DECISION-MAKING ON THE ORGANIZATION OF EXPORT OF METAL PRODUCTS IN CONDITIONS OF THE RAISED RISK

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Summary

The problem of risks is one of key in foreign trade activities. It is connected with an opportunity of adverse events approaching for the enterprise and makes objectively inevitable element of acceptance and execution practically any decision.
Last years the increase of a competition on world market of metal products is observed. It is connected with the appearance of new exporters, policy of the states concerning the given kind of activity. In conditions of a high competition the opportunity of elimination of negative factors plays the increasing role. For this reason, the decision-making at the organization of metal products export by the metallurgical enterprises of Ukraine in conditions of the raised risks is actual.

The application of methods and receptions of the classical theory of risks for optimization of decision-making process of concrete metal products flow export in the direction of OJSC "Ilyich iron and steel works of Mariupol" - the countries of the European region with trans-shipment through seaports of Ukraine is viewed in the paper. The examined methods allow estimate expediency of routes at service of an export stream and thus, prove the decision which is made from the logistical point of view.

Keywords: metal products export, risk, decision-making, classical theory of risks.

1. INTRODUCTION

A problem of risks is one of key in foreign trade activity. It's connected with possibility of unfavourable events appearance and makes the inevitable element of making and execution of practically any decisions. The problem of the forecasted risks without force majeur accounting is considered in the article[1].

Indeterminacy, which is caused by two groups of factors, is the main reason of risk situations occurrence at the export market of metal products for the last years. The factors of indeterminacy causation are:

1. The external factors are occurrence of new exporters, decline of world prices on the types of metal products and etc;
2. The internal ones are increasi of railway transportation rates, increase of prices on natural gas and electricity, state policy regarding to the return of VAT, distribution of influencing are at the Ukrainian raw materials market.

The analysis of modern science, practical and theoretical developments in the area of risks management in transport-logistic systems shows that main attention is paid to the estimation of unfavorable commercial and financial events probability, and also the probable losses of enterprise. The methods of classic theory of risks allow formalize statement of task taking into account mathematical and economical aspects, strategy of decision maker in attitude to risks, specify of logistical processes within the framework of concrete link in supply chain[1].

The objective of paper is acceptance of optimal alternative in choosing of metal products delivery route in logistics chain "industrial enterprise – sea port" in conditions of risks factors influencing. These factors are connected with breach of cargo delivery terms and following financial losses. For the aim achievement it is suggested to apply methods of classical theory, which view risk as economic category.

[1] Nikolaenko I.V., Bulgakova J.V. (2008): "Choice of optimum route of metal products delivery in the conditions of risk", Vestnik PSTU, issue 18

2. CONCEPTION OF RISKS, RISK AS AN ECONOMIC CATEGORY

The risk is an indeterminacy of run and consequences of separate operations and the whole activity of enterprise.

Applying to the analysis of final economic result, risk equates with possibility of some unfavorable event offensive, which cause such a result. In other words term of risk is viewed as possible danger of losses, caused by specify of different natural phenomenon and human activities. Risk as an economic category is determined by the group of random events, each of can happen or not happen. During realization of concrete event one of three types of economic results can occur: (1) negative (harm, loss), (2) zero (status quo), (3) positive (winning, benefit, income).

The risk is considered as negative or in some cases zero economic result. A distinctive feature of the risk conceptiontion is lack of information, which includes uncertainty in that, whether an undesirable event happen and whether it caused an unfavorable conditions; accidental nature of final economic result.

In this way analysis and comparison of alternatives in the conditions of risk, applying to all decision makers, mean an analysis and comparison of transformations:

$$W_0 \rightarrow Wf$$

Here:

W_0 - initial capital of decision maker;

W_f - proper final result for decision maker's viewed alternative. The result is considered as an accidental quantity.

Each decision maker has own attitude to risks and probable losses during analyzing situations. So while making the optimal decision in condition of risks for the same situation applying to different decision makers the different recommendations could be obtained[2].

