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RESEARCH OF WORLD AND NATIONAL MARKET CONDITIONS FOR WOOD PRODUCTS

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Annotation: We defined the structure of dynamic price-series for wood materials, singled out and researched the trend character as well as the cyclic processes. Both trends and cycles have common dynamics. We developed additive and multiplicative price models for the objects we analyzed. We analyzed the indexes of times series dynamics for wood materials. Correlation analysis of price times series for wood materials and oil demonstrated strong connections between each other.

Key words: economic and mathematical analysis of price dynamics for wood materials, price trends, cyclic recurrence, seasonal fluctuations, price modeling, correlation with oil.

Introduction.

The Russian economic industries demonstrate a sophisticated branch structure, which is undergoing modernization under the conditions of the current crisis and these industries are being structuralized. The optimization of export oriented raw material industries is linked with the world economic integration and globalization of the international economy. The Russian timber industry is significant for the country's economy. Owing to great timber resources of the Northern territories Russia possesses owns 21% of all world timber resources. The management of these resources needs innovational changes. Having considered the following aspects, we conduct a complex research of the timber market's conjuncture.

Methods of research.

Due to the multiple layer structure of the market, the objects of our complex timber market research are commodity headings (wood, sawn-timber, etc), semi-products (pulp, cardboard, corrugated cardboard), semi-finished and finished production (paper, plywood, ruffle cans). We used such informational sources as Federal services of state statistics of the Russian Federation, Federal customs service, economic agents and other sources. Information on the volumes and prices of the wood and paper-based products from world produces is based on the data collected from international statistic organizations**:** FAOSTAT [4], Foex Index Ltd. [5], Index Mundi [6]. A database of world prices for timber materials and oil (1985-2015) was compiled in order to carry out this analysis (30 year period used). In order to evaluate and disclose common patterns of raw materials' dynamics world price tendencies for oil were analyzed and a comparative correlation analysis of times series for timber materials and petroleum was carried out.

In order to define the structure of times series we used autocorrelation that revealed the content component. Evaluation of significance and interval evaluation of autocorrelation indexes for all times series were performed as well. The selection of trend's function type was calculated by the finite difference method. To evaluate the

quality of trend levels the average of relative mistake of approximation was calculated. Single-factor dispersion analysis included the following indexes for calculation: mean values, dispersion, mean square deviation. The evaluation of a factor's constraint force with the result was carried out through the calculation of the elasticity index which shows the percentage of index change when the factor changes by 1% [7]. After that the empirical correlation ratio necessary for the measuring of narrowness of nonlinear dependence was calculated for all forms of bonds. For the general evaluation of the trend's selection indexes of determination were defined. The statistic significance of indexes was supported by hypothesis: F-statistics (Fisher criterion) and t-statistics (Student criteria) [8]. The most complicated procedure of analysis was the elaboration of additive and multiplicative models for the times series of timber materials. The choice of optimal models and comparative analysis of the components that make up the models of timber materials. Another important aspect was the evaluation of the obtained price-models for pulp, cardboard as well as their comparison with oil prices.

In order to verify the hypothesis about difference of average values for selected prices on wood materials a paired double selection test was carried out. It confirms the inequality of dispersions in general combinations. The next step was to calculate the basis and chain indexes for the dynamics of the price times-series. To calculate the basis indexes every level of a series is compared with one of the initial levels. As for variables, every following level of a series was compared with the previous one. Absolute growths, growth tempos and build-up rates have been calculated for all times series using relative values [7]. To defined short-term periodic changes we studied seasonal indexes of price times series for timber materials and oil.

Afterwards we carried out a correlation analysis of price times series for timber materials and oil and constructed correlation matrixes. Statistic reliability and correlation indexes were verified as well.

Results of research. Discussion and analysis.

In general the autocorrelation of times series was carried out using standard methods. When calculating the indexes of autocorrelation of the 1st and 2nd order for lumber logs the price times series had the highest and most significant results. This confirms the fact that the lumber log price dynamics has a trend and seasonal component. The linear indexes of autocorrelation for pulp and paper materials are within the range of 0,75 - 0.97. These indexes are evaluated according to the Cheddok scale as a strong connection. Calculated on the basis of the 2 order auto-regression indexes of autocorrelation the price times series for paper and wood products demonstrate high values.

The choice of trend's function type was carried out using the finite difference method together with the calculations of quality criteria and the equation for regression and muliple determination index R2 [8]. Linear equations of the trend for the price time series of hardwood lumber logs (4)

$$y = 1,799\, t + 172,038, \tag{4}$$
$$y = 1,883\, t + 228,051, \tag{5}$$

where t – is the temporal level of a series.

