

# “Managing the agricultural enterprises’ valuation: actuarial approach”

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# MANAGING THE AGRICULTURAL ENTERPRISES' VALUATION: ACTUARIAL APPROACH

## Abstract

This article aims at finding ways to improve the efficiency of Ukrainian agricultural enterprises' valuation management based on a multidimensional actuarial model. The article confirmed the hypothesis of the relationship between accounting information, published in the financial statements of agricultural enterprises, compiled according to international financial reporting standards (IFRS), and actuarial management reporting. It is the latter, in the context of financial reporting conceptual basis, which promotes foreign investor's managerial decisions on the expediency of investing temporarily free financial resources in the development of the agro-sector. The methodology of the research is based on optimization of the algorithm for estimating the agricultural enterprise market value within the framework of a cost-effective approach based on information filling of the actuarial management reporting using the method of adjusted net assets. The results of the study showed the dependence of investment attractiveness of Ukrainian agricultural enterprises on qualitative content of the reporting information provided within the framework of international accounting. The practical value of the results confirmed the optimal algorithm for estimating the value of agribusiness based on the accounting and information of actuarial management reporting according to its spatial interpretation from 3D to 5D format. The proposed 5D model for managing the value of agribusiness will facilitate an objective assessment of the agricultural enterprise value in just one step.

## Keywords

valuation, investments, reporting, actuarial model,  
management, agriculture

## JEL Classification

G32, M41, Q14

## INTRODUCTION

Agriculture, as a significant sector of Ukraine's economy, is an important part of ensuring the proper level of its development. However, for successful functioning in the international arena of agrarians, this industry requires an appropriate level of financing for reconstruction, modernization, and active implementation of agro-innovations. Therefore, attracting the necessary volume of foreign investments into the development of Ukrainian agricultural enterprises plays a key role and is a strategic priority of the country. It is worth emphasizing that the real and potential investor assesses the investment attractiveness of the agricultural enterprise through the lens of financial statements compiled according to international financial reporting standards (IFRS). The preparation of financial statements and consolidated financial statements according to IFRS is stipulated in part 2 of Article 1 of the Law of Ukraine "Accounting and Financial Reporting in Ukraine" (Law of Ukraine "Accounting and Financial Reporting in Ukraine", 1999).

In Ukraine since January 1, 2019, financial statements under IFRS are necessarily made up by enterprises, which are of public interest, large

enterprises, public joint-stock companies, as well as enterprises engaged in mining operations of national importance. Accordingly, the financial statements on the national regulations (standards) of accounting (NR(S)A) are made by small, medium, and microenterprises, which cannot meet the increased reporting needs of the real and potential foreign investor comprehensively.

According to the State Statistics Service of Ukraine official data, the number of large enterprises in Ukraine in 2018 was 23 units, which is 5 units (27.8%) less than in 2017, and 10 units less (76.92%) than in 2010. As for medium-sized enterprises, their number in 2018 was 2,307 units, small enterprises (SEs) – 73,998 units, and microenterprises – 68,492 units, respectively, the latter make financial statements of the world acceptance (1-ME and 2-ME). The SEs make financial statements of the small enterprise (1-S and 2-S), according to part 1 and part 2 of the paragraph I NR(S)A 25 “Simplified Financial Reporting” (MFU, 2000).

So, in 2018, the total number of large, medium-sized, small, and microenterprises in Ukraine was 144,820 units, the share of large enterprises among them is only 0.02%, which makes up the reporting under IFRS, medium-sized enterprises occupy only 1.59%, small enterprises occupy 51.10%, and microenterprises – 47.29%. That is, 98.39% of Ukrainian enterprises make up the reporting under NR(S)A, which is not at all oriented to a real or potential foreign investor. Only 1.61% of Ukrainian economic entities make up financial statements under IFRS.

To attract the necessary volume of foreign investments into the development of agricultural medium-sized, small, and microenterprises, it is necessary to compile financial statements, oriented to the foreign investor, that is, accessible and understandable to foreign suppliers of capital and compiled in the context of financial reporting conceptual basis (International Accounting Standards Board, 2011) such as actuarial management reporting based on public (traditional) financial statements for NR(S)A.

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## 1. LITERATURE REVIEW

The actuarial financial reporting can increase the investment attractiveness of the economy’s agricultural sector and contributes to further effective management of agribusiness valuation since its content reflects the prospects for the growth of the agricultural enterprise’s economic potential based on the dichotomy of operational and financial activities. It is through the lens of actuarial financial reporting that the investor immediately sees a change in economic value, while the immediate valuation process is considerably facilitated. A real foreign investor sees the potential benefits of investing the financial resources and the prospects for long-term return on investment. In other words, actuarial management reporting is beneficial for implementing the strategic goals of the agricultural enterprise, investment, and promotes efficient management of agricultural enterprise valuation.

