сільськогосподарських підприємств. Балансовий майновий стан і варіація статків засновників підприємств, прибутки і збитки від операційної діяльності та розподіл залишкових доходів за факторами виробництва.

**Мета:** є узагальнення міркувань з приводу аграрної політики деяких країн світу

**Методологія:** використано інструменти моделювання сільськогосподарських підприємств країн ЄС.

**Результати роботи:** проведено дослідження історичного аналізу реформування сільськогосподарських підприємств країн, доведено що проблема фермерів всього світу містить факти падіння цін і доходності.

**Галузь застосування результатів:** управління господарськими системами у галузі сільського господарства і фермерства.

**Висновки:** нееластичність попиту є непереборним чинником кризи, не вичерпує проблеми фермерських доходів. Коливання внутрішнього попиту - інший аспект проблеми цін і доходів фермерів.

**Ключові слова:** моделювання, синтез, аналіз, ефективність, земельні відносини.

## АНАЛИТИЧЕСКОЕ МОДЕЛИРОВАНИЕ СЕЛЬСКОХОЗЯЙСТВЕННЫХ ПРЕДПРИЯТИЙ: ЗАРУБЕЖНЫЙ ОПЫТ

Лисецкий А.С.,  
Тирбах Л.В.,  
Чабан Г.В.

**Предмет работы:** моделирование воспроизводственных процессов сельскохозяйственных предприятий. Балансовый имущественном состоянии и вариация состояния учредителей предприятий, прибыли и убытки от операционной деятельности и распределение остаточных доходов по факторам производства.

**Цель:** есть обобщение соображений по поводу аграрной политики некоторых стран мира.

**Методология:** использовано инструменты моделирования сельскохозяйственных предприятий стран ЕС.

**Результаты работы:** проведено исследование исторического анализа реформирования сельскохозяйственных предприятий стран доказано, что проблема фермеров всего мира содержит факты падения цен и доходности.

**Область применения результатов:** управление хозяйственными системами в области сельского хозяйства и фермерства.

**Выводы:** неэластичность спроса является непреодолимым фактором кризиса, не исчерпывает проблемы фермерских доходов. Колебания внутреннего спроса - другой аспект проблемы цен и доходов фермеров.

**Ключевые слова:** моделирование, синтез, анализ, эффективность, земельные отношения.

## ANALYTICAL MODELING OF AGRICULTURAL ENTERPRISES: EXTERNAL EXPERIENCE

Lisetskyi A.S.,  
Tirbakh L.V.,  
Chaban G.V.

**The subject of work** - modeling of reproductive processes of agricultural enterprises. Balance-sheet property status and variation of the stock of founders of enterprises, profits and losses from operating activities and distribution of residual income by factors of production.

**The aim of work** – there is a generalization of considerations concerning the agrarian policy of some countries of the world.

**Method or the methodology of the work** - the modeling tools of agricultural enterprises of EU countries are used.

**The results of work** - a study of the historical analysis of the reform of agricultural enterprises in countries has been carried out, it has been proved that the problem of farmers around the world contains facts of falling prices and yields.

**Field of application of the results** - management of economic systems in the field of agriculture and farming.

**Conclusions:** inelasticity of demand is an insurmountable factor in the crisis, does not exhaust the problems of farm incomes. Fluctuations in domestic demand are another aspect of the problem of farmers' prices and incomes.

**Keywords:** modeling, synthesis, analysis, efficiency, land relations.

Actuality of theme. The Nobel Prize for Economics in 2008 was received by Paul Krugman, an American scientist, professor at Princeton University. N. Volchkova called the official formulation of his merits for the development and substantiation of a new economic geography and a new theory of a market economy [5].

