

Britchenko I.

*Doctor of Economics, Professor,
Professor of the Faculty of Technical and Economic Sciences,
State Higher Vocational School Memorial of Prof. Stanislaw Tarnowski,
Tarnobrzeg, Poland;
e-mail: ibritchenko@gmail.com; ORCID ID: 0000-0002-9196-8740*

Bohomolova N. I.

*Doctor of Economics, Professor,
Head of the Department of Finance and Credit
State University of Infrastructure and Technology, Kyiv, Ukraine;
e-mail: bogomolovan@ukr.net; ORCID ID: 0000-0001-5376-2437*

Kravchenko O. O.

*Doctor of Economics, Associate Professor,
Professor of the Department of Finance and Credit
State University of Infrastructure and Technology, Kyiv, Ukraine;
e-mail: kravch.olha@gmail.com; ORCID ID: 0000-0002-2258-2828*

Pinchuk S. S.

*Ph. D. in Economics,
Associate Professor of the Department of Finance and Credit
State University of Infrastructure and Technology, Kyiv, Ukraine;
e-mail: pin4yk_C@bigmir.net; ORCID ID: 0000-0001-5456-6403*

ASSESSMENT OF THE DETERMINANTS OF FINANCIAL SECURITY OF RAILWAYS IN UKRAINE

Abstract. The paper is devoted to the study of determinants determined the level of financial security of economic systems. It is shown that the financial security of an economic system implies the achievement of a level of financial stability that will contribute to simultaneously maintaining financial equilibrium and ensuring targeted growth in line with the development strategy.

The level of financial security of rail transport in Ukraine was analyzed and it was determined that the decline in its security was the result of a complex interaction of external and internal factors, the main of which were tight government regulation, shifting the financial burden of social responsibilities to Ukrzaliznytsya, PJSC, lack of competition in the transportation of the main nomenclature of cargo and the unsatisfactory state of non-current assets. Based on the Argenti's method, it is shown that the consequence of the inefficient financial management of Ukrzaliznytsya, PJSC are the reduction of its insolvency.

Three main determinants of the financial security of rail enterprises were identified: a reduction in traffic volumes, an unstable capital structure and the impossibility of timely repayment of current liabilities. An additive model for assessing the impact of selected determinants on the level of financial security of Ukrzaliznytsya, PJSC is proposed. The analysis of the model parameters showed that the greatest impact has the index of industrial production, which is due to the predominant formation of its own financial resources of rail transport due to income from freight traffic.

A complex of measures designed to improve the financial condition of rail enterprises was proposed. It is substantiated that in order to equalize existing threats, it is necessary to take political decisions aimed at improving the financial condition of Ukrzaliznytsya, PJSC by reducing the intensity of leaching of its financial resources, as well as implementing an anti-crisis financial strategy aimed at optimizing the capital structure and financial rehabilitation of rail enterprises.

Keywords: financial security; financial condition; determinant; assessment, rail transport.

JEL Classification G32, L92.

Formulas: 3; fig.: 2; tabl.: 6; bibl.: 15.

Брітченко І.

д.е.н., професор,

професор факультету економічних і технічних наук,

Вищий державний навчальний заклад імені професора С. Тарновського, Тарнобжег, Польща;

e-mail: ibritchenko@gmail.com; ORCID ID: 0000-0002-9196-8740

Богомолова Н. І.

д.е.н., професор,

завідувач кафедри фінансів і кредиту,

Державний університет інфраструктури і технологій, Київ, Україна;

e-mail: bogomolovan@ukr.net; ORCID ID: 0000-0001-5376-2437

Кравченко О. О.

д.е.н., доцент,

професор кафедри фінансів і кредиту,

Державний університет інфраструктури і технологій, Київ, Україна;

e-mail: kravch.olha@gmail.com; ORCID ID: 0000-0002-2258-2828

Пінчук С. С.

к.е.н., доцент кафедри фінансів і кредиту,

Державний університет інфраструктури і технологій, Київ, Україна;

e-mail: pin4uk_C@bigmir.net; ORCID ID: 0000-0001-5456-6403

ОЦІНКА ДЕТЕРМІНАНТ ФІНАНСОВОЇ БЕЗПЕКИ ЗАЛІЗНИЧНОГО ТРАНСПОРТУ В УКРАЇНІ

Анотація. Присвячено дослідженню детермінант, що визначають рівень фінансової безпеки економічних систем. Показано, що фінансова безпека будь-якої економічної системи передбачає досягнення такого рівня фінансової стійкості, який буде сприяти одночасній підтримці фінансової рівноваги і забезпеченню цілеспрямованого зростання відповідно до стратегії розвитку.

Проаналізовано рівень фінансової безпеки залізничного транспорту України і визначено, що зниження рівня безпеки було результатом складної взаємодії зовнішніх і внутрішніх факторів, основними з яких є суворе державне регулювання, перекладання фінансового тягаря соціальних обов'язків на ПАТ «Укрзалізниця», відсутність конкуренції при перевезеннях основної номенклатури вантажів і незадовільний стан необоротних активів. На основі моделі Аргенті показано, що наслідком неефективного управління фінансами ПАТ «Укрзалізниця» стало зниження неплатоспроможності.