As for other types of wood products the equations demonstrate some differences in the trend indexes a and b, however these equations also demonstrate close similarities (pic.1). It is important to keep in mind that the indexes of the linear trend represent the evaluations of theoretical indexes. However, the equation demonstrates the general tendency of objects being under research. The plywood indexes are somewhat higher in the linear trend. (6):

$$y = 2{,}611\ t + 329{,}476 \tag{6}$$
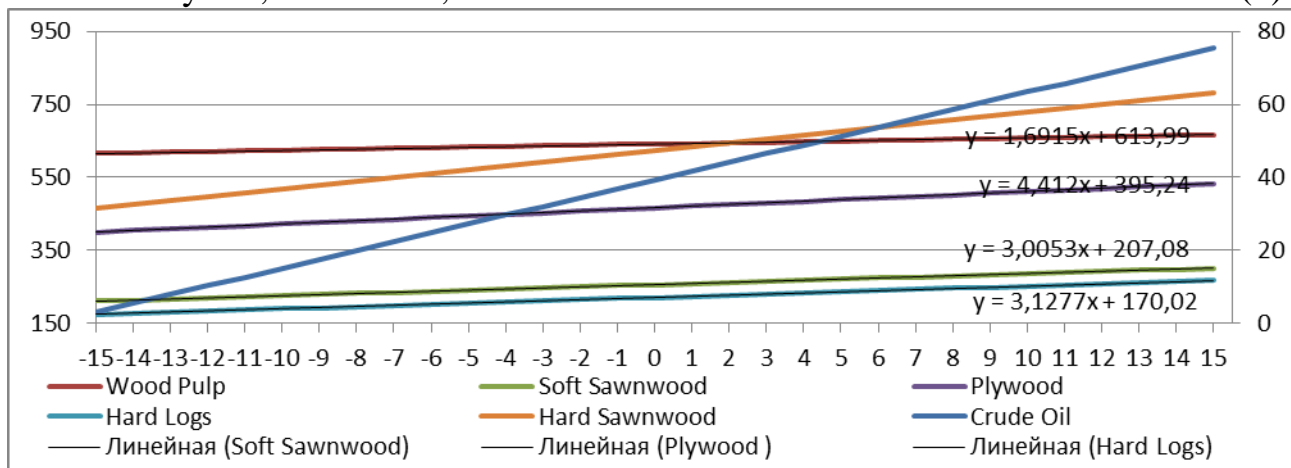
.Рис.1. Additive models' trend 1985-2014

At the next stage we carried out similar calculations for oil prices, which formulate the strategic raw material position for Russia [9, 10]. That is why it was important to define the differences and similarities in the price dynamics for such products, that refer to different branches of industry. It is possible to say that the linear trend for oil has an excellent and more significant positive angular inclination. It can be explained by the fact that every market of raw materials has its own peculiarities. The angle of inclination in linear trends that shows the price dynamics for wood products has a similar index (picture 1). All liner equations underwent a standard quality check. We can classify the evaluation of quality equations as average and it means that it will not be correct to use the given linear equations of the trend in order to establish prognoses. For that reason we further defined non-linear equations of times series' approximation (picture 2). They demonstrate a higher precision and accuracy of the analyzed price times series. Out of all non-linear functions of the trend we received the most accurate one was the poly-nominal function (picture 2) with its indexes of determination being quite high (from 0,74 to 0,87).

This is how we researched the trend systematic component of the price times series for wood products. We also managed to characterize its strength and duration. Besides trend changes, periodic fluctuations can be seen in the dynamics of economic indexes for any branch of economy. These periodic fluctuations happen under the influence of different factors. That is why it is necessary to characterize all periodic components of price dynamics in order to create and adequate model of price times series for wood products. The seasonal component may be singled out as a result of times series' decomposition.

$$y = -0,0012x^5 + 0,0727x^4 - 1,3363x^3 + 3,3636x^2 + 94,509x + 111,9$$
$$R^2 = 0,8354$$

$$y = 6E\text{-}05x^6 - 0,0062x^5 + 0,2424x^4 - 4,2818x^3 + 32,759x^2 - 70,42x + 338,66$$
$$R^2 = 0,7416$$

$$y = 2E\text{-}06x^6 - 0,001x^5 + 0,0593x^4 - 1,2892x^3 + 10,116x^2 - 10,077x + 118,96$$
$$R^2 = 0,7688$$

Soft Sawnwood, US/cubic meter
Plywood (Africa and Southeast Asia), Lauan, 3-ply, extra, 91 cm x 182 cm x 4 mm, wholesale price, spot Tokyo
Hard Logs, Best quality Malaysian meranti, import price Japan, US/Cubic Meter
Hard Sawnwood, Dark Red Meranti, select and better quality, C&F U,K port, US/cubic meter
Полиномиальная (Plywood (Africa and Southeast Asia), Lauan, 3-ply, extra, 91 cm x 182 cm x 4 mm, wholesale price, spot Tokyo)
Полиномиальная (Hard Logs, Best quality Malaysian meranti, import price Japan, US/Cubic Meter)
Полиномиальная (Hard Sawnwood, Dark Red Meranti, select and better quality, C&F U,K port, US/cubic meter)

Picture 2. Initial world price times series for wood products from 1985 to 2014.