3. CHOICE OF CARGO DELIVERY ROUTE IN THE CONDITIONS OF RISKS

The question of risks influencing during export of metal products is viewed on the example of metallurgical enterprise with using of

[2] Brodetskiy G.L. (2006): *Design of the logistic systems. Optimum decisions in the conditions of risk*, Moscow: Vershina Companies, p. 72 – 79.

statistical information about export deliveries of OJSC "Ilyich iron and steel works of Mariupol". During the review of foreign trade activity of enterprise the dynamic of metal products transshipment through Ukrainian sea ports was determined (Table 1).

Table 1: Transshipment of metal products flow through Ukrainian sea ports

Type of cargo	Cargo flow according to sea port, thousand tonns				
	Mariupol	**Odessa**	**Illichevsk**	**Izmail**	**Iyzhnyy**
Plate steel	242,3	563,1	178,6	46,1	15,0
Hot-rolled steel	916,8	297,4	430,3	179,5	19,0
Cold-rolled steel	123,8	86,9	69,9	42,8	7,0
Slab	248,6	69,7	0	0	0
Pipe	0,6	6,6	4,3	1,1	0,0
Cast iron	47,1	0,0	0,0	0,0	0,0
Total	**1579,7**	**1023,7**	**683,2**	**269,5**	**41,2**

Source: According to Ilyich iron and steel works of Mariupol (2007): Report of foreign trade activity of "Ilyich iron and steel works of Mariupol"

The analysis of logistic chains of metal products export has allowed define classification of risks, that occur on different steps of material flows motion stages:

1. Commercial risks: violation of terms and conditions of deliveries, failure to of sides' financial responsibilities.
2. Political risks: state policy regarding to the return of VAT, increasing of transportation rates, power price increasing.
3. The risks caused by violations of safety engineering and fire safety: during handling operations in workshops and sea port, during cargo carriage, risks of cargo theft.
4. Technical risk: breakage of transport vehicles and, as a result, possible delays in cargo delivery and rise of other risks probability.
5. Risk of cooperation with agents: on the step of signing a contract, on the step of products selling.
6. Natural risks are those, which connected with appearance of nature forces: earthquakes, floods, storms, fires, epidemics[3].

[3] Zaharov K.B., Bocharnikov V.P. (2004): *Logistic, efficiency and risks of external*

Commercial risks, which are connected with terms and conditions of delivery, will be viewed on paper. Because of present economic situation in Ukraine these risks are most important.

Within the framework of suggested methods the next piculiarities of rising the task of searching an optimal cargo delivery route in conditions of risks are stated. This are:

1.The task is viewed within the one term of Incoterms 2000;

2.Calculated time of cargo delivery for the compared routes is considered approximately equal;

3.Accidental possible time of cargo delays in transit, connected with technical and organizational differences of sea ports, for those routes are differed.

Based on survey of the delivery terms of metallurgical enterprise, the possibility of classical risks theory appliance for risks accounting, according to the terms of delivery Incoterms 2000, is represented in Table 2.

As an example of suggested method appliance two possible routes of movement during the delivery of hot rolled steel from metallurgical enterprise in Turkey on terms CFR are viewed. These routes are: (1) with transshipment in sea port Odessa, (2) with transshipment in sea port Illichevsk.

Table 2**:** Appliance of classical risks theory according to delivery terms of Incoterms 2000

Terms of delivery	Possibility of appliance	Reasons	The viewed part of route
FOB Free on board	Not applied	Port of transshipment is choosen by castomer	-
CIF Cost, insurance and freight	Applied	Possibility of choosing the port of transshipment	Workshop – ship board in port of transshipment
CFR Cost and freight	Applied	Possibility of choosing the port of transshipment	Workshop – ship board in port of transshipment
DAF Delivered at frontier	Applied	Possibility of choosing the boundary castomer post	Worksshop – boundary castomer post

Source: According to INCOTERMS 2000 and Standard of enterprise of STP 227 - 08.03-02 (2002)

economic operations, Kiev: El'ga Nika Center, p. 60.