Виділено три основні детермінанти фінансової безпеки залізничних підприємств: скорочення обсягів перевезень, нестійка структура капіталу і неможливість своєчасного погашення поточних зобов'язань. Запропоновано адитивну модель для оцінки впливу визначених детермінант на рівень фінансової безпеки ПАТ «Укрзалізниця». Аналіз параметрів моделі показав, що найбільший вплив має індекс промислового виробництва, що обумовлено переважним формуванням власних фінансових ресурсів залізничного транспорту за рахунок доходів від вантажних перевезень.

Запропоновано комплекс заходів, спрямованих на поліпшення фінансового стану залізничних підприємств. Установлено, що для вирівнювання наявних загроз потрібно ухвалювати політичні рішення, спрямовані на поліпшення фінансового стану ПАТ «Укрзалізниця» шляхом зниження інтенсивності вимивання його фінансових ресурсів, а також реалізації антикризової фінансової стратегії, спрямованої на оптимізацію структури капіталу і фінансового оздоровлення залізничних підприємств.

Ключові слова: фінансова безпека, фінансовий стан, детермінанта, оцінка, залізничний транспорт.

Формул: 3; рис.: 2; табл.: 6; бібл.: 15.

Бритченко И.

д.э.н., профессор,

профессор факультета экономических и технических наук,

Высшее государственное учебное заведение имени профессора С. Тарновского,

Тарнобжег, Польша;

e-mail: ibritchenko@gmail.com; ORCID ID: 0000-0002-9196-8740

Богомолова Н. И.

д.э.н., профессор

заведующий кафедрой финансов и кредита,

Государственный университет инфраструктуры и технологий, Киев, Украина;

e-mail: bogomolovan@ukr.net; ORCID ID: 0000-0001-5376-2437

Кравченко О. А.

д.э.н., доцент,

профессор кафедры финансов и кредита;

Государственный университет инфраструктуры и технологий, Киев, Украина;

e-mail: kravch.olha@gmail.com; ORCID ID: 0000-0002-2258-2828

Пінчук С. С.

к.э.н., доцент кафедры финансов и кредита,

Государственный университет инфраструктуры и технологий, Киев, Украина;

e-mail: pin4uk_C@bigmir.net; ORCID ID: 0000-0001-5456-6403

ОЦЕНКА ДЕТЕРМИНАНТ ФИНАНСОВОЙ БЕЗОПАСНОСТИ ЖЕЛЕЗНОДОРОЖНОГО ТРАНСПОРТА В УКРАИНЕ

Аннотация. Посвящено анализу уровня финансовой безопасности железнодорожного транспорта в Украине и оценке формирующих его детерминант. Построена аддитивная модель влияния выделенных детерминант на уровень финансовой безопасности. Разработан комплекс мероприятий, направленных на улучшение финансового состояния предприятий железнодорожного транспорта.

Ключевые слова: финансовая безопасности, финансовое состояние, детерминанта, оценка, железнодорожный транспорт.

Формул: 3; рис.: 2; табл.: 6; библи.: 15.

Introduction. The global financial and economic crisis, the acute phase of which lasted for 2008—2009, and the subsequent slowdown of the economic recovery, led the understanding by the political community of the industrialized countries of the need to change the approaches to the formation of the economic policies and development strategies not only of the individual states, but also their associations. In such circumstances, the development and implementation of a new model of development, the basis of which is the policy of neo-industrialization or industrial renaissance, which became ‘one of the most hotly debated and interesting issues of the early twenty-first century...’ [1], becomes particularly acute as the post-crisis revival began, first of all, in the industrial sector, which is already considered as one of the ‘driving force’ the way-out of the economy from a recession.

This, in turn, led to a change in the assessment of the importance of certain infrastructure industries for the development of the economy and its industrial potential. Until recently the leading European countries put the main emphasis on the development of the road transport, and the railways were considered ‘old-fashioned’, now it is returning its positions as one of the most efficient and safe modes of transportation, which allows carrying large volumes of goods and passengers to the significant distances. In addition, the rail transport is virtually non-alternative for individual goods (coal and coke, oil and petroleum products, ore, ferrous metals, chemical and mineral fertilizers, grain and products of grinding). M. Sussman (the President of Strategic Rail Finance, USA), noted that for a well-functioning society, railways have the same meaning as clean

water and electricity [2]. This is also true for Ukraine, where the rail transport is a system-building infrastructure industry.

Thus, in 2017, the Ukrainian railways accounted for 55.9% of the cargo turnover and 28.4% of the passenger turnover of all modes of transport. [based on 3]. Ukrzaliznytsya, PJSC is one of the largest taxpayers in the state and local budgets: in 2017 it paid 17.5 billion UAH as taxes and fees to the budgets of all levels and the state trust funds. In addition, in 2016 Ukrzaliznytsya, PJSC was at the top of the 500 largest companies ranking in the Central and Eastern Europe by the number of employees (more than 270 thousand people). Thus, functioning of the rail transport of Ukraine, its financial efficiency and safety are one of the key factors of not only national economy functioning, but also ensuring economic security of both the state as a whole, branches of the national economy and individual enterprises.

In the context of the financial and social and economic crisis, the issue of the financial security ensuring becomes especially urgent. This is equally valid for the rail transport, for which the assessment of the determinants of the financial security will enable not only to timely diagnose the difficulties encountered in its financial activities, but also to develop the appropriate management solutions aimed at eliminating the emerging threats to the financial sustainability and solvency, as well as to prevent the reduction of the efficiency operational activity and decrease in the investment activity.