There are several key issues of novelty. The first large and small enterprises are equally productive if they have equal factor production. Factor capacity is the ratio of factor costs per unit of final product. With this emphasis, the theory of equilibrium of growing funds of consumption of wage funds is being made. Having found a point of equilibrium, we can not talk about the average size of business and enterprise. It turns out that the factor of production is the same for all enterprises, and therefore there is no scale effect. No competition, no need for it. There is no need to decide on the specialization of regions and states to motivate rational international trade. Small and simple Krugman models have opened up new knowledge in the field of commerce. The economy has a steady number of consumers, which gives grounds for simply formulating the utility function. The first derivative of the consumption function is greater than zero. This means that the needs are characterized by signs of saturation. The second derivative function of consumption is less than zero, and therefore the saturation process compensates for the increase in demand. The equilibrium of growing demand (MAX) and steady income (w) forms a balance model that can bear the name of Krugman.

For its theoretical solution, not so many assumptions are required. The new economic policy does not eliminate competition, but competition and trade arise not only and not so much from the specialization of states, as from the competition of technological decisions of states and monopolies. The key to our analysis is the equality of factor capacities in monopolistic competition. We must emphasize the relevance of the new content of analysis for the «old world» and developing countries. But the most urgent question is the question of factoring at the level of an agricultural enterprise that uses land and biological resources of plant growing and livestock farming.

In most EU countries, small farms predominate, which do not mainly provide full employment and family budgets, and therefore the work on the farm is often combined with other types of activities [6]. Such a structure of agriculture in Europe has developed after feudalism, and evolutionary crushing, which was characterized by large land holdings over the centuries.

In France, the privileges of large land tenure by the 1789 revolution were abolished. The peasants received small plots, which determined the policy of co-development in conditions of crushing and through the moon.

The general reform of Italy after the Second World War has determined numerous small-scale management, but without a cooperative movement. In Spain and Portugal, small land tenure predominates. Due to the delayed colonization of North America, larger farms are characterized by the size of the area and the amount of business. The average area of farms is 187 hectares from 20 thousand dollars of sales. In total, 2.8 million people (1989) employed, of which 0.9 million are hired workers.

Problem is inheritance of land ownership. In order to stop the further shredding of farms, legislation in the West applies to all kinds of restrictions. So, for example, in Europe a farm can be inherited by only one descendant, others must be satisfied with compensation. In France, where the Napoleonic laws recognized the right to distribute land, they came not only to shredding but also to fragmentation, when the owner has several separate plots. This determined the problem of viability of the farmer and methods of solving it. The relevance of the union is not reduced.

Agrarian policy should be segmented in relation to the size of economic formations. The agricultural production spectrum in Ukraine is too broad for a single concept of development. It is necessary to distinguish entrepreneurship on the basis of the size of the concentration of production. Small non-food subsidiary farms with an area of up to 1 hectare could not be taken into account. Peasant farms, which can grow as a result of agricultural transformation, should be divided into groups. Standardized can be farms by signs of land use. But it can not perfectly reflect the size of the economy, its income, the tax field, land rent, not taking into account the quality of land. The size of farms is not identical to their land use and can not be calculated by the area of land resources. Therefore, it is proposed to introduce an appropriate accounting system for economic entities according to standardized economic features.

The economic size of farms based on land quality in EU countries is measured in Standardized Units (EOP) [6]. The unit is based on a household which has a standardized gross income (STBE) of 1200 eq in its calculations. Thus, the concentration of production in the EU countries has a significant amount of variation (Table 1).

**Table 1. Typization of farm sizes in EU countries (in% to the total)**

	Types of farms by size (EOR)					
	<2	2-4	4-8	8-16	16-40	>40
EU12	40	17	15	11	11	5
UK	23	8	10	11	20	27
Denmark	1	6	15	19	31	29
Netherlands	0	4	11	13	27	44
Germany	19	12	15	18	26	10
France	15	9	13	18	30	15
Italy	46	20	15	9	7	3
Spain	51	19	15	9	5	1

Reference: Tracy M. *Agriculture and Food in the Economy of Developed Countries: An Introduction to Theory, Practice, and Politics* / Trans. from Eng. St. Petersburg: Economic School, 1995. - P.28 - 30.