Our research reveals that the seasonal components of price times series which we calculated are quite similar for most types of wood materials (picture 3). It should be also noted that the seasonal nature of price times series for oil is very similar in its characteristics to the seasonal component of the price times series for wood products.
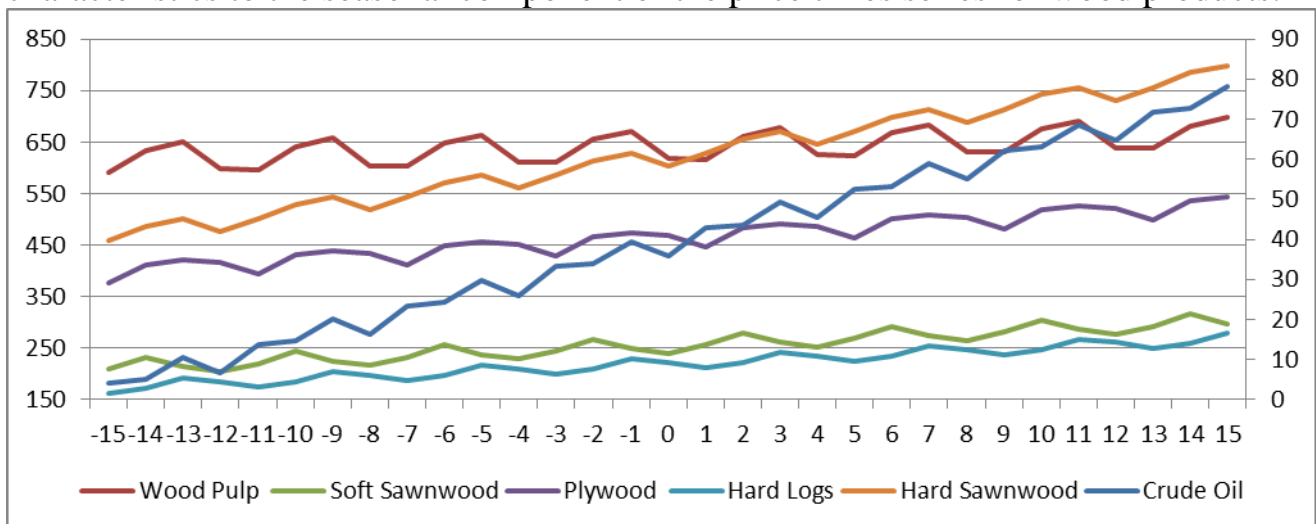
Рис.3. Seasonal and trend components of additive models for the world prices on wood materials 1985 - 2014.

Seasonal fluctuations are discussed when short-term periodic fluctuations in the levels of times series happen within a year [2]. The amplitude of the seasonal component for all price times series are analogous in many parameters with just a few peculiarities. These peculiarities demonstrate the extent of the change. The highest value of the seasonal component was found the in the price dynamics for pulp,

cardboard and paper. This can be explained by the higher price for these types of products. Direct coincidences of seasonal volumes and the price dynamics of demand for pulp and paper products at different levels of distribution can be seen quite rarely.

Таблица 2

Seasonal componeant change. Quarterly report.

Quarter	Oil	Pulp	Coniferous Lumber log	Plywood	Wood	Broadleaf Lumber log
	Dollar/ barrel	Dollar/ ton	Dollar / cubic meter.	Dollar / item	Dollar / cubic meter.	Dollar / cubic meter.
1	-1,22	25,75	1,44	23,86	11,28	5,51
2	0,41	-17,27	-18,69	-8,51	5,24	-11,94
3	-2,72	-31,5	2,49	-12,55	-13,41	-14,45

The next procedure of analysis for times series was the verification of the presence of autocorrelation remains. The independence of values in random deviates to the values of deviates is an important condition for building up a high quality regression model [6]. The verification of remains demonstrated the presence of autocorrelation function for all analyzed times series. That proves the presence of the periodic component in the model, which is caused by the direct constant impact of the factors that cannot be considered. The analysis of the remaining component, after the seasonal and trend components were removed, shows that the times series contains a different periodic component and that component lasts longer than the seasonal component. Periodic fluctuations, that take place with the interval from 2 to 5 years are called cycles. As a result of this analysis we found cyclic fluctuations in all price times series (picture 4). These cyclic changes of prices for the given products depend on the intra-industry economic and technical factors as well as the economy in general. As a result the final consumption of products for all brunches of industry is formed. Transformation is typical of cyclicality and it can occur with different speeds. That is why the cyclicality for the greater part of wood materials does not have a stable character. Longer cycles are replaced by short-term ones.

Along with long-term tendencies in the price times series for wood materials periodic fluctuations are observed and they happen with a certain interval [12]. In the course of our research we found and examined the trend and periodic components of price times series - seasonal and cyclic ones.

In frames of this research additive models have been created for price times series and wood materials (picture 5). For some of these times series more complex multiplicative models were developed (picture 5) as well as models with fictitious variables and models that use harmonics from 1 to 6 [6].