Literature review and the problem statement. The issues of the financial security ensuring in the conditions of instability are devoted to the publication of the leading domestic and foreign scientists, among which E.I. Altman [4], St. Athanasoulis, R. Shiller, E. van Wincoop [5], O. Baranovs'kyi [6], E. Brigham, M. Ehrhardt [7], V. Delas, E. Nosova, O. Yafinovich [8], M. Yermoshenko [9], V. Heyets, M. Kyzym, T. Klebanova, O. Chernyak [10] should be noted. These researchers carried out the fundamental theoretical and practical studies of the issues of the financial security ensuring of the state, individual markets, financial institutions, and industrial enterprises.

At the same time, in these studies, the issue of the financial safety in relation to the rail transport is practically not considered. This is explained, on the one hand, by the established scientific tradition, when the functioning of the industry is considered as one of the constituent parts of the national security of the state through the prism of transportation capacities and the traffic capacity of the transport network. On the other hand, little attention was paid to the financial aspects of the rail companies' activity due to the considerable control of the financial and economic activities of the state, the emphasis on the technical safety of the rail transport, the complexity of the organization of finance in the industry, etc. This led to the accumulation of the issues in financial activities of Ukrzaliznytsya, PJSC, which can have negative consequences not only for the rail transport (stopping traffic due to the current assets deficiency, violation of the integrity of the network due to the unacceptably high wear and tear and obsolescence of non-current assets, etc.), but also the economy as a whole, as well as the national security of Ukraine.

Therefore, the purpose of this study is to assess the determinants of the financial safety of Ukraine's rail transport and justify a set of measures to improve the financial condition of Ukrzaliznytsya, PJSC.

Research results. Maintaining an adequate level of the financial security in any economic system (state, region, enterprise) in an unstable environment is a prerequisite for its survival. This is due to the fact that exactly the security level characterizes the degree of 'security' when destabilizing effects emerge in the internal and external environment and the ability to neutralize them with the least losses.

The complexity and comprehensiveness of 'financial security' concept leads to a divergence of views of the scientists on its essence and definition of criteria that determine the level of the financial security. This is due to the fact that financial security must simultaneously be considered in the plane of (1) the possibilities of effective functioning of a certain system in an unstable market environment (2) the ability to form the necessary internal and external resources and their rational use; (3) the development potential forming; (4) maintaining the optimal (necessary or sufficient)

level of the financial sustainability, and (5) countering the internal and external threats to its stability.

The economic system (the rail transport, in particular) can be considered to have a sufficient level of the financial security if there is an efficient and continuous allocation of the resources; current and potentially possible financial risks can be identified and evaluated in a timely manner with sufficient accuracy, allowing for adequate management decisions to minimize their negative impact; the system can ‘absorb financial and real economic unpredictable events...’ [11]. Thus, the financial security implies achieving such a level of the financial stability that allows the economic system to get a level of the financial stability that will contribute to simultaneously maintaining financial equilibrium and ensuring targeted growth in line with the development strategy.

Any economic system, including rail transport, has a specific functioning and development that significantly influences the current and future levels of the financial stability, that is, on the determinants, the change of which is determinant for the level of security. Their allocation should be based on the analysis of production and economic activity and financial situation.

The issues of the financial activity of the rail transport in Ukraine are a consequence of the deep crisis, which became the result of a complex of interconnected factors, the main of which are: (1) rigid state regulation of the production, economic, and financial activity of branch enterprises, in particular tariff and depreciation policy, etc., which excludes the possibility of timely and adequate response to changing market conditions in the transport services market; (2) shifting the financial burden of the state's social obligations to the rail transport without corresponding compensation of the expenses (the transportation of the preferential categories of passengers, provision of tariff preferences to certain sectors of the national economy, maintenance of unprofitable low-performing sections of the rail network, etc.), which leads to the gradual omission of the financial resources from operating turnover and reduces the possibilities of the innovative development of the rail transport; (3) the actual lack of competition in the carriage of the main nomenclature of goods (coal and coke, oil and oil products, iron and manganese ores, ferrous metals, chemical industry products, grain and products of grinding, and building materials) resulting in the lack of motivation to expand the services list and improving their quality; and (4) the unsatisfactory state of non-current assets, in particular rolling stock and cars, which greatly reduces the transport capabilities of the rail transport and, as a consequence, its financial results.

The result was a reduction in the level of the financial security of the rail transport. It is advisable to assess the ‘normal nature’ of the financial situation in the industry using the Credit-Men method, which involves calculating the integral indicator based on the coefficients of a rapid liquidity, creditworthiness, immobilization of equity, inventory turnover and receivables (Table 1).

The situation is considered good if the integral assessment of the financial situation exceeds 100. In 2010-2014 the financial situation of Ukrzaliznytsya, PJSC was not good, with the continuation of the trend of the further deterioration (Figure 1). The consequence of this was the issue of the deficit of current assets to finance the operational, investment, and financial activities. A substantial improvement of the situation in 2015-2016 was the result of not increasing the efficiency of production, economic, and financial activities, but solely artificial revaluation of the assets of the rail enterprises, which really did not affect the financial situation in the industry.