The countries of Western-Northern Europe favor a very large, market-oriented (high-value) farms. But they are left with family farms (without signs of exploitation of hired labor). Farmers require significant advance capital, filling the market of various means of production.

The resource consistency is a concept that contains the signs of three factors: land, labor, capital, but technology tends to the canons of classical economic theory. However, the postulates of the classical economic theory of A. Smith and D. Ricardo we were disgraced even earlier. Now more often you can hear the emphasis on the effect of the law of value, in particular on the methodological level. Today from young reformers we can hear the desire to raise prices and tariffs for the population because of the growing «cost». These disgracefulness, which are not compatible with Krugman's latest theory of economic equilibrium, they tend to be justified not by the desire for profit, but by the real costs of production. Theoretical analysis of the problems of economic analysis can be found at that time by many scholars and practitioners [1].

Particular attention deserves the American School of Economic Analysis, which does not contradict Krugman's models, but is conservative with respect to the theory of choice from «Economics» by Stanley Brue and McConnell [2].

The achievements of US agriculture and the developmental agrarian policy have been and will be exemplary benchmarks for our imitation and reform of the industry in Ukraine. However, the «monetarist doctrine» of macroeconomic stabilization has been, is and will oppose development because economics and hreumatics are different scientific initiatives from ancient times, from Aristotle to the present and Milton Friedman. By that time, among the populist-reformers there were representatives of the new liberal paradigm and the market way of development.

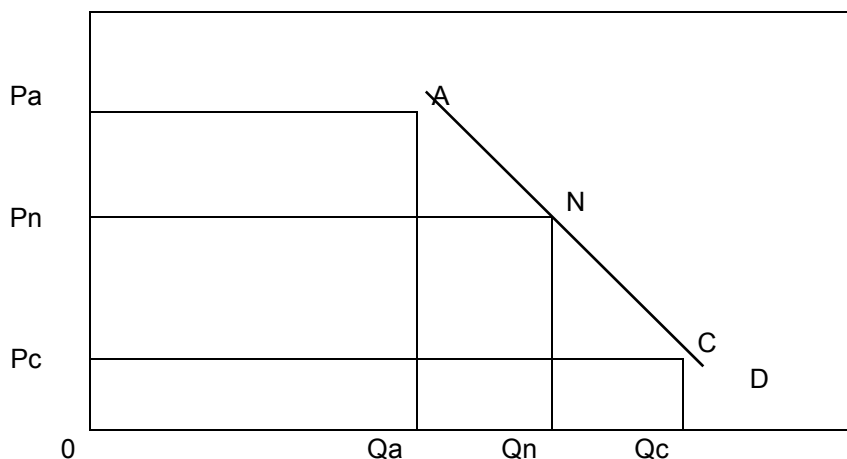
Recently speaking in Ukraine, prof. Eric Runnert (The Netherlands) answered, «Do not read what they write and do not listen to what they say in the IMF, but see what they are doing», «It's necessary to distinguish between those who collect money from those who collects technology», «Money is not necessary to collect, but we must dissipate». Let us turn to the traditions of analyzing the problems of classical farming in the United States [6].

An analysis based on the effects of inelastic demand.

Prices and incomes in agriculture are subject to significant variations, in particular: (a) Due to the inelastic nature of the demand for its (agricultural) products, which transforms small changes in its volume into agricultural production and demand in rather substantial changes in prices and revenues; b) due to technical progress, which is a factor in a sharp increase in the supply of agricultural products; c) due to the reduction in the number of available population, which is a factor in the public demand for agricultural products; d) through a synergistic combination of factors of supply growth and falling demand. Conclusion: US agriculture is becoming an industry that systematically and systematically decreases [6].

Historically, it has been confirmed that the problem of farmers around the world contains facts of falling prices and profitability. The features of natural conditions of economic activity, in particular in geographical and temporal space, are superimposed. Among the socio-economic factors of the problem is often called inelastic demand for agricultural products. It has been proved that for agricultural products, the coefficient of elasticity is within the range of 0.2-0.25, which means that prices should fall by 40-50% in order to increase purchases by 10 percent.