The actuarial model of management acts as effective leverage in attracting the necessary amount of foreign investment in the development of agri-

business, and during the valuation, according to the actuarial reporting provided the sale of it as a complete property complex (CPC). Many scientists describe the research of actuarial content of the report and the use of its data for management, in particular, Shigaev (2011), Kuter, Eshugova, Komkova, and Shihidi (2009), Lahovska (2014), Penman (2007), Rishar (2000), and others. Penman (2007) emphasizes that business valuation is the basis of the investment, and a significant part of the information for its implementation is in the actuarial financial statements. The scientist discloses the method of obtaining information from actuarial reporting and using it to manage the value of an enterprise that it generates. Moreover, Shigaev (2011) describes in detail the current models of enterprise valuation according to the actuarial financial statements and its usage to build an effective system of cost-oriented business process management in general. Famous French scientist Rishar (2000) draws particular attention to the method of compiling a form of actuarial reporting, such as the actuarial balance sheet (actuarial financial statement), and notes that the actuarial balance is intended to de-

termine and compare the discounted value of an enterprise in different periods (time moments).

As for 3D financial reporting format, Golden (2016) revealed in detail a non-trivial approach to the formation of reporting information, bypassing the traditional procedure of fixing in the system of accounts of enterprise's business operations. This approach creates favorable conditions for establishing the cause and effect of the influence of business transactions on the financial statements and allows thinking about the level of enterprise's conduct and financial performance. In the book 'Financial Reporting in 3D', Golden (2016) discloses the method of preparation of financial statements based on business transactions, without compiling accounting. Only after discovering an innovative approach to preparing the financial statements, she describes the preparation of traditional events while revealing the fundamental principles of an innovative management system.

The research is devoted to the application of effective methods of business valuation based on reporting within the framework of cost-effective approach, namely the method of net assets, which are presented in the work of Gryaznova, Fedotova, and Eskyndarov (2003). The authors claimed that the net asset method is applied by enterprises that own a significant share of tangible assets. This trait is intrinsic in agricultural enterprises since the most important part of their property is occupied by tangible assets, which, given the specificity of the industry, are biological assets. Bezverkhyi and Kovach (2013) state that the share of biological assets in the agricultural market financial statement (balance sheet) can range from 40 to 50%. The scientists say that it is the main asset, which is the core of net income formation from the sale of agricultural products.

In general, the scientists focused their attention on the economic growth of agriculture is the bedrock of economic growth, development, and poverty eradication in the developing countries. Agriculture is also considered as the engine and panacea to economic prosperity (Sertoğlu, Ugural, & Bekun, 2017).

However, the need to introduce an actuarial 5D model for Ukrainian agricultural enterprises valuation management, based on modern non-trivial

approaches in multidimensional interpretation to improve the efficiency of their valuation management, was not considered at all, that is why the research was needed in that direction.

## 2. RESEARCH AIM

The study aims to justify the need to improve the Ukrainian agricultural enterprises valuation management through the use of a 5D actuarial model, which is based on the information content of the management actuarial reporting according to its spatial interpretation from 3D to 5D format and its implementation based on the operational system for estimating the value of agribusiness.

## 3. RESEARCH METHODS

The article paid special attention to optimization of agricultural enterprises' valuation algorithm within the cost-effective approach based on information filling of 5D actuarial reporting using the method of adjusted net assets. The actuarial 5D model of valuation management is a system that uses the double, triple (3D), (from English Dimension (D) – the number of independent parameters (measurements), the transaction record, and aims to estimate the economic value that is being created, and future cash flows, that is, provides information on the change in the market value of the enterprise in 5D format. The 5D format of modern management system should be interpreted as a 5-dimensional spatial interpretation of actuarial information on the prospects for changing economic potential in 4D format ( $3D + tl$ , where  $tl$  is a prospective time lag) based on 3D accounts of strength, financial reporting in 3D, which is being transformed into 5D actuarial financial reporting format bypassing the stage of fixation in the system of accounts of business transactions.

Graphically, the internal spatial interpretation of the actuarial 5D management and evaluation shows the formation of a penteract (a five-dimensional hypercube, actually an analog of the cube in a five-dimensional space).

5D actuarial financial statements include the reporting forms. The corresponding numbers with

the letter “a” from the word ‘actuarial’ are assigned, for example:

- actuarial financial statement (balance sheet), standard form No. 1-a;
- actuarial financial statement (cumulative income), standard form No. 2-a;
- actuarial financial statement (actuarial balance of cash flows), standard form No. 3-a;
- actuarial statement on changes in equity, standard form No. 4-a.

Attention should be paid to the first of actuarial reporting forms, namely, the actuarial financial statement (balance sheet), which Shigaev (2011) characterizes it as the actuarial (estimated) balance. Rishar (2000) notes that this reporting form is intended to determine and compare the discounted value of an enterprise at various points in time. The scientists note that actuarial management system requires the use of specific valuation methods, in particular, discounted valuation and the amount of capital that the net cash flows of an enterprise can recover in the future.

The structure of the actuarial financial statement (balance sheet) is fundamentally different from the standard form No. 1 of the enterprise’s public financial statements, that is, balance sheet (financial statement) standard form No. 1. This difference is due to the distinction between the operational and financial activities of the enterprise, and it is based on a dichotomy (from Greek ‘dichotomia’, from “dicha” – in two parts and “tome” – cross-section between them. After all, an asset consists of operating assets and operating liabilities, and the liability of the capital, financial assets, and financial liabilities.

Such an approach to the construction of the actuarial financial statement is essential in the conditions of the enterprise sale as an integral property complex (IPC). Moreover, the information from the actuarial accounting system may interest real and potential investors in this format, which is quite relevant for the agricultural sector of Ukraine. Overall, the introduction of actuarial accounting and reporting in agricultural enterprises will help to increase their investment attractiveness in the market.