According to the term CFR – Cost and Freight transfer of risks from seller to customer causes at the moment of cargo arrival on the ship's board in the port of transshipment. So, the part of route from workshop to port of transshipment is viewed.

The next basic data are specified for the task rising:

1.Transport costs for each of the routes: customs duty of exported cargo, railway transportation costs, freight forwarding costs in the sea port, celebration of contract for sea carriage;

2.Penalty for each day of delay more than calculated term of cargo delivery stipulated in contract;

3.Accident delays of cargo delivery are specified by proper discrete partition law.

Formalization of stated task is made via additive model of commercial risks interpretation. The model allows analyze costs comparable with alternative as an accident quantity which is stated in absolute indexes.

The compared alternatives are two possible cargo delivery routes stated as a points $A_1(m_1;\sigma_1)$ и $A_2(m_2;\sigma_2)$. Here m_1, m_2 are mathematical expectation of middle expected expenses of contract implementation for alternatives which are considered; σ_1, σ_2 – proper mean-square distances, which characterize the indeterminacy measure of proper economic result.

In effort to choose the optimal alternative depending on decision maker's type of relation to risk the criterion functions and condition of choosing are stated.

Criterion function $f(m;\sigma_m)$, which determine the arrangement of lines of levels in space "Costs - Risk" for this decision maker. For different types of decision maker's relation to risks function $f(m;\sigma_m)$ have an appearances:

$f_1(m;\sigma_m) = m - 0{,}001 \times \sigma_m^2$ – tend to risks decision maker;

$f_2(m;\sigma_m) = m + 0{,}0001 \times \sigma_m^2$ – careful to risks decision maker;

$f_3(m;\sigma_m) = m$ –indifferent to risk decision maker.

Criterion of choosing the alternatives in conditions:

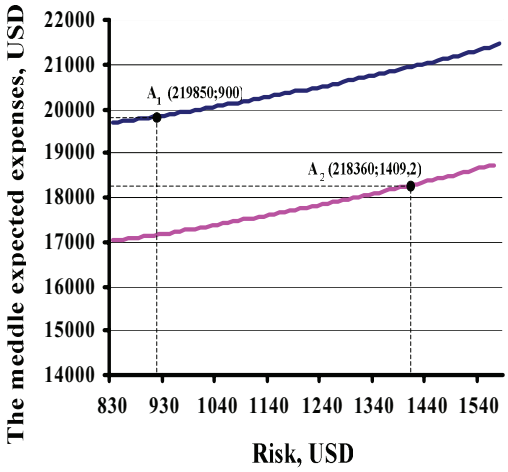
$$f(m;\sigma_m) \to \min$$

The searching minimum is one from number of alternatives A_1 and A_2. For comparison of alternatives by analytical method the criterion of the "expected value", EVC – criterion, and criterion of "meaningful dispersion", MVC – criterion, are used. Search of optimum decision by decision makers "tend to risk" and "careful to risk" is carried out by means of MVC – criterion. EVC – criterion allows make decision for person with indifferent attitude to risk[4].

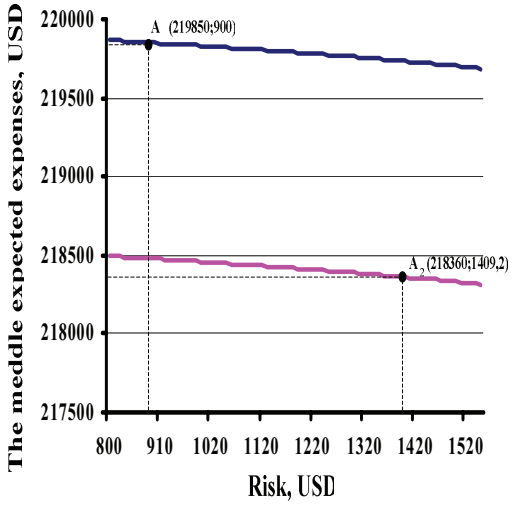
According to stated functions, the lines families that reflect the type of attitude to risk are built for comparison of alternatives by graphic method. In obedience to the requirements of choice criterion, the preferable alternative is that lies on line of lower level in space "Expense - Risk" (Figure 1).