Even a slight increase in output leads to price disturbance, material changes in farm incomes (Fig. 1).

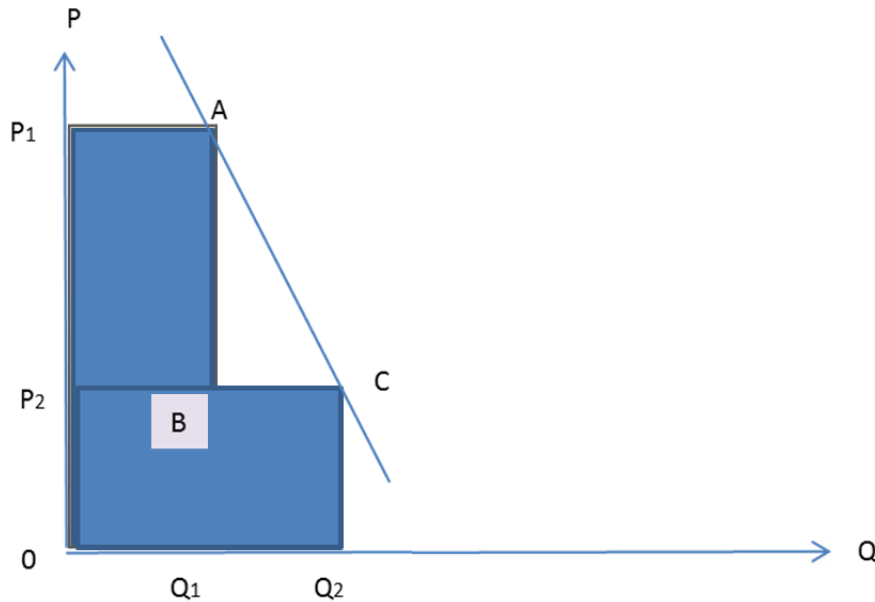


**Figure 1. The effect of changes in production volumes**

The graph shows options for changing prices and revenues. If production volumes change from  $Q_n$  to  $Q_a$  or  $Q_s$ , price changes may deviate from  $P_n$  to  $P_a$  or  $P_c$ ). The explicit yield function can be written as the  $0P_nNQ_n$  plane deviating from the mean to the probable ( $0P_aAQ_a$  or  $0P_cCQ_c$ ). Line D reflects the inelasticity of demand. Obviously, the planes will be different due to changes in the volume of the market. It is proved that the farmer's income in case of deviation of output from the average does not offset the market price. Fluctuations in the market of agricultural products are automatically regulated by a fivefold drop in prices and revenues. Farmers can regulate

production, try to maintain the necessary level of product prices. Known are attempts to restrict access to the market, reduce crop areas, etc. The market system is a systemic factor of overproduction and the financial crisis.

The conclusion that inelasticity of demand is an insurmountable factor in the crisis does not exhaust the problems of farm incomes. Fluctuations in domestic demand are another aspect of the problem of farmers' prices and incomes (Fig. 2).



**Figure 2. Impact of changes in demand for farmers' prices and revenues.**

Theoretically possible is a situation where the volume of production is somewhat constant ( $Q_2$ ), and market demand is falling. Due to the rather inelastic demand for agricultural products, a rather small decrease in demand from C to A causes a significant price change from  $P_1$  to  $P_2$  and reduces the gross income of farmers. from  $OP_1AQ_1$  to  $OP_2SQ_2$ . A likely situation is when demand grows.

It is debatable that the reduction in demand will immediately result in the cessation of the work of many farmers, and the reduction of crop area will align the market and price. Adjustment of sown areas is a state maneuver, for example, the United States. In addition, the factors of counteracting the spontaneous termination of the farmer's movement are the excess of the fixed costs of farmers over the current variable costs. Land rent, interest on mortgages under land and property, taxes are the main fixed costs of the US farm. Fixed can be considered the pay of the farmer and his family. Payments for hired workers, seeds, fertilizers, fuel, livestock feeds, etc. - are variable costs. The presence of fixed costs is an incentive to cultivate land, the advantage of the inaction of the owners of land resources.