New financial reporting system creates an information base for the implementation within the income approach of the specific concept of valuation. According to it, the enterprise value is a function of the future results of its business activities and is determined based on the carrying amount of its own or total capital or the aggregate financial result of its activities.

From Figure 1, it is noticeable that the preparation of financial statements in 3D occurs in the second stage, which precedes the stage of accounting.

This is the content of the non-trivial foreign approach to the procedure of preparation of financial statements in 3D because the completion of the reporting forms occurs without the disclosure of information in the accounts. In the third stage, the financial statements are transformed from 3D to 5D actuarial reporting. In the final fifth stage, the data of 5D actuarial reporting should be used to estimate the value of the agricultural enterprise in order to improve its growth management efficiency in the future. Among the listed approaches to the enterprise valuation, the most reasonable is the use of a cost-effective approach, namely the method of net assets. The cost-effective approach takes into account the context of the static balance equation of actuarial accounting (Shigaev, 2011). Besides, its methodology is quite easy to apply based on the content of the actuarial financial statement (balance sheet), standard form No. 1-a:

$$NOA = NFL + OE, \tag{1}$$

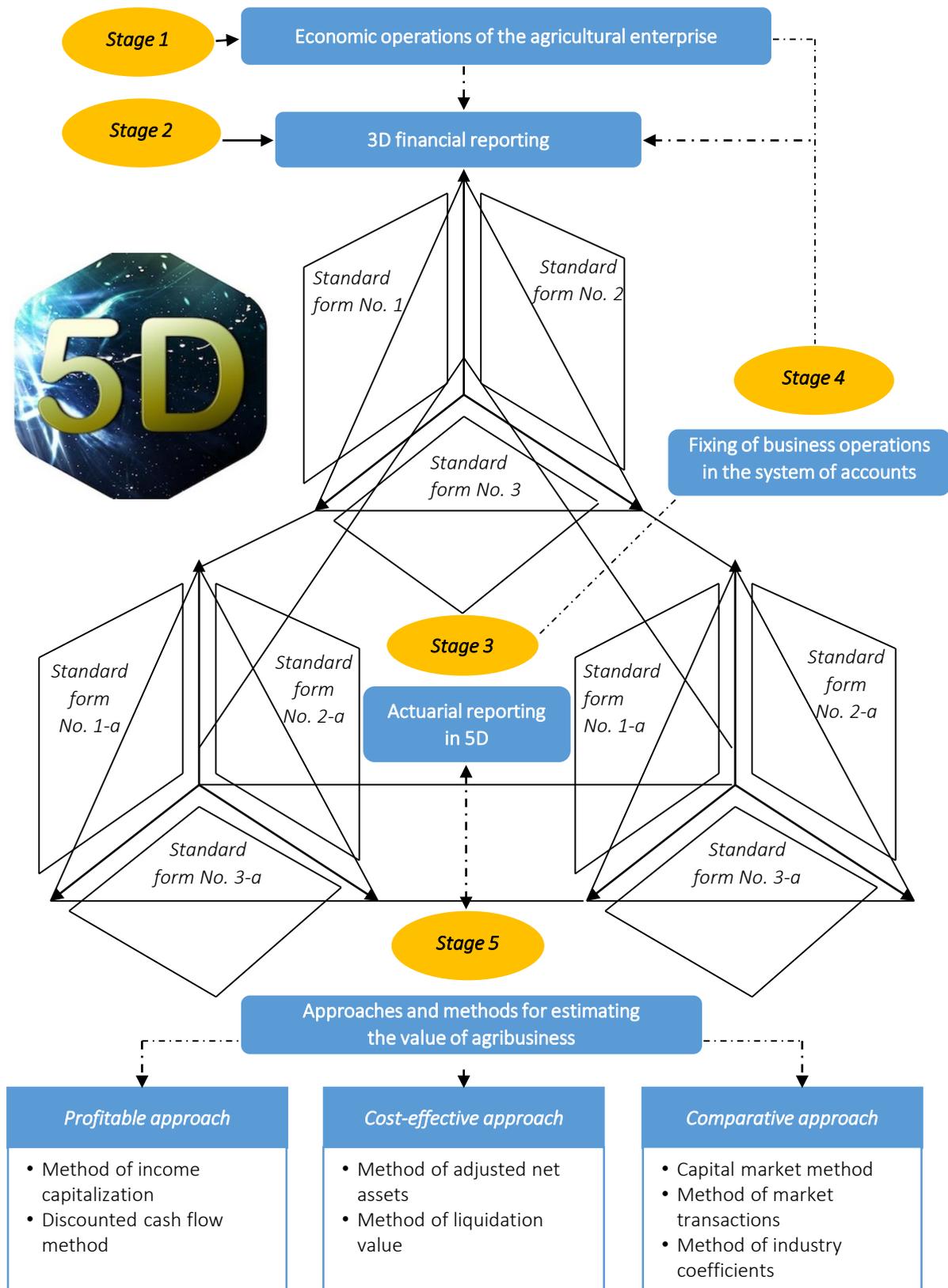
where *NOA* – net operating assets, *NFL* – net financial liabilities, *OE* – owner’s equity.

Within cost-effective approach, as it is evident from Figure 4, there are two methods: net asset method and liquidation value method. The net asset method allows estimating the value of the enterprise based on accounting and information filling of reporting forms. The value of the enterprise is calculated as follows:

$$V = A_p - O, \tag{2}$$

where *V* – enterprise value; *A<sub>p</sub>* – market value of the property; *O* – obligation (minus calculations with founders).

