

INFLUENCE OF VERTICAL INTEGRATION OF ENTERPRISES ON CHANGE OF THEIR FINANCIAL INDICATORS AND ECONOMIC SECURITY

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ABSTRACT

Article takes into account that vertical integration of enterprises affects change of their financial performance and economic security. On example of international vertically integrated holding Metinvest B.V. main results from acquisition of 50% of shares of metallurgical plant “Zaporizhstal” were demonstrated. Positive impact of change in pre-tax profit indicator and quantitative improvement of level of economic security of all participants in integration has been revealed. Obtained results allowed to form classification of management decisions on basis of impact on change of economic security of enterprise. In particular, in traditional solutions, such as vertical integration to increase market share and minimize costs, a change in economic security is a side effect. However, if a management decision is made purposefully to improve economic security, it can result not only in an increase in its level, but also in reducing the time required for economic security indicators to reach their limits, as well as improving the coherent security of stakeholders.

Keywords: Economic Security, Influence, Pre-Tax Profit, Vertical Integration, Financial Indicators.

INTRODUCTION

Changing models and principles of business organization, primarily due to increasing competition and dynamism of business environment. The first to note these trends were Michael Piore and Charles Zebel. According to them, competition has led to new logic of production activities of economic entities - flexible specialization:

“... there are flexible manufacturers, who are able to respond quickly to changing market conditions to meet the requirements of constantly changing market, firms resort to new ways of organizing, which provide for the distribution of production by diversified inter-firm relations with suppliers, subcontractors and end users” (Piore & Sabel, 1984).

Companies, that prefer prosperity rather than just survival in times of crisis, tend to successfully realize opportunities for growth. Already today in many industries there is an acquisition of some companies by others, and in the near future there will be an increase in the

number of mergers and acquisitions. This happened during the global financial crisis. And this will happen again after the crisis caused by the coronavirus pandemic. The basic reason for this is that vertical integration leads to increased control and increased profitability. Shifting towards vertically integrated business models makes sense: it allows you to control the supply chain, the project planning process and the results that contribute to higher profitability. It is also important: the greater the vertical integration degree, the higher the profitability.

Today's fragmented and multilevel contracting practices often hinder large-scale changes in the way we work, deploy digital tools, make overall investments and develop new ones. Therefore, most corporate enterprises have already revised their supply chains for vulnerability to the pandemic. In future, they should consider various options for strengthening - such as the creation of inventories, the definition of reserve distribution channels and attracting human capital to replace subcontractors. This can lead to greater consolidation and vertical integration of the supply chain not only to minimize hazards and threats, but also to improve financial performance and strengthen economic security in the future. This determines the relevance of research to identify the impact of vertical integration on these indicators.

The purpose of the work is to substantiate the method of determining the impact of vertical integration of corporate enterprises on their financial performance and economic security.

LITERATURE REVIEW

The issue of vertical integration of enterprises and its feasibility has been given much attention in the works of scientists, among whom the first were M. Adelman (Adelman, 1949), R.Coase (Coase, 1937), G. Stigler, (Stigler, 1951), K. Harrigan (Harrigan, 1984, 1985), S.J. Grossman, O.D. Hart (Grossman & Hart, 1986) and others who analyzed the causes of integrated structures, forms and types of vertical integration of enterprises, its consequences.

According to neoclassical direction of the economic theory, which allows the existence of competitive markets through which the efficient allocation of resources, the only justified case of vertical integration was the existence of a continuous technological relationship of different stages of production. It was assumed that in order to achieve the efficiency of successive processes that coincide in time and space, such as in the production of steel, common property is needed (Coase, 1937). However, later various scientists proved that the market is not an ideal mechanism for allocating resources.