Table 1

Financial coefficients of Ukrzaliznytsya, PJSC

Indicators	2010	2011	2012	2013	2014	2015	2016
Quick liquidity ratio	0,11	0,18	0,04	0,07	0,08	0,21	0,29
Debt ratio	1,64	1,49	1,44	1,37	0,61	3,93	3,76
Equity immobilization rate	0,67	0,66	0,63	0,63	0,41	0,84	0,84
Inventory turnover ratio	16,75	16,77	14,93	12,70	14,57	13,33	11,49
Receivables turnover ratio	57,2	67,90	85,37	110,81	85,17	50,92	35,93

Source: Calculated by authors based on [12]

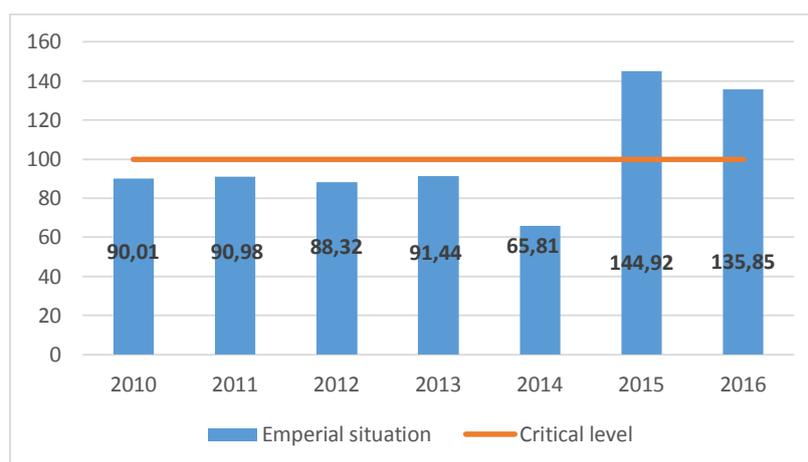


Fig. 1. Levels of financial situation of Ukrzaliznytsya, PJSC in 2010-2016

Source: Built by authors based on the calculations of the Depalyan's method

This is confirmed by calculations under the A-score (Argenti's method), which characterizes the level of management crisis of the company. The analysis of the situation in Ukrzaliznytsya, PJSC showed that the consequences of an ineffective management, first of all, of its finances were the symptoms of impending insolvency. This indicates that the development of the crisis situation under the A-score is already in the third stage, namely (a) there are attempts to conceal the deterioration of the indicators with the help of the 'creative' calculations, and (b) there is a shortage of funds that are being attempted to liquidate at the expense of expensive short money. Thus, A-score for Ukrzaliznytsya, PJSC is 81 points out of 100 (Table 2). This indicates a high probability of bankruptcy over the next five years and, as a consequence, a possible cessation of the rail transport, which would have catastrophic consequences for the national economy.

The rail transport as an infrastructure branch has peculiarities of organization of production, economic, and financial activity, which should be considered as the basic determinant of the financial security of any enterprise, since the actual efficiency of the production activity, its level of profitability determines the intensity of generation and the volume of operational cash flow. In this context, the key feature of the rail transport is its product, which is a service for the transportation (carriage) of goods and passengers and is not a new product that can be separated from the production process and can participate in the economic turnover in a material and physical form as a commodity.

Table 2

A-score for Ukrzaliznytsya, PJSC

Indicators	Accrued point*	A-score
1. Disadvantages		
Score points	39	43
2. Errors:		
too high share of borrowed capital	15	15
lack of current asset	15	15
the presence of a large project	0	15
Score points	30	45
3. Symptoms:		
deterioration of the financial indicators	3	3
use of 'creative' accounting	3	3
non-financial indicators of ill-being	3	3
the final symptoms of the crisis (lawsuits, scandals, resignations)	3	3
Score points	12	12
A-score	81	100

* accrued points were determined based on the results of an expert survey of the leading experts dealing with the issues of the rail transport economy

This also determines the revenue structure of Ukrzaliznytsya, PJSC (Table 3). Thus, revenues from freight transport form the basis of their own financial resources, their share increased from 75.2% in 2013 to 81.1%. The revenues from the passenger and luggage transportation accounted for 13.7% in 2013 to 10.0% in 2016. Similar dynamics is observed for other incomes and additional services related to revenues from the sale of the transport services. Other incomes have a small share.

Table 3

Indicators	2013		2014		2015		2016	
	million UAH	%						
Income from freight transportation	38805	75,2	39309	78,4	49099	80,4	54460	81,1
Income from passenger and luggage transportation	7059	13,7	5255	10,4	5997	9,8	6720	10,0
Other income and additional services	5186	10,1	4892	9,8	5028	8,2	5389	8,1
Other income	519	1,0	702	1,4	976	1,6	559	0,8
Total income	51569	100,0	50158	100,0	61100	100,0	67128	100,0

Source: Calculated by authors based on [12]

The conducted studies [13 et al.] show that the existing range of goods transported by the rail transport of Ukraine determines the existence of a stable correlation between the growth rates of volumes of the industrial production and transport, primarily freight (Figure 2). Therefore, for the period of 2007-2017, the correlation between indices of the industrial products and freight traffic was 0.964, which indicates a close connection between them. A less pronounced relationship exists between the volumes of the industrial products and passenger transport, the correlation of which amounted to 0.793. This necessitates the accounting of the current and forecast volumes of the production of the leading industries, as well as trends in their changes for the timely build-up or reduction of the production potential of the rail enterprises (transportation capacities) and the network of roads in general (traffic capacity).