The dependence of Ukraine's agricultural sector on demand in the world market is high for well-known reasons. One of them is the surplus of land resources of 12-14 oblasts. This addiction is an additional factor in the instability of demand and an attractive object for the market withdrawal and resources. It is known that the countries of the united Europe regulate the availability of our goods to our market. Grain, oil seeds buy more freely. It is useless to hope for the necessary free competition. Negative role is played by fluctuations of the exchange rate in Ukraine. Export volumes are influenced by weather and politics. Foreign intermediaries and borrowers of cash have a false pressure. These and other reasons influenced the dynamics and structure of exports. Under the influence of political manipulation, uncritical imports of agricultural products are increasing.

The problems of agriculture in the medium-term retrospective tend to aggravate, in particular, due to technological revolution in the industry, which increased the supply of products, and demand for it did not increase. Scientific and technological progress has become a factor in the aggravated problems of the farm. Mechanization and electrification of farms; technology for improved land cultivation and soil conservation; irrigation; obtaining hybrid seeds of agricultural crops; availability of markets for effective protection of plants and mineral fertilizers; improved breeding and animal care, all these achievements have lost their effectiveness. Indicators of the STP called the labor resources. The number of employed in the industry declined at a higher pace than the size of fixed capital and land in cultivation. Labor productivity is a dubious indicator of the growth of farmers' productivity. Growth is the result of replacing large collective farms with private and small farms while preserving arable land.

The Farmer Program deserves attention, which should contain key development issues: 1) prices, revenues and subsidies for farmers; 2) protection of natural resources (water and soils); 3) scientific research in the field of agriculture; 4) lending to farmers and fiscal policy; 5) insurance of risks; 6) supporting the development of export potential of the

regions. From the 30s of the last century, US farmers received and receive subsidies today. Let's consider the problem of farming exclusively from the side of economic policy, that is, the policy of maintaining prices and revenues.

The size of the subsidy. Granting of subsidies is argued taking into account the following postulates. The farmer is a representative of the poorer people. The family farm is the foundation of social development. Farm business is associated with natural and climatic risks. The market for agricultural products is considered to be completely competitive in essence. Farmers deal with the supply of industries with prominent market power and domination. It is with these considerations that a policy based on the concept of parity is appropriate.

1. Analysis of the structure of the economic system.

Setting objectives. A set of enterprises with more than 4,5 thousand units is divided into 10 groups. The weighting of each group is the ratio of the number of enterprises in the group to the total.

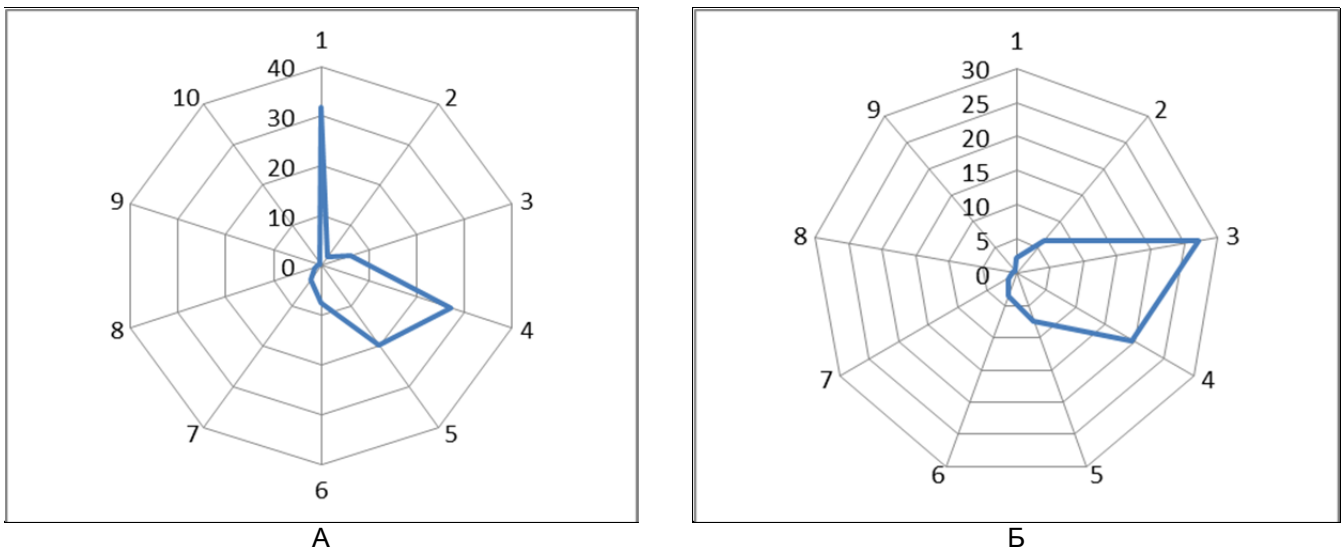
The observation matrix has the following form (tab.2).