Source: Developed by the authors.



**Figure 1.** Innovative 5D model of agribusiness valuation

Paragraph 4, Part I of the 'General Provisions' the Standard of Accounting 30 'Biological Assets' in Ukraine includes current biological assets of poultry farming and they are capable of producing agricultural products and/or additional biological assets, otherwise generating economic benefits for a period not exceeding 12 months and animals for breeding and fattening.

The use of 5D actuarial financial statements as an information base to evaluate the business value of the adjusted net assets method eliminates the need to adjust the financial statement (balance sheet), standard form No. 1, to adjust the carrying amount of assets and liabilities to market cost with the appropriate situation, whereas the function of actuarial accounting is to give preference to fair value and discounted value.

Among traditional approaches to valuation, the prerogative is given to the fair value and discounted valuation methods. Of particular importance is the measurement of the fair value of financial assets and liabilities, which, first and foremost, is much easier than the fair value of operating assets and liabilities, and, secondly, makes it easier to calculate the economic value of net financial assets (NFA) and owner's equity (OE) of the enterprise.

## 4. RESULTS

The development of agriculture directly affects the level of food security of the country, that is, determines the possibility of providing the population with its quality and healthy products. Foreign non-trivial approaches to the method of building a model of business valuation management deserve special attention in the modern conditions of innovative transformations in all spheres of public life, including the system of the enterprises' economic potential assessment. For many European countries, in particular France, the UK, reporting through the lens of the new actuarial basis, and its generalization in actuarial reporting has already become quite common. Ukrainian agricultural, forestry, and fisheries enterprises received in 2018 almost UAH 71.0 billion net profit, which is the second indicator among all types of economic activity (net profit of industry for the same period amounted to UAH 109,300,000,000). The indus-

try has become the most profitable. According to the State Statistics Service of Ukraine, the level of profitability of the operational activities of agricultural, forestry, and fisheries enterprises in 2018 amounted to 18.3% in Ukrainian economy (6.3% in the industry). According to Figure 2, the most profitable in 2018 were sunflower (profitability level 32.5%) and grain (24.7%).

In the livestock industry in the country, the situation is much worse (Figure 3). The most profitable was the production of milk with indicators of 18.2% (2016), 26.9% (2017), 16.1% (2018). In 2018, the production of pork (6.9%), poultry meat (5.7%), eggs (5.4%) was profitable. However, the decrease in beef production reached 17.7% (Figure 3).

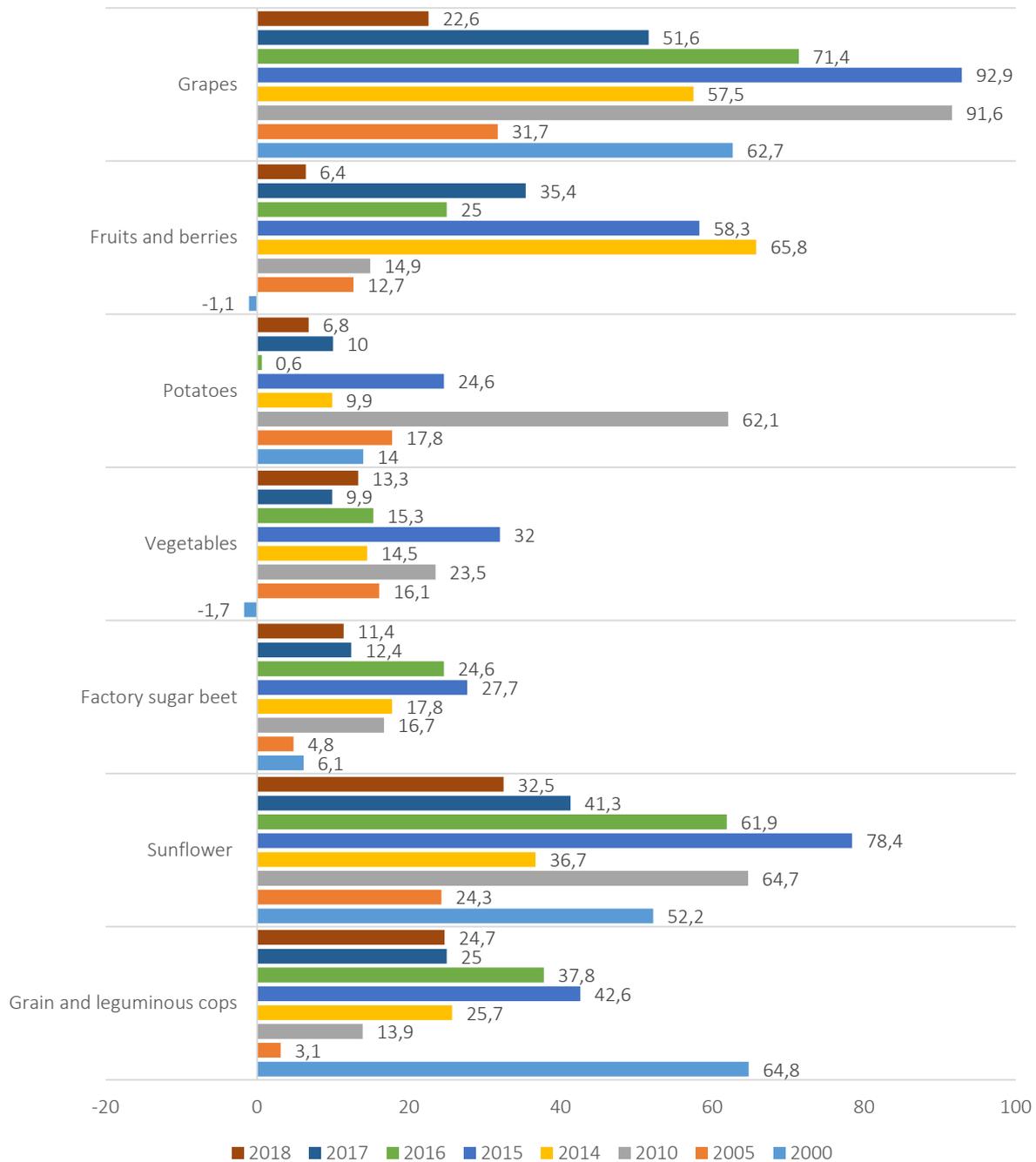
In 2018, Ukraine took 63rd place, gaining 54.1 points in the overall ranking of 113 countries on the Food Security Index, which was determined, considering such factors as quality and security, financial and physical accessibility, and the influence of natural conditions.