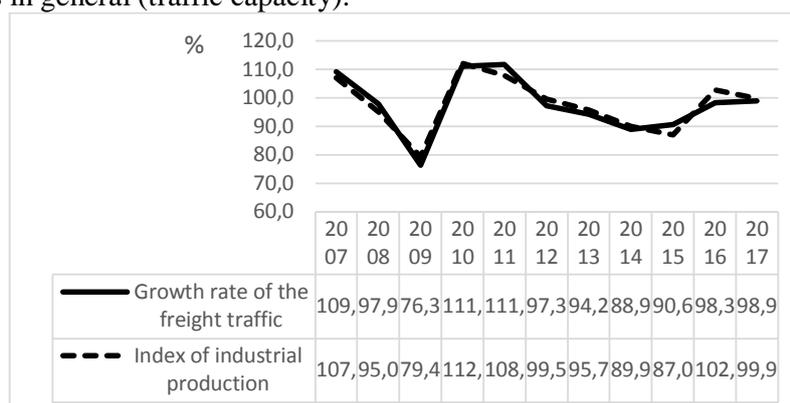


Fig. 2. The dynamics of the index of industrial production and the growth rate of the freight traffic in 2007-2017

Source: Built by authors based on [3, 14]

The analysis of the sold industrial production (goods, services) in 2007-2017 in comparable prices shows the unstable dynamics. Therefore, in determining the prospects for the incomes growth, it should be borne in mind that in 2014 there was a sharp decrease in the volume of industrial production by 45.2%, and this trend is not only preserved, but it can grow. This is due not only to the miscalculations in the state's economic policy, but also to the structural feature of the national economy. Thus, over the past few years, there has been a collapse of highly technologically

advanced industries and the transformation of Ukraine's economy into predominantly commodity economy while the global industry is shifting to a new, high-tech stage of development. This is accompanied by one of the largest commodity markets crisis, which, according to analysts, there may no longer be a way out of. Therefore, the most probable scenario is a gradual decrease in volumes of the industrial production and, as a consequence, the rail transport, revenues of Ukrzaliznytsya, PJSC and the further increase of disproportions in the formation of the financial resources (Table 4).

Thus, in 2014, own resources accounted for 57.9% of all resources, in 2015 — only 37.7%. In 2015-2016 the share of own capital grew to 79% due to the artificial increase in equity through a revaluation of its value, but, actually, (at a comparable cost) own capital accounted for only 33% of the financial resources. The consequence was an increase in the level of credit burden, which increased from 0.728 in 2013 to 2.018 (according to the data given) in 2016, which indicates an increase in the risk of insolvency due to the excessively high concentration of a borrowed capital. The artificial change in the capital structure of Ukrzaliznytsya, PJSC was aimed at increasing the 'attractiveness' of the enterprise for the potential investors, especially foreign ones. At the same time, the short-term liabilities exceed the long-term, indicating another significant issue — the lack of the financial resources to finance the operating activities, which could have catastrophic consequences for Ukraine's rail transport. Therefore, as the second determinant of the financial security of Ukrzaliznytsya, PJSC, one should consider the structure of its capital and, above all, credit load.

Table 4

Resource structure of Ukrzaliznytsya, PJSC in 2013-2016

Indicators	2013		2014		2015		2016	
	million UAH	%	million UAH	%	million UAH	%	million UAH	%
Own capital	43213	57,9	27769	37,7	218239	79,7	210813	79,0
Long-term liabilities	15619	20,9	9460	12,8	24061	8,8	26850	10,1
Short-term liabilities	15861	21,2	36444	49,5	31427	11,5	29189	10,9
Total	74693	100,0	73673	100,0	273727	100,0	266852	100,0
Credit load level actual / given	0,728	—	1,653	—	0,254 / 1,998	—	0,266 / 2,018	—

Source: Calculated by authors based on [12]

The deterioration in the financial condition of the Ukrainian railways negatively affected the financial risks associated with Ukrzaliznytsya, PJSC. Thus, the main financial risks of the rail transport in Ukraine are: (1) risk of operating activities financing as a result the decrease of the volumes of freight traffic and illiterate financial policies; (2) liquidity risk as a result of irrational credit policy leading to exceed of the amount of current liabilities over the amount of current assets; (3) interest rate risk as a consequence of the volatility of interest rates on the external liabilities and the high sensitivity of the financial results of Ukrzaliznytsya, PJSC to the changes in the basis points thereon; (4) credit risk arising, above all, in the process of shippers crediting; and (5) currency risk as a consequence of the calculations for transit and interstate transportation, as well as representation of the majority of obligations (more than 80%) in foreign currency.

Over the past few years, the level of these risks has significantly increased, which, according to Ernest&Young's Consulting Firm, was the result of the external factors, namely a significant deterioration in the social and economic situation in Ukraine, bilateral relations with other countries (first of all, Russian Federation), high inflation, lowering the level of the external and internal demand for transportation [12]. At the same time, the internal issues of Ukrzaliznytsya, PJSC (absence of the effective reforms in the sphere of the rail transport, the exhaustion of the financial resources, the actual cessation of not only extended but also simple reproduction of non-current assets, their unacceptably high wear and tear, etc.) are practically not considered as factors influencing the financial risks level. However, the consequence of these issues was the timeliness of

repayment of the current liabilities (Table 5). The situation has intensified since 2015, when the plan for the repayment of obligations was fulfilled only by 8.3%.