**Table 2. The observation matrix**

№	0	From 1 to 5	From 5 to 10	From 10 to 20	From 20 to 30	From 30 to 40	From 40 to 50	From 50 to 60	From 60 to 70	More 70
li	0	1	2	3	4	5	6	7	8	9
1	1437	100	281	1228	888	335	154	63	27	18
2	31,7	2,2	6,2	27,1	19,6	7,4	3,4	1,4	0,6	0,4
3	0	3	8	15	24	34	44	54	64	83

Source: Arrarbericht, Tables 53, 55.

To display weight coefficients apply a petal diagram (Fig.3).



**Figure 3. Displays weighting factors in enterprise groups**

Analysis of display options. Option A contains 10 groups, one of which is quite different from the others. Option B shows only those companies that are tangent to the grouping attributes. This option does not add information, but the pain clearly shows the structure of enterprises and the difference between leading groups.

**Список використаних джерел**

1. Бодриков М. Классическая теория ценности: современное звучание нерешенных проблем. / Бодриков М. // Вопросы экономики, 2009, № 7. С. 97–118.; Концепція формування цінового механізму на продукцію аграрного виробництва // Економіка АПК. – 2008. – № 1. – С. 5-18.
2. Макконнелл К.Р. Экономикс: принципы, проблемы и политика. / Макконнелл К.Р., Брю С.Л. Пер.с 13-го англ.изд. – М. : ИНФРА-М, 1999. – 974 с.
3. Концепція формування цінового механізму на продукцію аграрного виробництва. // Економіка АПК, 2008, № 1. – С. 5-18.
4. Лисецький А.С. Мультипликатори витрат і зростання для балансознавства і маржинального аналізу. / Лисецький А.С., Паламарчук О.М., Чабан Г.В. // Економічний вісник університету – Вип. 30/1. – ДННЗ «Переяслав-Хмельницький державний педагогічний університет. – Переяслав-Хмельницький, 2016. – С. 96–102.
5. Н. Волчкова. Новая теория международной торговли и новая экономическая география (Нобелевская премия по экономике 2008 года). / Н. Волчкова. // Вопросы экономики, 2009, №1. – С. 68–83.
6. Трейси М. Сельское хозяйство и продовольствие в экономике развитых стран: Введение в теорию, практику и политику / Трейси М. / Пер.с англ. Спб.: Экономическая школа, 1995.- С.28 – 30.

7. Україна : сільськогосподарський сектор у перехідний період. / Дослідження по країні Світового Банку – Надруковано у Сполучених Штатах Америки. 1995 Міжнародний банк реконструкції та розвитку / Світовий банк. 1818 H Street, N.W. Washington, D.C. 20433, USA. – 205 с.