G. Stigler took a different view, considering the vertical integration of firms through the theory of division of labor, authored by Adam Smith. According to this view, at the beginning of the industry, all firms in it are highly integrated, because due to the novelty of the product, materials, equipment it is difficult to find partners with whom to cooperate, respectively, businesses are forced to produce everything within their units. As the industry grows and reaches a certain scale, the stages of the technological chain are disintegrated, as specialized firms perform certain functions with greater efficiency and lower costs due to the division of labor. But as soon as the industry enters a stage of decline, the decline begins in the "service" industries that produce materials and equipment. The efficiency of firms in these industries is declining, which, according to G. Stigler, requires the return of previously transferred functions to the firm and a high degree of vertical integration (Stigler, 1951). The advantage of this approach is that the focus is on the size of production costs and the stage of development of the industry as factors influencing the degree of vertical integration. However, they did not take into account the

strengthening of economic security, which may also explain the need for vertical integration of firms, as shown in (Mishchuk, 2020).

M. Adelman argues that a firm is vertically integrated when within it from one unit to another is the movement of goods and services that could be sold on the market without further processing. This statement reflects the opinion of most scientists that vertical integration involves one hundred percent control of the firm over several stages of production (Adelman, 1949).

The alternatives to vertical integration were considered by K. Harrigan, who studied it taking into account the dynamics of the firm in the industry. He understood vertical integration itself as a way to increase added value when creating a particular product and promoting it to the end user (Harrigan, 1984, 1985).

Among the ukrainian researchers should be noted the work of D. Kolesnikov, who developed an indicator that takes into account changes in the financial results of operating activities and changes in financial condition of the vertically integrated structure with change in its members (Kolesnikov, 2013). However, the impact on economic security was overlooked.

The various scientific views on the essence of vertical integration, in our opinion, should not be considered as contradictory. On the contrary, when applying the systems approach, they can organically complement each other, characterizing vertical integration as a complex multilateral phenomenon, which results in various impacts on changes in key financial indicators and increased economic security.

MATERIALS AND METHODS

The methodological basis of the study is formed through the use of general scientific and special methods. In particular, the methods of abstract-logical and comparative analysis were used to clarify the essence of vertical integration; methods of analysis, synthesis, induction, deduction and logical generalizations – to develop methods for assessment of the impact of vertical integration on enterprises financial performance and change their economic security; tabular method – to visualize the statistical material and the results of calculations of the impact of vertical integration on financial performance and the level of economic security.

The vertical integration in most cases has a positive effect on the financial performance of enterprises participating in integration, which in turn increases the level of economic security of both these enterprises and the entire holding. At the same time, the acquisition of new assets and liabilities changes the financial condition of the holding company, which may deteriorate if significant amount of liabilities of the enterprise-goal is joined or improve if the enterprise-goal has significant stock of equity. Therefore, it is also necessary to assess the level of economic security based on modeling of consolidated balance sheet for the assessed option of vertical integration. It should be borne in mind that in the case of acquisition of shares of enterprise-goal for cash, these funds are transferred to the old shareholders of the enterprise-goal and go beyond the system. Therefore, these funds should be excluded when assessment of the security of holding after vertical integration. It should be noted that in the process of vertical integration, any components of economic security may change, not just financial (Nusinova, 2012). The level of security of technical and technological interests, competitive status, security of economic and information interests, as well as the level of security of stakeholders of enterprises - participants in vertical integration may differ significantly in the enterprise-goal (Mishchuk et al., 2020, 2021). It is obvious that in the process of vertical integration not only assets and liabilities are

joined, but also possible environmental, social and other problems of the enterprise-goal, which are transferred to the enterprise-buyer (Nusinova, 2012). Therefore, in addition to the well-known change in financial indicators, the main of which is profit, it is necessary to consider the change in economic security. This change represents economic security level deviation with and without vertical integration.