Such 'lack of commitment' of Ukrzaliznytsya, PJSC in terms of repayment of long-term loan agreements led to a cross-default on other loans and, consequently, to a decrease in the international ratings [15]. Thus, the consulting company Standard&Poor's has assigned a long-term foreign currency credit rating at SD level, credit rating LPN -CCC +; consulting company Fitch Ratings — levels RD and CCC respectively. And although the management of Ukrzaliznytsya, PJSC states that during 2016-2017, certain efforts were made to correct the situation, it acknowledges that the conditions for short-term Eurobonds ShortLine P-L-C (nominal value of USD 500,000) may also be violated. In this case, Eurobond holders will be entitled to demand immediate repayment of the debt. This will further worsen the financial situation of the rail companies, as these funds were directed not to the development of the industry, but to repay other obligations. Thus, the third determinant of the financial safety of the rail transport in Ukraine is the possibility of timely repayment of the obligations on the borrowed funds.

Table 5

Repayment of obligations of Ukrzaliznytsya, PJSC in 2010-2016

Indicators	2010	2011	2012	2013	2014	2015	2016
Attraction of funds, billion UAH	2,7	5,2	10,2	12,8	7,4	0,6	1,2
Liabilities settlement plan, billion UAH	2,8	3,8	7,6	17,7	11,1	8,4	16,3
Actual liabilities repayment, billion UAH	2,3	4,2	7,8	14,3	7,6	0,7	7,2
Plan execution, %	80,8	109,9	103,5	80,9	68,9	8,3	43,9

Source: Calculated by authors based on [12]

Then the financial safety of the rail transport can be considered as a dynamic function, the current level of which is defined by the determinants, formed in both the current and the previous periods of time, namely:

$$FS(t) = f(Pr_{ind}(t), Str_{kap}(t-1), V_{ob}(t-1)), \quad (1)$$

where, $FS(t)$ — the level of the financial security over the time period t ; $Pr_{ind}(t)$ — the index of the industrial production; $Str_{kap}(t)$ — the existing capital structure; $V_{ob}(t-1)$ — the level of the obligations repayment.

The identified determinants have a significant impact on the financial security of Ukrzaliznytsya, PJSC, which predetermines the need for their constant monitoring and analysis of factors that determine their level. However, in order to develop a set of priority measures to improve the situation, it is necessary to assess the impact of the determinants on the financial security.

As a criterion characterizing the existing level of security, the bankruptcy forecast ratio will be adopted, indicating the ability of the enterprise to pay for its short-term obligations, subject to the favorable sale of reserves. The influence of determinants on the coefficient of bankruptcy forecast taking into account (1) can be represented as an additive model as follows:

$$FS(t) = \alpha_0 + \alpha_1 Pr_{ind}(t) + \alpha_2 Str_{kap}(t-1) + \alpha_3 V_{ob}(t-1), \quad (2)$$

where, $\alpha_1, \alpha_2, \alpha_3$ — the model parameters characterizing the influence of the corresponding determinant on the level of the coefficient of forecasting bankruptcy; α_0 — a parameter characterizing the value of the resultant parameter under the condition that the influence of all determinants will be zero.

The initial data for calculating the parameters of the model (2) is given in Table 6.

Table 6

Repayment of obligations of Ukrzaliznytsya, PJSC in 2010-2016

Indicators	2010	2011	2012	2013	2014	2015	2016
Bankruptcy forecast ratio	-0,204	-0,161	-0,188	-0,152	-0,426	-0,078	-0,062
Industrial production index	1,122	1,080	0,995	0,957	0,899	0,870	1,028
Credit load level (given)	0,611	0,670	0,696	0,728	1,653	1,998	2,018
Current liabilities repayment level	80,8	109,9	103,5	80,9	68,9	8,3	43,9

Source: Calculated by authors based on [12]

The parameters of model (2) can be determined using the least squares method by solving a system of normal equations. As a result of the solution of the system of equations, the following financial security model for the rail transport of Ukraine was obtained:

$$FS(t) = -2,509 + 1,471Pr_{ind}(t) + 0,451Str_{kap}(t - 1) + 0,564V_{ob}(t - 1). \quad (3)$$

Model (3) is statistically reliable ($R^2 = 0,948$). Consequently, it can be used for the further analysis. Thus, the index of the industrial production has the greatest influence on the level of the financial security. This is explained by the fact that more than 75% of its own financial resources are formed due to the revenues from the freight transportation, the volume of which depends on the functioning of the national industry. This determinant is external to the rail transport and it cannot influence directly on it. However, the importance of the industry for the Ukrainian economy and its national security should lead to the political decisions that will help to increase the financial result of Ukrzaliznytsya, PJSC. Such decisions, in the first place, should include (1) the development and implementation of a mechanism for compensation from the state budget of the subsidies provided for the transport of the products of the individual industries; (2) the introduction of an effective mechanism for compensation for the passenger transportation carried out from the state and local budgets, as well as the determination of the liability of the officials for the late transfer of funds. This will impede the money laundering from the economic turnover of the rail transport enterprises and, thus, will reduce their sharp deficits. At the same time, the state, in accordance with the Law of Ukraine 'On Railway Transport' and the Association Agreement between the EU and Ukraine, should support the industry in (1) the development of free competition in the railroad market; (2) financing of the updating of non-current assets; and (3) providing greater autonomy in production, economic, and financial activities. The implementation of these events will not only maintain a sufficient level of the financial stability of Ukrzaliznytsya, PJSC in a crisis, but also reduce the imbalances in the financial activity, which will have a positive impact on its capital structure, the timely fulfillment of the credit obligations and, as a consequence, credit ratings.