#### References

1. M. Bodrikov. *Classical theory of value: modern sounding of unresolved problems.* / *Issues of Economics*, 2009, No. 7. P. 97-118; *The Concept of the Formulation of the Tcn Mechanism on the Product of the Agrarian Vibrobitytva* // *Економіка АПК.* - 2008. - No. 1. - P. 5-18.
2. McConnell K.R., Brue S.L. *Economics: Principles, Problems and Politics.* Per.s 13th English edition. - Moscow: INFRA-M, 1999. - 974 p.
3. *Concept of formation of the price mechanism for products of agrarian production.* / *Economy of agroindustrial complex*, 2008, No. 1. - P. 5-18.
4. Lisetskii AS, Palamarchuk O. M., Chaban G.V. *Expense and growth multipliers for balancing and margin analysis.* / *Economic Herald of the University / Issue No. 30/1.* - DNNZ «Pereyaslav-Khmelnytsky State Pedagogical University. - Pereyaslav-Khmelnytsky, 2016. - P. 96-102.
5. N. Volchkova. *New theory of international trade and new economic geography (Nobel Prize in Economics 2008).* / *Issues of Economics*, 2009, №1. - P. 68-83.
6. Tracy M. *Agriculture and Food in the Economy of Developed Countries: An Introduction to Theory, Practice, and Politics* / Per.c Eng. St. Petersburg: Economic School, 1995. - P.28 - 30.
7. *Ukraine: Transitional Agricultural Sector.* / *World Bank Country Study - Printed in the United States of America.* 1995 International Bank for Reconstruction and Development / World Bank. 1818 H Street, N.W. Washington, D.C. 20433, USA. - 205 s.

#### ДАНІ ПРО АВТОРІВ

**Лисецький Анатолій Степанович**, доктор економічних наук, професор, зав. кафедри обліку і оподаткування  
e-mail: [a.lisecky@meta.ua](mailto:a.lisecky@meta.ua)

**Тірбах Леся віталіївна**, кандидат економічних наук, кафедри економіки

**Чабан Галина Вікторівна**, кандидат економічних наук, доцент, заступник зав. кафедри обліку і оподаткування

e-mail: [lesia.tirbah@mail.ru](mailto:lesia.tirbah@mail.ru)

ДВНЗ «Переяслав-Хмельницький ДПУ імені Григорія Сковороди»

вул. Сухомлинського, 30, м. Переяслав-Хмельницький, Київська обл., Україна, 08401

#### ДАННЫЕ ОБ АВТОРАХ

**Лисецкий Анатолий Степанович**, доктор экономических наук, профессор, зав. кафедры учета и налогообложения

e-mail: [a.lisecky@meta.ua](mailto:a.lisecky@meta.ua)

**Тирбах Леся Витальевна**, кандидат экономических наук, преподаватель кафедры экономики

**Чабан Галина Викторовна**, кандидат экономических наук, доцент, зам. зав. кафедры учета и налогообложения

e-mail: [lesia.tirbah@mail.ru](mailto:lesia.tirbah@mail.ru)

ГВУЗ «Переяслав-Хмельницкий ГПУ имени Григория Сковороды»

ул. Сухомлинского, 30, г. Переяслав-Хмельницкий, Киевская обл., Украина, 08401

#### DATA ABOUT THE AUTHORS

**Lysetskyi Anatolii Stepanovich**, doctor of economic sciences, professor, head. Department of Accounting

e-mail: [a.lisecky@meta.ua](mailto:a.lisecky@meta.ua)

**Tirbakh Lesya Vitaliivna** candidate of economic sciences, lecturer of the Department of Economics

**Chaban Galina Victorivna**, candidate of economic sciences, lecturer of the Department of Accounting and Taxation

SHEE «Pereiaslav-Khmelnytsky Hrygorii Skovoroda State Pedagogical University»

Sukhomlynsky Str., 30, Pereyaslav-Khmelnytsky, Kyiv region, 08401, Ukraine

e-mail: [lesia.tirbah@mail.ru](mailto:lesia.tirbah@mail.ru)