Data in Figure 4 show the positive dynamics of agricultural production growth in Ukraine in 2000–2018 (Figure 4).

The main increase in agricultural output was due to crop production, which in 2018 increased by 59.5% compared to 2010. The share of crop production decreased from 61.5% (2000) to 73.7% (2018). However, this could have been avoided by increasing the efficiency of land cultivation. Thus, with average grain and leguminous crops yield in 2018 47.4 c/ha, the yield of grain in agricultural enterprises was 52.2 c/ha, and in personal farms of peasants (including farms), only 34.4 c/ha. At the same time, about 27.4% of all areas planted for grain were processed by personal farms, which do not have either equipment, money, or sufficient skills of land processing.

In the livestock sector, the volume decline in 2018 was UAH 417,600,000. (0.6%) compared to 2010 and UAH 12,566 million (216%) compared to 2000. The production of milk and meat has significantly decreased, which is due to a catastrophic decrease in comparison with 2010 of the cattle, in particular, cows – by 1.6%. There was also a decrease in pork production due to a reduced num-

Source: Developed by the authors based on the official website of State Statistics Service of Ukraine (2019).



**Figure 2.** Dynamics of profitability of the main crops in Ukraine, %

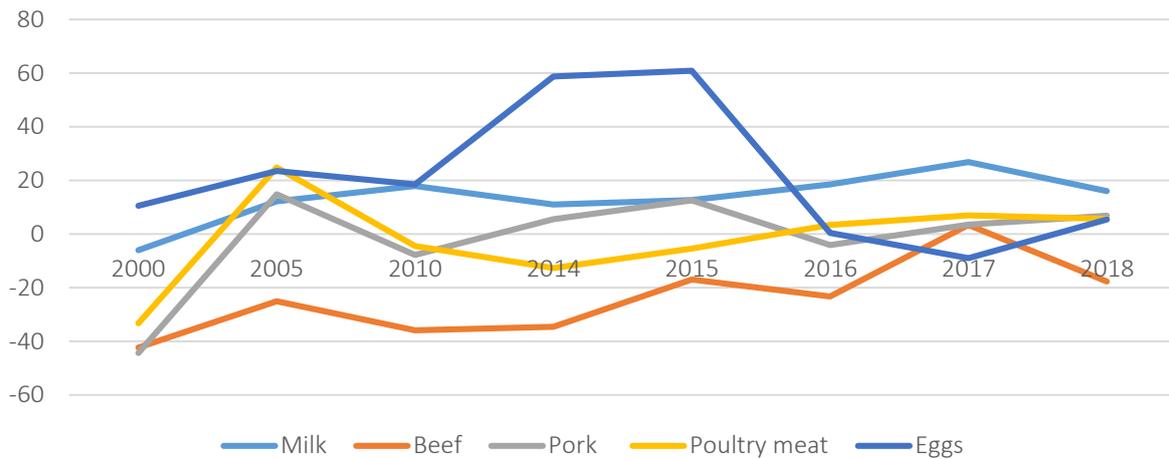
ber of pigs by 5.7% compared to 2015. The growth of the poultry meat production has little positive dynamics – in 2018, the production of the poultry meat was 1,770.2 thousand tons, which is 17.4% more than in 2015 and 38.4% more than in 2010.

The decline in livestock production in 2018, according to scientists, did not significantly affect

the market, although the almost constant decline in food standards is unsustainable, some adjustments are required to stimulate production.

In 2018, Ukrainian agrarians produced 70.1 million tons of grain, collected a record harvest of corn – 35.8 million tons, sunflower – 1.42 million tons, soy – 4.5 million tons. Ukraine is grad-

Source: Developed by the authors based on the official website of State Statistics Service of Ukraine (2019).