As the crisis phenomena in the financial sphere of Ukrzaliznytsya, PJSC grow over a sufficiently long period of time, an anti-crisis strategy aimed at, on the one hand, the financial improvement of the rail enterprises and, on the other hand, the improvement of their 'financial image' as the reliable partners. An analysis of the existing anti-crisis financial strategies used in domestic and international practice has shown that the optimal strategy for optimizing capital structure is the most suitable for the rail transport. This strategy involves achieving an optimal (sound) ratio of own and borrowed capital in the structure of the long-term financing sources, minimizing the cost of raising capital and real growth of the market value of Ukrzaliznytsya, PJSC, which is especially actual due to its corporatization. In addition, the rail enterprises must get rid of non-core or unused assets; review the list of services provided to exclude unprofitable or low-return ones, taking into account the possibility of maintaining full-fledged transportation of the goods and passengers; carry out continuous monitoring of the generation of incoming and outgoing financial flows, as well as strictly control the level of liquidity, solvency, and financial sustainability. The anti-crisis financial strategy will only be effective if the management of Ukraine supports and continuously oversees its implementation not only by Ukrzaliznytsya, PJSC but also by the Ministry of Transport of Ukraine.

Conclusions. Thus, on the basis of the study carried out, it can be concluded that the level of the financial security has significantly decreased in Ukraine during the recent years, which may have extremely negative consequences for the national economy and state security in general. The main determinants of such a decrease in the financial security are (1) the decrease in the transport volumes as a result of a significant decline in the industrial production; (2) the inappropriate capital structure of Ukrzaliznytsya, PJSC with unjustifiably overestimated share of borrowed funds, primarily short-term; and (3) the impossibility of full timely repayment of the current liabilities due to the shortage of available financial resources.

An analysis of the proposed model of the influence of the determinants on the level of the financial security has shown that the index has the greatest influence on the industrial production, which is due to the predominant formation of own financial resources of the rail transport at the expense of revenues from freight transportation. Partial alleviation of the threats associated with this determinant may result, first and foremost, from the political decisions that would contribute to the improvement of the financial situation of Ukrzaliznytsya, PJSC due to the reduction of the intensity of its financial resources erosion. In addition, the state should provide the financial support for the development of the rail transport, and does not consider it exclusively as a state budget donor. In order to reduce the risks associated with two other determinants, Ukrzaliznytsya, PJSC should develop an emergency financial strategy aimed at optimizing the structure of capital and providing for the financial rehabilitation of the rail enterprises and risk reduction. A complex realization of these events will allow to maintain an adequate level of the financial stability in the conditions of reduction of demand for freight transportation, decrease the imbalances in the structure of capital, and also provide the necessary level of solvency under current obligations.

The complexity and multifaceted nature of the issue of financial security ensuring in the context of the crisis necessitates the further research aimed at developing the methodological bases for forecasting the impact of the individual threats on the level of the financial safety of the rail transport on the basis of the informal approaches (for example, scenario approach) to develop a set of measures for the prompt response to emerging threats, as well as on the development of the conceptual bases for monitoring changes in external and internal environment for timely identification.

Література

1. Naudé W. Industrial policy for development [Electronic resource] / W. Naudé, A. Szirmai // United Nations University. — 2013. — Available at : <https://pdfs.semanticscholar.org/8f69/e732f966d6f39598f50c551342d22a1fffd1.pdf>.
2. Sussman M. Realizing railroads' promise [Electronic resource] / M. Sussman. — Philadelphia, PA, 2013. — Available at : <https://www.dot.state.oh.us>.
3. Транспорт / Державна служба статистики України [Електронний ресурс]. — Режим доступу : <http://www.ukrstat.gov.ua>.
4. Altman E. Financial ratios, discriminant analysis, and the prediction of corporate bankruptcy / E. Altman // Journal of Finance. — 1968. — Vol. 23. — September. — P. 589—609.
5. Athanasoulis S. Macro markets and financial security / S. Athanasoulis, R. Shiller, E. van Wincoop // FRBNY Economic Policy Review. — 1999. — April. — P. 21—39.
6. Барановський О. І. Фінансова безпека в Україні (методологія оцінки та механізми забезпечення) / О. І. Барановський. — Київ : КНТЕУ, 2004. — 760 с.
7. Brigham E. F. Financial Management: theory & practice / E. F. Brigham, M. Erhardt. — Boston : Thomson, 2008. — 1200 p.
8. Delas V. Financial security of enterprises / V. Delas, E. Nosova, O. Yafinovich // Procedia Economics and Finance. — 2015. — № 27. — P. 248—266.
9. Єрмошенко М. М. Фінансова безпека держави: національні інтереси, реальні загрози, стратегія забезпечення / М. М. Єрмошенко. — Київ : КНТЕУ, 2001. — 309 с.
10. Геєць В. М. Моделювання економічної безпеки: держава, регіон, підприємство / В. М. Геєць, М. О. Кизим, Т. С. Клебанова, О. І. Черняк та ін. ; за ред. В. М. Геєця. — Харків : ВД «ІНЖЕК», 2006. — 240 с.
11. Єпіфанов А. О. Фінансова безпека підприємств і банківських установ : монографія / А. О. Єпіфанов. — Суми : ДВНЗ «УАБС НБУ», 2009. — 295 с.
12. Консолідована фінансова звітність за 2010—2016 рр. [Електронний ресурс] / Державна адміністрація залізничного транспорту України «Українська залізниця». — Режим доступу : http://www.uz.gov.ua/about/investors/financial_statements.
13. Бутов А. М. Рынок перевозок грузов железнодорожным транспортом / А. М. Бутов. — Москва : Национальный исследовательский университет «Высшая школа экономики», 2016. — 63 с.
14. Індеси промислової продукції в Україні [Електронний ресурс] / Державна служба статистики України. — Режим доступу : <http://www.ukrstat.gov.ua>.
15. Кредитні рейтинги [Електронний ресурс] / Державна адміністрація залізничного транспорту України «Українська залізниця». — Режим доступу : http://www.uz.gov.ua/about/investors/credit_ratings.