The research of price times series for pulp has shown that all chosen models have equal precision indexes which means they have both scientific and practical applications.
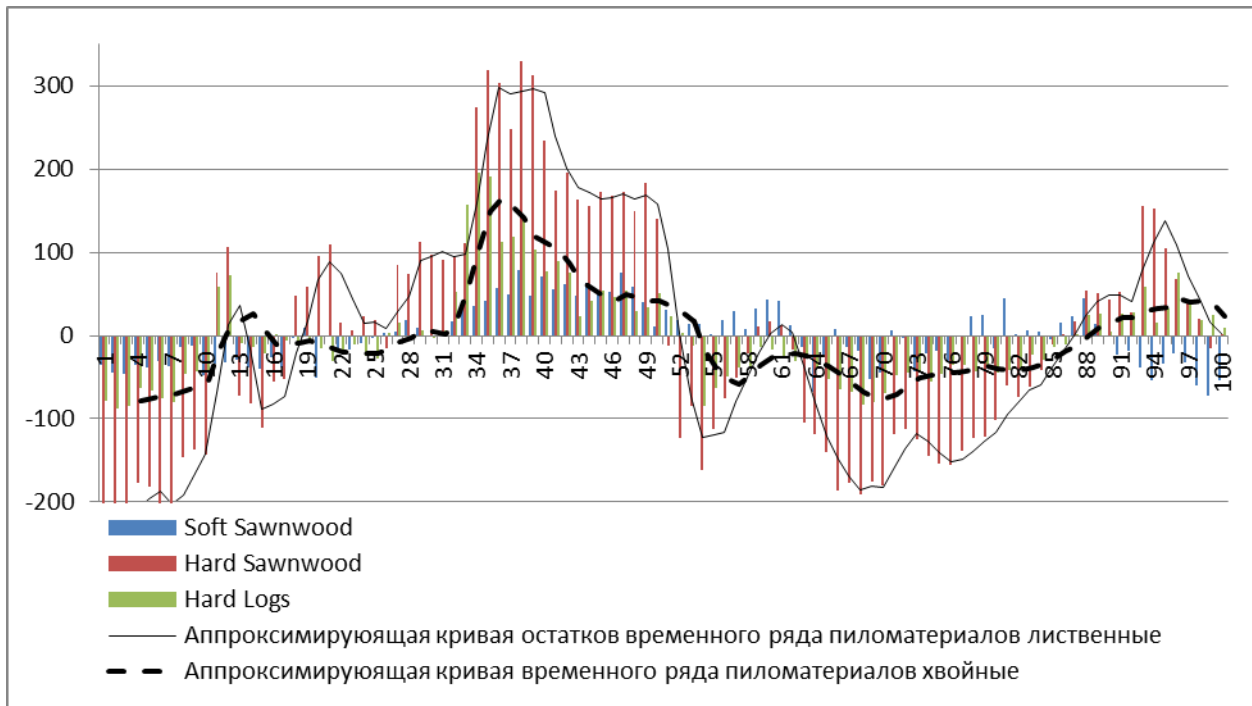
Рис.4. Cyclic and residual component of quarterly times series for coniferous and broadleaf lumber logs and wood obtained from broadleaved species.
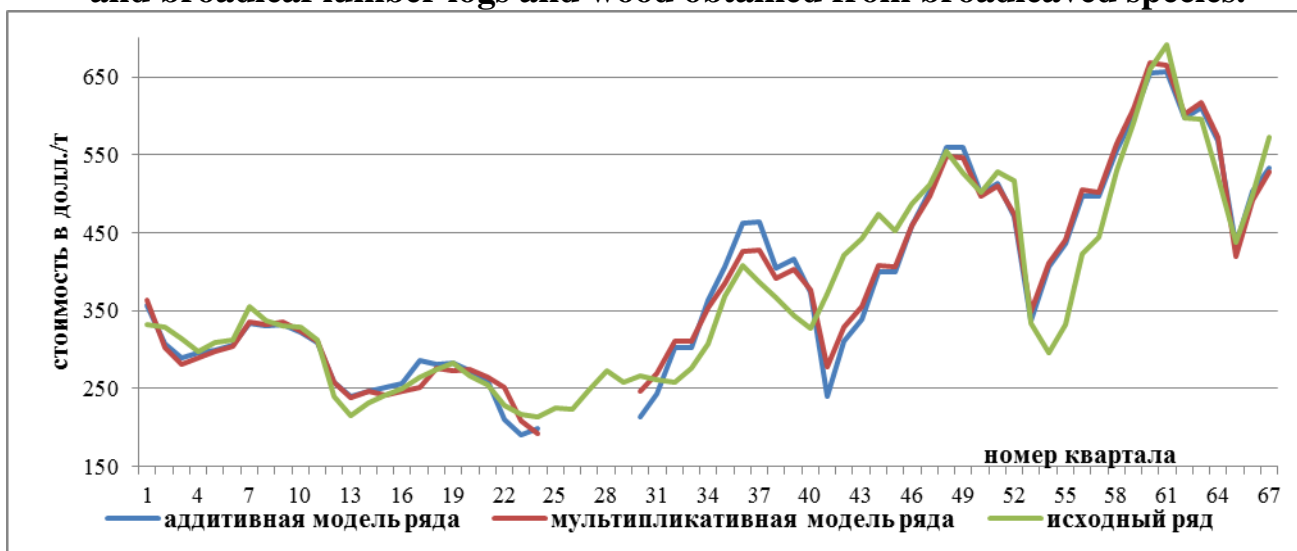
Picture 5. Additive and multiplicative models of price times series for cardboard produced on the Russian Pulp and Paper mill from 1996 to 2012.

In order to characterize the intensity of price dynamics for wood materials and oil over time we have developed chain and basis indexes of times series. After that we calculated the absolute increment, growth tempos, increment tempos. The absolute value of 1 percent of increment in six times series underwent a comparative analysis. All calculation data for chain and basis indexes of all price times series are presented in table 3.