**Figure 3.** Dynamics of profitability of the main animal products in Ukraine, %

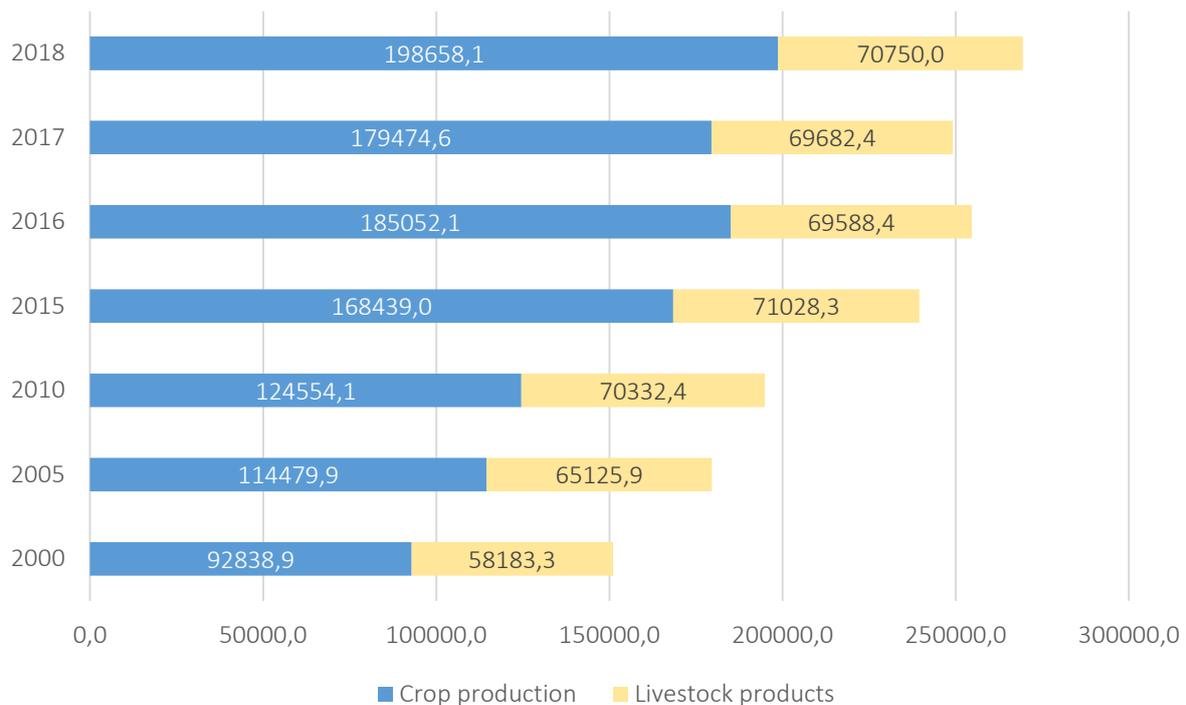
ually increasing its agricultural exports. In 2018, Ukrainian agrarians exported to foreign markets grain crops for 7.2 million tons. The share of food exports in Ukraine’s total exports in 2018 was 39.3%. According to customs officials, in 2018, the total value of agricultural exports was USD 10.4 billion, while in 2017, this figure was USD 9.6 billion.

ensure proper preparation of agricultural lands for planting, processing with minimal losses during growth and harvesting, processing, and storage. To maintain the current growth rate of agriculture and to equip the industry with advanced technologies is possible only by attracting foreign investment.

In order for Ukraine to produce even more quality products, modern technologies are needed to

In 2018, total foreign direct investment (equity capital) in the economy of Ukraine amounted to USD 32,291.9 million, that is, USD 5,363.6 mil-

Source: Developed by the authors based on the official website of State Statistics Service of Ukraine (2019).



**Figure 4.** Dynamics of agricultural production in Ukraine, at constant prices in 2010, UAH million

lion (or 14.24%) less than in 2017 and USD 6,701.0 million (17.19%) less than in 2010. Foreign direct investment in agriculture, forestry, and fisheries in 2018 amounted to USD 560.9 million, that is, USD 60.8 million more than the same indicator of 2017, and USD 108.3 million (or 16.2%) less than in 2010. The largest increase in foreign direct investment in agriculture in Ukraine to 2018 is observed from such countries as Cyprus – USD 137.5 million (24.5% of total investment in the agricultural sector); the Virgin Islands – USD 85.2 million (15.2%); Germany – USD 80.7 million (14.4%); Denmark – USD 52.3 million (9.5%); France – USD 27.3 million (4.9%), and the United Kingdom – USD 35.2 million (4.5%). According to experts, in the medium term, the share of the agro-industrial sector (AIS) in the investment structure will decrease, and this indicates the restoration of other branches of the national economy. Investment is now focused on “old-school” agriculture: corporate rights and assets are being bought. In the future, most likely, one will see an increase in investments in agro-technologies and services.

Actuarial management reporting meets the requirements of the conceptual basis of financial reporting (International Accounting Standards Board, 2011), that is, contains a statement of concepts on which the compilation and presentation of financial reports to external users are based, and are understandable to foreign investors. According to section I., M.3 of the conceptual basis of financial reporting (International Accounting Standards Board, 2011), the expectations of investors, lenders, and other creditors regarding profits depend on their estimate of the amount, time, and uncertainty (prospects) of the receipts of future net cash. So investors, lenders, and other creditors need the information that will help them to assess the prospects for future net cash receipts from the enterprise.