Стаття рекомендована до друку 03.12. 2018

© Бритченко І., Богомоллова Н. І.
Кравченко О. О., Пінчук С. С.

References

1. Naudé, W., & Szirmai, A. (2013). Industrial policy for development. United Nations University. Retrieved from <https://pdfs.semanticscholar.org/8f69/e732f966d6f39598f50c551342d22a1fffd1.pdf>.
2. Sussman, M. (2013). Realizing railroads' promise / M. Sussman. — Philadelphia, PA. Retrieved from <https://www.dot.state.oh.us>.
3. Derzhavna sluzhba statystyky Ukrainy [State Statistics Service of Ukraine]. (n. d.). Transport. Retrieved from <http://www.ukrstat.gov.ua> [in Ukrainian].
4. Altman, E. (1968, September). Financial ratios, discriminant analysis, and the prediction of corporate bankruptcy. *Journal of Finance*, Vol. 23, 589—609.
5. Athanasoulis, S., Shiller, R., & Wincoop, E., van. (1999, April). Macro markets and financial security. *FRBNY Economic Policy Review*, 21—39.
6. Baranovskyi, O. I. (2004). Finansova bezpeka v Ukraini (metodolohiia otsinky ta mekhanizmy zabezpechennia) [Financial Security in Ukraine (the methodology of the state and security mechanisms)]. Kyiv: KNTEU [in Ukrainian].
7. Brigham, E. F., & Ehrhardt, M. (2008). Financial Management: theory & practice. Boston: Thomson.
8. Delas, V., Nosova, E., & Yafinovykh, O. (2015). Financial security of enterprises. *Procedia Economics and Finance*, 27, 248—266.
9. Yermoshenko, M. M. (2001). *Finansova bezpeka derzhavy: natsionalsh interesy, realni zahrozy, stratehiia zabezpechennia* [Financial safety of the state: national interpees, pecial threats, security standards]. Kyiv: KNTEU [in Ukrainian].
10. Heyets, V. M., Kyzym, M. O., Klebanova T. S., & Cherniak, O. I. (et al.). (2006). *Modeliuvannia ekonomichnoi bezpeky: derzhava, rehion, pidpriemstvo* [Modeling of economic security: state, region, enterprise]. V. M. Heyets (Ed.). Kharkiv: VD «INZhEK» [in Ukrainian].
11. Yepifanov, A. O. (2009). *Finansova bezpeka pidpriemstv i bankivskykh ustanov* [Financial security of enterprises and banking institutions]. Sumy: DVNZ «UABS NBU» [in Ukrainian].
12. Derzhavna administratsiia zaliznychnoho transportu Ukrainy «Ukrainska zaliznytsia [State Railway Administration of Ukraine «Ukrainian Railways»]. (n. d.). *Konsolidovana finansova zvitnist za 2010—2016 rr.* [Consolidated financial statements for 2010—2016]. Retrieved from http://www.uz.gov.ua/about/investors/financial_statements [in Ukrainian].
13. Butov, A. M. (2016). *Rynok perevozok gruzov zheleznodorozhnym transportom* [The market of freight transportations by rail transport]. Moskva: Nacional'nyj issledovatel'skij universitet «Vysshaya shkola ehkonomiki» [in Russian].
14. Derzhavna sluzhba statystyky Ukrainy [State statistics service of Ukraine]. (n. d.). *Indeksy promyslovoi produktsii v Ukraini* [Indices of industrial production in Ukraine]. Retrieved from <http://www.ukrstat.gov.ua> [in Ukrainian].
15. Derzhavna administratsiia zaliznychnoho transportu Ukrainy «Ukrainska zaliznytsia [State Railway Administration of Ukraine «Ukrainian Railways»]. (n. d.). *Kredytni reitynhy* [Credit ratings]. Retrieved from http://www.uz.gov.ua/about/investors/credit_ratings [in Ukrainian].

The article is recommended for printing 03.12.2018

© Britchenko I., Bohomolova N. I.,
Kravchenko O. O., Pinchuk S. S