Table 3

Chain and basis indexes of the price times series for wood materials and oil

Production	Chain indexes					Basis indexes	
	Absolute Increment 2014/2013	Growth tempo, % 2014/2013	Price maximum 1985 - 2014	Price Minimum 1985 - 2014	Build-up rate 2014/2013	Absolute increment 2014/1985	Growth tempo, % 1985/2014

Broadleaved lumber	-19,1	-5,9	324,9	135,1	Acceleration	170,7	226,35
Coniferous	-40,6	-4,55	892,8	97,4	Acceleration	588,6	323,3
Древесина	-38,0	-13,2	387,9	97,4	Acceleration	152,0	256,1
Фанера	-69,6	-13,2	646,1	239,1	Acceleration	218,4	191,34
Целлюлоза	5,0	0,6	936,1	391,1	Deceleration	461,8	211,8
Картон*	134,3	30,7	691,0	214,5	Acceleration	239,8	172,2
Нефть	-48,5	-43,8	110,7	10,4	Deceleration	35,4	232,1

- *The price times series for cardboard includes data from 1996 to 2013 .*

The calculations of correlation indexes for original price times series showed the following results for all object of this research (picture 4).

Table 4

The Matrix of correlation for original price times series with wood materials and oil

	Oil	Pulp	Broadleaved lumber	Plywood	Wood	Coniferous lumber
Oil	1,00					
Pulp	0,62	1,00				
Broadleaved lumber	0,40	0,16	1,00			
Plywood	0,57	0,37	0,72	1,00		
Wood	0,58	0,37	0,54	0,89	1,00	
Coniferous lumber	0,69	0,51	0,74	0,89	0,87	1,00

The indexes of autocorrelation demonstrate that the price dynamics for this type of raw materials has synchronous unidirectional changes, they account for the influence of general factors on the conjuncture of the market's branches. We remind that the closer this index is to the value [1]., the closer is the liner connection found in the dynamic series. In the matrix we presented above the values of correlation indexes have high values in most cases. Close correlation is observed between oil and pulp (0,62), plywood (0,57), coniferous lumber (0,69). Correlation of the average strength with lumber board (0,40). Price correlation for wood materials of different strengths, except of pulp, lumber board (0,16). The force of correlation increases when the original data is evened-out.

Conclusion:

Making general conclusions it is important to note that the price dynamics for wood materials has a complex structure with determined-stochastic nature. The determined components define regular dynamics of development, the stochastic component reflects occasional fluctuations (noises) in the dynamics of prices. The combination of increased and decreased trends, seasonal and cyclic processes makes price prognostication more difficult.

Therefore the research of cause-effect relations represents an important question for today. These relations determine price dynamics in different segments of raw material and consumption markets. They take into account macroeconomic indexes which represent an interdependent system with complex relations and multiple factors that cause changes in quoted prices. That is why it is important to pay increased attention to the study of these relations and principles of price formation in changing environments.

1. The trend, cyclic and seasonal natures exist.

2. Trends and cycles have common dynamics.

3. Cyclic nature has different durations from 16 to 60 months. (from 2,5 to 5 years).

4. A stable positive trend can be observed since 2001, it is the starting point of circularity.

5. The model of price time series we developed for Russian and world pulp production are comparable and do not demonstrate significant differences in quality and quantity characteristics.

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Innovation management: the factor of reorganization

Institute of management, business and technology

Keywords: reorganization, merger, acquisition, business process, forms, methods, tools, models, competition, conglomerates.

Abstract: the article discusses the possibility of a reorganization of management, its existing forms and methods. Take into account the cyclical nature of existing business processes, which are studied in dynamics. All changes can be traced in the scientific layer of business reengineering. Special attention is paid to program support process. Uses a systematic, comprehensive, situational and process approaches. Specific examples of the reorganization of experience in the domestic economy. Gives practical recommendations.

In practical implementation it is necessary to consider the diversity of forms and methods of reorganization, without which knowledge it is impossible to correctly choose a suitable idea to optimize the existing company situation. All types of reorganization are governed by Civil law and therefore are most of the theoretical aspect, but in special cases may be of practical importance [2, p. 121]. In the case of deviations from norms GK the Russian Federation the decision on the reorganization and the act of registration of the legal entity resulting from the reorganization of the other entity may be declared invalid by a decision of the judiciary.

It is very important to be able to recognize the form of reorganization in conjunction with the laws governing safety, as this has a huge impact on the development of a plan of reorganization of the company. If the supervisor does not have sufficient amount of knowledge on this issue and to review not enough time, it is better to engage a specialist that will deal with many nuances difficult reform activities [1, p. 186].

Here is the form of reorganization of the activities and their brief, but the most common characteristics. Shapes can be subdivided into the following types:

1. Depending on the initiator of the reorganization.

1.1. Forced reorganization may be made only by the court or by the authorized state body, such as the Federal Antimonopoly service.

1.2. Voluntary reorganization – can be carried out by the founders of the organization or legal entity having the authority and acting on the basis of constituent documents (most often of the Charter or power of Attorney).

2. Depending on the form definition of the reorganization on the merits.

2.1. The selection is the most complex form of reorganization, which means that when you create one or more new societies, they passed part of the rights and obligations of the reorganized company, which continues to exist. The main difference between forms of separation from the rest of the reorganized society is not lifted, when in other forms terminated the activity of at least one legal entity. The procedure for voluntary reorganization in the form of allocation refers to the General meeting of shareholders.