Actuarial financial statement (balance sheet) is built according to standard form No. 1-a for several Ukrainian agricultural enterprises: PLC ‘Verbivske’ (Kharkiv region, Balakliia district, Verbivka village), PLC ‘Troiana’ in Kyiv, Ltd. ‘Orshivska’ (Chernivtsi region, Kitsman district, Orshivtsi village), PLC ‘Provesin’ (Lviv), Ltd. ‘Obrii’ (Chernihiv region, Talalaevka district, Kharkove village), PLC ‘Gunivska’ (Zaporizhzhia region, Velykobilozersk

district, Gunivka village), using as their information base their balance sheets (financial statements) for 2017 according to official data of the Stock Market Infrastructure Development Agency of Ukraine (SMIDA) (Table 1).

Actuarial financial statement (balance sheet), standard form No. 1-a, characterizes the aggregate amount of net operating assets (NOA) (Part I), that is, the net accounting value of agricultural enterprises’ economic resources. In other words, the property characterizes the main operating activity of an agricultural enterprise. From Table 1, it is noticeable that the most significant net accounting value of economic resources was at PLC ‘Obrii’, and amounted to UAH 201,479.0 thousand and UAH 297,305.0 thousand, respectively, at the beginning and the end of 2017.

The liability of the actuarial financial statement (balance sheet) contains two sections: Section II. Net financial liabilities (NFL) and Section III. Owner’s equity (OE). However, Section II, if the aggregate amount of financial liabilities (FL) exceeds the aggregate amount of financial assets (FA) and takes the form of net financial assets (NFA).

Finally, it is the characteristic of PLC ‘Verbivske’ and PLC ‘Gunivska’, where the total amount of net financial assets amounted to UAH 19454,0 thousand, UAH 53060,0 thousand, UAH 3028,0 thousand, and UAH 3022,0 thousand. However, the amount of financial assets is substantially less than the amount of financial liabilities at PLC ‘Orshivska’, PLC ‘Provesin’, and Ltd. ‘Obrii’ Therefore, net financial liabilities are formed in the enterprises.

Accordingly, the liability of the actuarial financial statement (balance sheet) accumulates actuarial accounting information on the financial activities of the agricultural enterprises under investigation; in other words, the sources of financing for operational activities in the agricultural sector. Shigaev (2011) characterizes the right-hand side of the first actuarial reporting form as the aggregate amount of economic resource requirements that investors make.

The actuarial financial statements of the studied agricultural enterprises in Table 1 are used to as-

**Table 1.** Economic potential of agricultural enterprises through the lens of actuarial reports in 2018

Source: Developed by the authors.

	PLC 'Verbivske', (Kharkiv region, Balakliia district, Verbivka village)		PLC 'Troiana' (Kyiv)		Ltd. 'Orshivska' (Chernivtsi region, Kitsman district, Orshivtsi village)		PLC 'Provesin' (Lviv)		Ltd. 'Obrii' (Chernihiv region, Talalaevka district, Kharkove village)		PLC 'Gunivska' (Zaporizhzhia region, Velykobilozersk district, Gunivka village)	
	At the beginning of the reporting period	At the end of the reporting period	At the beginning of the reporting period	At the end of the reporting period	At the beginning of the reporting period	At the end of the reporting period	At the beginning of the reporting period	At the end of the reporting period	At the beginning of the reporting period	At the end of the reporting period	At the beginning of the reporting period	At the end of the reporting period
<b>ASSETS</b>												
<b>I. Net operating assets</b>												
Operating assets	107,137.0	101,580.0	582,978.0	310,550.0	468,039.0	478,411.0	29,194.0	28,720.0	331,315.0	357,947.0	42,638.0	55,967.0
Operating liabilities	206,125.0	234,082.0	588,911.0	274,651.0	284,512.0	286,893.0	17,421.0	22,714.0	129,836.0	60,642.0	814.0	3,394.0
Total Section I	(98,988.0)	(132,502.0)	(5,933.0)	35,899.0	183,527.0	191,518.0	11,773.0	6,006.0	201,479.0	297,305.0	41,824.0	52,573.0
BALANCE	(98,988.0)	(132,502.0)	(5,933.0)	35,899.0	183,527.0	191,518.0	11,773.0	6,006.0	201,479.0	297,305.0	41,824.0	52,573.0
<b>LIABILITIES</b>												
<b>II. Net financial liabilities</b>												
Financial liabilities	26,412.0	99.0	–	–	10,000.0	10,000.0	9,016.0	9,016.0	14,903.0	3,649.0	–	–
Financial assets	45,866.0	53,159.0	–	–	46.0	46.0	–	–	–	–	3,028.0	3,022.0
Total Section II	(19,454.0)	(53,060.0)	–	–	99,954.0	99,954.0	9,016.0	9,016.0	14,903.0	3,649.0	(3,028.0)	(3,022.0)
<b>III. Owner's equity</b>												
Owner's equity	(79,534.0)	(79,442.0)	(5,933.0)	35,899.0	83,573.0	91,564.0	2,757.0	(3,010.0)	186,576.0	293,656.0	44,852.0	55,595.0
Total Section III	(79,534.0)	(79,442.0)	(5,933.0)	35,899.0	83,573.0	91,564.0	11,773.0	6,006.0	186,576.0	293,656.0	44,852.0	55,595.0
BALANCE	(98,988.0)	(132,502.0)	(5,933.0)	35,899.0	183,527.0	191,518.0	11,773.0	6,006.0	201,479.0	297,305.0	41,824.0	52,573.0

sess their market value by the method of adjusted net assets, and to summarize the results obtained in Table 2.