The methodology for assessment of economic security is described in detail in the works (Mishchuk et al., 2020, 2021). It is based on an assessment of the amount of insufficient pre-tax profit. This value is amount that the company will not receive due to the fact that financial ratios and other indicators of economic security are not equal to their nominal (regulatory) value. It is logical that as the result of vertical integration the amount of such insufficient profit before tax becomes smaller, compared to option without integration. The consequences of decision on vertical integration are characterized by three groups of influences: change in level of enterprises economic security – the participants in vertical integration, change in time period of economic security indicators of these enterprises to achieve their limits, change in coherent security of stakeholders. To determine the change in the integrated state of economic security of a corporate enterprise (*ISes*), the following indicator is proposed:

$$\Delta ISes = ISes_1 - ISes_0, \quad (1)$$

where $ISes_1$, $ISes_0$ – in accordance, the value of economic security integrated state of enterprise, taking into account the vertical integration and without it.

Metinvest B.V. holding is the powerful international vertically integrated group of companies. It includes mining companies in Ukraine and the United States that produce iron ore and coking coal (Metinvest, 2021). In order to become the leading integrated steel producer in Europe, Metinvest B.V. it is necessary to expand its organizational structure through the acquisition of domestic enterprises, whether mining and metallurgical enterprises, while taking into account the advantages and disadvantages of such an association, to assess the performance of integration through the resulting effect. In this case, it is necessary to take into account that when a loss-making enterprise is merged, the economic security of the Metinvest B.V. should have decreased, since there is the decrease in its financial assets in connection with the implementation of investments to purchase a block of shares in new structural element, as well as to cover its existing liabilities. However, there is a synergy, which D. Kolesnikov wrote about, the positive impact of which can serve as a basis for justifying the feasibility of increasing the number of participants in vertical integration. This should at least cover, firstly, the decrease in the value of the profit before taxation caused by the accession of new participant, and secondly, the existing debt of the enterprise (Kolesnikov, 2013). The most significant operations of vertical integration were the acquisition by the Metinvest B.V. holding of the Illich Steel and Iron Works, 50% of metallurgical plant “Zaporizhstal”, the Dnieper Metallurgical Combine, as well as the “Pokrovskoye” mine management and the Svyato-Varvarinskaya enrichment factory:

1. The purchase of industrial complex of the Dnieper Metallurgical Combine will allow Metinvest B.V. holding to expand its product line, replacing the production of square billets, wire rod assortments, rebar and structural shapes, as well as providing square billets to the Bulgarian company of the Promet Steel Holding Group;
2. The “Pokrovskoye” mine management and the Svyato-Varvarinskaya enrichment factory carry out the extraction of ordinary coal, its enrichment and further sale in the form of coal concentrate. Therefore, the consolidation of these assets will allow Metinvest B.V. holding to fully meet its own needs in coking coal

for pig iron production. Replacement of imported fuel with coal from the Pokrovske mine management will reduce the cost of pig iron smelting for the largest mining and metallurgical group;

3. One of the important operations was the acquisition by the holding ten years ago of 50% of the shares of metallurgical plant “Zaporizhstal”. The appearance of this plant provided sales of iron ore raw materials of three mining and processing plants: Central, North and Ingulets. According to experts in the ferrous metals market, if this metallurgical plant had not been acquired by Metinvest B.V. holding, Russian competitors would have done so. In this case, metallurgical plant “Zaporizhstal” would abandon the iron ore raw materials of Ukrainian mining and processing plants and buy it from Russian iron ore mining companies. This would lead to a significant reduction in sales by Metinvest B.V. companies.

Let us conditionally assume that when Metinvest B.V. of these metallurgical plants, the capacity utilization of other enterprises of the holding has not changed. Therefore, to assess the change in financial indicators, it arises due to changes in sales volumes, we will consider not the entire Metinvest holding, but only its mining and processing segment as part of PrJSC “Central GZK”, PrJSC “Northern GZK”, PrJSC “Ingulets GZK” and metallurgical plant “Zaporizhstal”. Therefore, in order to determine the feasibility of vertical integration, which has already taken place, we will consider only one factor – it is the change in the volume of production and sale of iron ore raw materials. To demonstrate the impact of such vertical integration, we calculate the financial performance of mining and processing plants - suppliers of finished products to the metallurgical plant in two ways: the presence and absence of the holding metallurgical plant “Zaporizhstal”. The main sources of information were:

1. In the case of vertical integration with 50% of the metallurgical plant “Zaporizhstal”: the sum of corresponding balance sheet of mining and processing plants and the values of the metallurgical plant “Zaporizhstal”, divided by 2;
2. In case of absence of 50% of metallurgical plant “Zaporizhstal” in holding: the sum of the corresponding indicators of enterprises balance sheets of Metinvest B.V. holding companies, reduced by amounts of change in cash, receivables and payables, which are received as a result of increased sales at integration with 50% of metallurgical plant “Zaporizhstal”;
3. Income and expenses from non-operating activities are not taken into account because they are not basic.

RESULTS AND DISCUSSION

As a result of the calculations, the following was determined. There is no impact of vertical integration for PrJSC “Central GZK”, since this one was supplying iron ore to the metallurgical plant “Zaporizhstal” at the time of the transaction.

Vertical integration of PrJSC “Northern GZK” with the metallurgical plant “Zaporizhstal” allowed the first enterprise to increase its sales of pellets by 50 thousand tons. This led to an increase in its operating profit and profit before tax by 32092, 58 thousand hryvnias (UAH), which is given in Table. 1.

Indicator	Variant 1: taking into account integration	Variant 0: lack of integration	Deviation	
			absolute	rel., %
Sales of main products, thousand tons:				
concentrate	3039,1	3039,1	-	-
pellet	10150,6	10100,6	50	0,50
Sales price of main products (excluding VAT), UAH for 1 t				

concentrate	617,31	617,31	-	-
pellet	944,65	944,65	-	-
Net sales revenue, thousand UAH	11465839,00	11417598,61	48240,39	0,42
Variable costs per 1 ton, UAH	204,72	204,72	-	-
Variable costs for entire volume of sold products, thousand UAH	2700153,59	2689917,75	10235,84	0,38
Fixed costs for entire volume of sold products, thousand UAH	3583657,41	3583657,41	-	-
Total operating expenses, thousand UAH	6283811,00	6273575,16	10235,84	0,16
Financial result from other operating activities, thousand UAH	-23568,00	-23568,00	-	-
Financial result from operating activities, thousand UAH	5158460,00	5120455,45	38004,55	0,74
Profit before tax, thousand UAH	5158460,00	5120455,45	38004,55	0,74

Source: financial statements of enterprises and (Kolesnikov, 2013)

From the Table 1 shows that if PrJSC “Northern GZK” did not cooperate with the metallurgical plant “Zaporizhstal” within the holding, its profit before tax would be lower by 38004.55 thousand UAH or 0.74%.

The greatest impact on growth of pre-tax profit was caused by the integration of PrJSC “Ingulets GZK” with the metallurgical plant “Zaporizhstal”. Assuming that Metinvest B.V. would not buy 50% of the shares of metallurgical plant “Zaporizhstal”, this plant would not cooperate with PrJSC “Ingulets GZK” and would not buy from it 2907.1 thousand tons of concentrate. In this case, the value of pre-tax profit of PrJSC “Ingulets GZK” would be less by 1742025.65 thousand UAH or 43.35% Table 2.

Indicator	Variant 1: taking into account integration	Variant 0: lack of integration	Deviation	
			absolute	rel., %
Sales of basic products, thousand tons				
concentrate	13487,96	10580,86	2907,1	27,48
pellet	0	0	0	
The sale price of concentrate (excluding VAT), UAH for 1 t	740,4165	740,4165	-	-
Net proceeds from sale of concentrate, thousand UAH	9986708,00	7834280,36	2152427,64	27,48
Variable costs per 1 ton, UAH	141,17	141,17	-	-
Variable costs for the entire volume of sold products, thousand UAH	1904126,31	1493724,32	410401,99	27,48
Fixed costs for the entire volume of sold products, thousand UAH	2395097,69	2395097,69	-	-
Total operating expenses, thousand UAH	4299224,00	3888822,01	410401,99	10,55
Financial result from other operating activities, thousand UAH	72769,00	72769,00	-	-
Financial result from operating activities, thousand UAH	5760253,00	4018227,35	1742025,65	43,35
Profit before tax, thousand UAH	5760253,00	4018227,35	1742025,65	43,35