For clarity of explanation of the concept of "allocation" is invited to consider the example of the forced reorganization: the market of river transportation there are several commercial organizations (JSC "Osetrovsky river port", JSC "LPG", JSC "LORP") engaged in business activities on the river Lena, and located in a dominant position. These leading companies have committed 2 or more violations involving the antitrust laws. If this situation does not hinder the development of competition in the sector under consideration, then the FAS has the right to take a decision on compulsory reorganization of these companies through the allocation from its structure of 1 or more organizations based on structural units.

Such a situation occurred with JSC "Osetrovsky river port", which until recently had a monopoly in this area, and this violated the freedom of competition. As a result of violations of the Antimonopoly legislation of JSC "Osetrovsky river port" has to be reorganized in the form of separation. Summary highlight: created the company "Reserves", which received part of the rights and obligations of the reorganized company OAO "Osetrovsky river port", which still continues in successful operation, being one of the strongest competitor in this area.

2.2. Separation is the termination (liquidation) of legal entity, in the process transferring all its rights and obligations to a newly created legal entity. Reorganization in the form of splitting is performed in the case of approval the following decisions at the General meeting of shareholders on reorganization in form of division; the creation of new companies; approval of the separation balance sheet; on the procedure of conversion shares.

2.3. Transformation – is a form of reorganization of a legal entity in which a legal entity changes its legal form. This form is characterized by the fact that the reorganized legal entity ceases to exist, and all of its rights and obligations under the deed of assignment transferred to a legal person. Russian legislation, there are restrictions on the conversion of the legal entity in a certain legal form

Reorganization of a legal entity by converting in order to minimize tax costs has virtually no meaning. In accordance with article 50 of the Tax Code of the Russian Federation – execution of obligations on payment of taxes of the reorganized legal entity are transferred to its successor in the matter: has anyone reorganized the company with its obligations or not. You should pay attention to the fact that if the restructuring inspection bodies did not commit any violations, after the reorganization, no penalties are the place to be.

2.4. The merger is one of the forms of reorganization, which provides for the creation of a new society by equipping him with all the rights duties of 2 or more societies with the end of the last, and created in the process of merging the entity becomes a full legal successor to all rights and obligations of the merged organizations.

Reorganization of the merger is more likely to occur if you have the desire to strengthen the position in a particular market. To this method is prefer to use companies with different profiles – conglomerate mergers, the main purpose of which is to obtain high profits in countries with low tax rates and reduced taxes on financial activities.

As an example of this form of reorganization driven company, "Hanson" [3] (specializes in the acquisition of technologically simple businesses a stable market). "Hanson" is trying to reduce production costs in the acquired company, applies a clear and strict system of control of the managers. It is austerity measures and control help losing before the results are output to a higher level.

2.5. Joining is a form of reorganization, which is characterized by the transfer of all rights and obligations on the basis of the transfer certificate to another entity. Attachable entity ceases its activities, leaving the succession already existing entity. This form of reorganization is used for optimization of budget expenditures. The main disadvantage of joining – the presence of the successor, as there is a threat of bringing him before the tax authorities and creditors for the activities of the defunct company, and consequently, we should expect the imposition of vicarious criminal liability of former owners and the management.

Reorganization of the company often correlate to processes such as changing the scale and changing the direction of production activities, organizational changes, etc. the Use of each form of reorganization could expect one or another unfortunate consequence that can be avoided if the time to compute the probable risks, while implementing the necessary measures and competently implement the reorganization process necessary methods [4].

But before proceeding to the study of methods of reorganization, it is necessary to determine the importance of holding such events. Untimely and inappropriate use of methods of reorganization is a common mistake business leaders. The errors in this process can be fraught with failure strategically important for organizational innovations. To avoid adverse impacts to the head should always be ready adequate tool for assessing the situation and choosing the best options when conducting institutional reforms. With the introduction of innovations in the management system takes into account the 2 main options:

(a) the Degree of urgency of innovation and the time resource available to successfully perform the procedure of introduction of innovations;

b) psychological, vocational and technological training to global changes in the company.

Finally, you should consider methods that can be used during the reorganization of an entity:

1. Coercive method is characterized by the use of force to smooth or to overcome resistance from the staff. The use of such a method is permissible in terms of critical time constraints, but requires high costs, which may not afford the company with a small budget. In addition, the process of using coercive method is useless in the reorganization due to the following aspects:

• The decline in the quality of strategic decisions due to the lack of understanding of the need to increase competence;

• It is impossible to eliminate the cause of resistance;

• The appearance of ignoring the instructions for the implementation of changes;

• Too high-risk innovations.

Due to strict measures of a coercive method, employees adjust themselves and their colleagues against the head, ignoring his demands, which leads to stagnation in

the process of reorganization. Before applying this method, the supervisor should carefully consider the fact that there are more lenient measures, but to every employee needs to apply an individual approach, which will be expressed by the motivation, understanding, sympathy, support and training from the management.

2. Method of adaptive changes is the gradual emergence of minor changes in the process of strategic changes over a long period of time. This method will not be effective in case of extraordinary events in the external environment, but the benefits will be noticeable when favourable and unfavourable trends in the external environment easy to predict.