Figure 1: The Graphic method of alternatives comparison: a) tend to risk decision maker; b) careful to risk decision maker; c) indifferent to risk decision maker.

a)

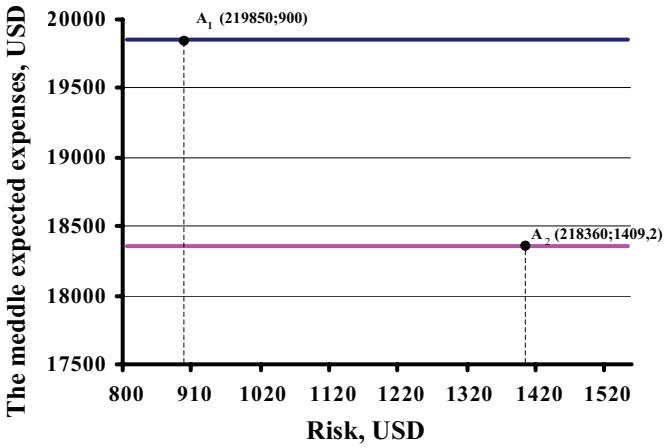


b)



[4] Brodetskiy G.L. (2006*): Design of the logistic systems. Optimum decisions in the conditions of risk*, Moscow: Vershina Companies, p. 112 - 136.

c)



Source: According to calculations based on appliance of classical theory of risks

According to criterion of meaningful dispersion the parameters of alternatives comparison are indexes of K_1 and K_2. These indexes characterize separate lines of levels of given lines family. Points, which present compared alternatives in space "Expense - Risk", are situated on this lines family. The results of comparison are presented in Table 3.

Table 3: Comparison of alternatives

Attitude to risk	**Criterion of comparison**	**Criterial equation**	**Value of comparison characteristics**	**Chosen alterna-tive**
Indifferent to risk	EVC	Comparison of the expected values of expense	$m_1 = 219850$ $m_2 = 218360$	A_2
Feel like a risk	MVC	$f(m;\sigma_m) = m - 0{,}001\times\sigma$	$K_1 = f(m_1;\sigma_1) = 219040$ $K_2 = f(m_2;\sigma_2) = 216374$	A_2
Careful to risks decision maker	MVC	$f(m;\sigma_m) = m + 0{,}0001\times\sigma$	$K_1 = f(m_1;\sigma_1) = 219931$ $K_2 = f(m_2;\sigma_2) = 218558{,}6$	A_2

4. CONCLUSION

During the researches the next points have been made. First, today the question of metal flow delivery in logistic chain "industrial enterprises – sea port" subjected to a great amount of different kind of risks. The problem of competitiveness is also relevant in viewed aspect. At the same time a considerable amount of risks connected with political and economical events had occurred in Ukraine and international stage for the last time. Possibility of reducing the losses occurred as a result of risk factors influence is the key requirement for making a decision.
Second, taking into account the peculiarity of the applied conception of classic risks theory of risks it is possible to draw a conclusion, that in order to forecast dynamic decision making process it is preferable one, because it envisage the consideration of risk as an economic category and searching the optimal proportion between risks and costs.

Third, the viewed conception was applied for enhancement the export operations of OJSC "Ilyich iron and steel works of Mariupol". Among the all aspects the grater attention paid to searching the most preferable delivery routes and ports of transshipment. In viewed case for all decision makers' attitudes to risk alternative, that represented by delivery route of hot rolled steel in Turkey with point of transshipment in sea port Illichevsk, is the optimal one.

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