Source: financial statements of enterprises and (Kolesnikov, 2013)

In determining the change in financial performance due to the integration of the metallurgical plant “Zaporizhstal” in the holding should be borne in mind that the holding *Metinvest B.V.* owns only 50% of the shares of this plant, so the value of the financial result before taxation of the metallurgical plant “Zaporizhstal” must be divided by 2. As a result, we will receive a loss in the amount of 139856,00 thousand UAH.

According to the methods described above and described in (Mishchuk, 2020, 2021) consider the results of impact of vertical integration on example of changes in the level of economic security of enterprises Table 3.

Enterprise	Level of economic security in variant 1: taking into account integration	Level of economic security in variant 0: lack of integration	Changing the level of economic security
PrJSC “Central GZK”	0,62/ middle	0,62/middle	Null
PrJSC “Northern GZK”	0,76/ high	0,58/ middle	+0,18
PrJSC “Ingulets GZK”	0,68/ middle	0,51/ middle	+0,17
Metinvest B.V.	0,67/ middle	0,57/ middle	+0,1

Source: calculated by I. Mishchuk

Thus, as a result of the getting of 50% of the shares of the unprofitable metallurgical plant “Zaporizhstal” the positive impact was obtained. It is manifested in the change in the pre-tax profit indicator and the quantitative improvement of the level of economic security for all participants in the integration (except for PrJSC “Central GZK”). PrJSC “Northern GZK” additionally received a qualitative improvement in economic security, the level of which changed from medium to high. This was facilitated by the reduction of pre-tax profits due to the strengthening of security of competitive status, obtaining additional funds to finance measures to strengthen the security of personnel interests, as well as economic and production interests.

The obtained results allow to form the classification of management decisions on the basis of the impact on the change of economic security of the enterprise. Thus, in traditional solutions, such as vertical integration to increase market share and minimize costs, a change in economic security is a side effect. However, if a management decision is made purposefully to improve economic security, it can result not only in increasing its level, but also in reducing the time required for economic security indicators to reach their limits, as well as improving the coherent security of stakeholders.

CONCLUSION

Comparing the absolute value and dynamics of profit before tax of enterprises participating in vertical integration before and after its implementation is only the first step in determining the impact of integration measures on financial performance and economic security. If after the vertical integration of enterprises the financial result before taxation in the current period is negative, then the integration is impractical. It is not necessary to conduct further analysis. If the vertical integration of enterprises will reduce the shortfall in pre-tax profits, it is necessary to calculate other impacts: reducing the time required for economic security indicators to achieve their limits, as well as changing the coherent security of stakeholders of enterprises – participants in vertical integration. The decision on vertical integration is one of the options of

management decisions, which are proposed to be classified depending on their impact on the change of economic security of the enterprise. The developed classification provides an opportunity to identify all possible impacts of integration measures and reasonably assess them.

Considering changes in financial indicators and the level of economic security made it possible to improve the quality of assessing the feasibility of vertical integration for the specified holding, and the practical use of the proposed methodological tools can contribute to selection of the most profitable variant for vertical integration in future.

Author Contributions

1. Mishchuk Ievgeniia – ideas, wrote sections as "Results and Discussion", "Conclusion", developed a methodology for assessing changes in economic security, taking into account vertical integration and the classification of management decisions based on the impact on changes in economic security.
2. Hamova Oksana, Tkachenko Sergii – wrote the "Introduction" section, were responsible for collecting statistical information on the metallurgical plant "Zaporizhstal".
3. Skliar Nadiia, Bulhakova Olena – conducted a literature review.
4. Levandivskiy Omelian – analyzed the mergers and acquisitions of Metinvest B.V. holding.

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