The feature of this method is that the process will not be managed by higher level management staff, and special staff of the project team, which solves conflicts by compromise and deals. The establishment of such groups should have a positive impact on employees, because they never feel fear or panic, as before TOP managers, but keep your distance, since they are lower in the hierarchy, does not want to be punished and deprived of motivation.

3. Method of crisis management is designed for use in situations where changes in the environment threaten the existence of the administration. The task of leadership is not fighting with the resistance of subordinates, and measures to prevent panic, support.

In practice, there are effective techniques for the management to prevent panic from the staff during the crisis:

• To adjust themselves to the role of a lifeguard at the onset of the crisis and not to dwell on its implications, not to lose heart;

• To convince employees in the inevitability of the crisis;

• To take preventive measures;

• To divert the attention of the staff from the global problem by inventing the "external enemy" – an artificial crisis.

4. Management of resistance is referred to as an intermediate method that can be implemented in terms of developments in the external environment. The peculiarity of this method lies in the urgency with increasing urgency – a method is forced, with the fall of the rate of urgency – adaptive. This method can be called effective in the case when the random effects of the external environment is not solitary, but a recurring one. The disadvantages of the method are considerable complexity to the implementation, continuous supervision of the top management that is easy to overcome, being able to plan actions in unpredictable situations.

The method of control of resistance is the minimum resistance control involved in the changes of the first unit. In the process of use of new types of motivation that employees demonstrate positive changes [5].

On the basis of reviewing the forms and methods of restructuring can be sum up.

A voluntary restructuring in the form of splitting is most suitable company OOO "STK". Legal person who is the most unprofitable in the Group, but has valuable assets that should be liquidated. You must analyze the reason of loss in order for the asset management, a newly created entity that is not repeating the mistakes of the reorganized company. For approval of restructuring in the form of splitting OOO "STK" it is necessary to spend General meeting of shareholders, at which each

participant will Express their opinions about planned activities. You need to pay attention to each decision on reorganization in form of division; the creation of a new company; approval of the separation balance sheet; on the order of conversion of shares between participants. To ensure that no information was missed, the meeting minutes should be kept (such protocols are made in multiple copies, the originals remain with the participants, and sometimes include other stakeholders). When the reorganization is approved, you can start to draw up a detailed plan about the stages of a global revolution in the company.

Applying this research method as a simulation, it can be concluded that a voluntary restructuring in the form of splitting is not the only way for the company. It is possible that for OOO "STK" may come another form of reorganization, such as the accession, which is the same as the separation is characterized by the cessation of activities of the affiliated entity. If the problem is only in need of optimization of budget expenditures, then this form is the place to be in reorganization of activity OOO "STK". If the company has a lot of debt, then the form will not work, because there might be a risk of attracting the successor to the tax authorities, creditors and the risk of vicarious criminal liability of former owners and the management.

The merger provides for the creation of a new society by equipping him with all the rights duties of 2 or more societies with the end of the last, and created in the process of merging the entity becomes a full legal successor to all rights and obligations of the merged organizations. This type of reorganization could come OOO "STK", if the purpose of leadership was to gain positions in a particular market.

If we talk about the remaining forms, the selection can be immediately dropped because the reorganized company continues its existence. The conversion is also not ideal because of the reorganized legal entity ceases to exist, and all of its rights and obligations under the deed of assignment transferred to a legal person, i.e. any changes this form of reorganization will not suffer.

Therefore, in order finally to determine the form of the reorganization, it is necessary to analyze technical and economic capacities of the company, to highlight weaknesses.

During the process of liquidation LLC "STK" it is possible to apply a method of crisis management. As already mentioned, the task of leadership is not fighting with the resistance of subordinates, and measures to prevent panic, support. Method of adaptive changes appeared to be most suitable in the early stages of development, because the growth process of the company will be covered by the gradual and minor changes in a long time.

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INTEGRAL EVALUATION OF ENTERPRISE FINANCIAL STABILITY LEVEL

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Abstract. The paper deals with a set of enterprise financial stability indexes and gives integral evaluation of financial stability of electrotechnical enterprises in Ukraine.

Key words: financial stability, level, integral evaluation, scoring, ratio.

Introduction.

Evaluating enterprise financial stability level is rather a difficult task as financial stability is a many-sided characteristic of a financial condition which gives an evidence of adequate amount of own funds, effective management policy, optimal capital structure, effective debt policy, adequate enterprise accounting liquidity and financial solvency.

Financial stability is a dynamic, not static, characteristic of an enterprise condition, which indicates that an enterprise not only possesses now all the above-mentioned characteristics but also has a favourable development trend.

The fact that the category of financial stability is a many-sided one makes it difficult to define its level at a definite enterprise as one characteristics can indicate financial stability increase while the others can indicate its decrease.

To monitor an enterprise financial stability it is necessary to define its real level and quantify this level. It is very important to specify both financial capacity that is a number of factors determining stability limits and systematic approach to financial stability evaluation especially in the age of economic globalization and data flow density increase.

Each enterprise should be interested in determining its financial stability limits. The inadequate financial stability may lead to its financial insolvency and the excess one may result in the accumulation of surpluses and excess reserves, which, in its turn, causes maintenance cost increase; the enterprise receives less profits than it is due and the rates of the enterprise economic development slow down.