Nikolaenko and Efimova (2015) emphasize that the calculation of the aggregate amount of net assets is to calculate the difference between assets (A) and liabilities (L) according to the financial statements of an enterprise. However, scientists do not pay attention to the fact that from the above amount, it is obligatory to calculate the debt of the founders for contributions to the authorized capital (DF) and the future period income (FPI). Due to the formula presented earlier, the calculation of net assets will take the following form:

$$NA = (A - DF) - (L - FPI). \quad (3)$$

As for 2017, the founders' arrears of contributions to the authorized capital and future periods were absent at the analyzed agricultural enterprises, the calculation of the value of the adjusted net assets (ANA) according to the actuarial financial statement will take the following form:

$$ANA = OA + FA - OL - FL, \quad (4)$$

$$\text{or } ANA = NOA - NFL. \quad (5)$$

The adjusted amount of the entity's net assets is calculated as the difference between Part I 'Net Operating Assets' and Part II 'Net Financial Liabilities' of the current (estimated) financial statement (balance sheet), standard form No. 1-a. It is worth noting that, when using the actuarial balance sheet, as an information base for further assessment of the net assets method, unlike the use of the traditional financial statement, there is no need to adjust such items as real estate, machinery and equipment, intangible assets, long-term and short-term investments in the market value,

since this procedure is carried out at the stage of actuarial reporting in 5D. For liabilities, they are measured at the present value.

From the data of Table 2, it is noticeable that the whole procedure of calculating the value of agribusiness by the method of adjusted net assets, according to the actuarial data, is reduced to calculate the difference between the first and second sections of the actuarial (estimated) financial statement (balance sheet), standard form No. 1-a, or net operating assets (NOA) and net financial liabilities (NFL) (in the absence of the latter, between net operating and financial assets). This creates significant advantages over the traditional fifteen-stage adjustment method of the net asset method.

PLC 'Verbivske' and PLC 'Provesin' are characterized by a negative net worth of the enterprise, since the investigated agricultural enterprises do not have net financial liabilities at all, while net financial assets are present (NFA).

At PLC 'Troiana', Ltd. 'Orshivska', Ltd. 'Obrii' and PLC 'Gunivska', the net value of business is positive. However, PLC 'Troiana' also lacks the amount of net financial liabilities (NFL), and PLC 'Gunivska' has have a negative value, and they acquire forms of net financial assets (NFA). However, in the final expression, this did not influence the positive value of the net worth value of the abovementioned agricultural enterprises, which amounted to UAH 35,899.0 thousand and UAH 55 595.0 thousand.

Among the investigated agricultural enterprises, the most investment-attractive is Ltd. 'Orshivska' with a net worth of UAH 91564,0 thousand, and Ltd. 'Obrii' with a value of UAH 293,656.0 thousand. It means that a real and potential investor or other

**Table 2.** Calculation of the agricultural enterprises' value using the method of adjusted net assets (within the cost-effective approach)

Source: Developed by the authors.

Title of the actuarial financial statement (balance sheet) section	PLC 'Verbivske'	PLC 'Troiana'	Ltd. 'Orshivska'	PLC 'Provesin'	Ltd. 'Obrii'	PLC 'Gunivska'
I. Net Operating Assets (NOA)	(132,502.0)	35,899.0	191,518.0	6,006.0	297,305.0	52,573.0
II. Net Financial Liabilities (NFL)	(53,060.0)	–	99,954.0	9,016.0	3,649.0	(3,022.0)
Cost of agribusiness (NOA-NFL)	(79,442.0)	35,899.0	91,564.0	(3,010.0)	293,656.0	55,595.0

capital providers will be interested in these agricultural enterprises. Therefore, the adjusted net assets method within the cost-effective approach based on 5D innovative and informational based on actuarial management allows estimating operatively and objectively the cost of agribusiness in one step only.

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## CONCLUSION

Thus, the proposed 5D model of Ukrainian agribusiness valuation management should take an important place in the modern system of improving the investment attractiveness of the agricultural sector of the Ukrainian economy because based on its generalized information through the lens of spatial interpretation of 5D actuarial reporting management, a favorable ground for further implementation of objective evaluation is being formed within the framework of a cost-effective approach, by transforming financial reporting into 3D. The research showed that in Ukrainian agricultural enterprises, taking into account the specifics of the industry, the most expeditious method for implementing the effectiveness of the system of business valuation, within the framework of the cost-effective approach, is the method of adjusted net assets. The entire procedure for assessing the agricultural enterprise's economic potential is reduced to calculating the difference between the first section of the asset and the first section of the liability of the actuarial financial statement (balance sheet), standard form No. 1-a.

Information on the agricultural enterprise's value is primarily useful for real and potential foreign investors and other capital providers, the complex increases the level of their investment attractiveness in the agricultural sector in order to attract the necessary financial resources and investments. The latter contributes to building the effectiveness of the management system for the cost of national agribusiness and opens the horizons for active international cooperation on the world stage of agrarians in the capital market.

The results of the content-information filling of the 5D model through the lens of actuarial management reporting can be used in the system of agricultural enterprises' valuation management to attract the necessary amount of foreign investment, that is, to contribute to increasing the level of their investment attractiveness on the world stage of agrarians.

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