Literature review.

Many domestic and foreign scientists have dealt with the problem how to evaluate the integrated level of enterprise financial stability. The nature of enterprise financial stability has comprehensively been analyzed and the methods of its monitoring have been suggested in the works by Anosoff I., Bernstein L., White A., James Van Horn, Worst Y., Vorst Y., Perar J., Helfert E., Frizevinkel H., Blank I., Bocharov V., EdronovaV., Efimova O., Kovalev V., Leontiev V., Polyak G., SavistkayaV., Stoyanova E., Sheremet A.

In the researches by Tikhanin V., Tryastsina N., Shamkhalov F. and Sharmudova E. the problems of enterprise financial stability evaluation are studied on the basis of the ratio method and the integrated index of the bankruptcy probability. The ratio method of the financial stability evaluation is also widely used in the works

by Berdnikova T., Nikiforova A., Seleznyeva N. Pavlova I. suggests giving an integral evaluation of the financial stability taking into account the enterprise life cycle [1].The approach by Gilyazova is worth noticing, as she has evaluated the financial stability by the ratio method, using the correspondence between the definite coefficient and weight (significance) and taking into account the coefficient dynamics based on scoring [2]. Sadkov V., Kravchenko T., Morozov B. and Mashegov P. ground an integral evaluation on the index weight and the deviation value of the real value of the local index from its reference value [3]. Omelchenko I. has suggested taking into account both the enterprise economic performance and financial ratios in the integrated index of the enterprise financial stability [4]. Khorev A., Salikov Y. and Ushakov S. take into account the dynamics of every local ratio in the enterprise integrated sustainability index [5].

Body of the paper. In order to build the enterprise financial stability it is necessary not only to have sufficient amount of working capital but to manage it effectively, to determine optimum financial leverage, optimum balance between receivables and payables, to provide sufficient accounting liquidity and financial solvency.

It is advisable to monitor the relative indexes of the enterprise financial stability based on the aggregation of the ratios reflecting the level of all the above-mentioned characteristics which the enterprise achieved:

- y1 – equity-to-asset ratio is calculated as the relationship between the amount of internal capital and total balance (standard index $\approx$ 0,5). Ratio increasing trend is favourable;

- y2 – capital gearing ratio is defined by the relationship between the debt and equity capital (standard 0,5÷1,5). Ratio decreasing trend is favourable;

- y3 –working capital to total assets ratio shows how many working capital units are in one unit of reserves (standard 0,6÷0,8). Ratio increasing trend is favourable;

- y4 – current assets to equity ratio is defined as the relationship between the working capital amount to equity capital (standard 0,4 ÷ 0,6). Ratio increasing trend is favourable;

- y5 –long-term raising debt ratio is defined as the relationship between the amount of a consolidated debt and the total amount of a consolidated debt and internal capital. The ratio decrease shows that the dependence on outside investors becomes weaker;

- y6 – ratio of the reserve raising source autonomy shows the proportion of working capital in the total number of reserve raising sources. The ratio value decrease implies the decrease in an enterprise financial stability level;

- y7 – ratio of the long-term investment pattern is defined as the relationship between the amount of a consolidated debt and the total of capital assets and other noncurrent assets. The ratio value increase shows that the enterprise dependence on outside investors increases, and the enterprise financial stability is under the threat;

- y8 – credit debt ratio shows the portion of the credit debt value in the total debt. The ratio value increase implies the decrease in the enterprise financial stability;

- y9 – receivables and payables ratio shows how many units of the enterprise receivables are in one unit of its payables. The recommended minimum value of the ratio is 1. In dynamics, the quicker the ratio value decreases as compared to 1, the lower the level of the enterprise financial stability is. At the same time, a significant excess of receivables over payables results into a significant diversion of the enterprise funds, which may lead to the necessity to raise debt funds and may decrease the enterprise financial stability level;

- y10 – absolute liquidity ratio shows which portion of the short-term debt the enterprise can pay in the nearest time or at the current moment (standard $\geq 0,2$). Ratio increasing trend is favourable;

- y11 – marginal liquidity ratio describes the enterprise predictable payment opportunities under the condition of the timely settlements with debtors. The ratio characterizes the expected solvency for the period equal to the mean time of one receivables turnover (standard $\geq(0,8\div1)$). Ratio increasing trend is a favourable ratio dynamics;

- y12 – current liquidity ratio shows the enterprise payment opportunities under the condition of not only timely settlements with debtors and favourable sales of finished products, but sales of other stocks (standard $\geq(1,8\div2)$). Ratio increasing trend is favourable.

The integral evaluation of the enterprise financial stability indexes was carried out based on the performance data of three electrotechnical enterprises of Ukraine for the period between 2009 – 2012. The calculation data for each ratio of each enterprise during the period under study is given in tab. 1-3.

Table 1

Financial stability indexes OJSC "KZVA"

Ratio	2009	2010	2011	2012
y1	0,82	0,74	0,84	0,68
y2	0,22	0,35	0,18	0,46
y3	0,57	0,35	0,59	0,27
y4	0,22	0,16	0,22	0,16
y5	0	0	0,004	0
y6	0,23	0,17	0,21	0,16
y7	0	0	0	0
y8	1	1	0,65	0,86
y9	0,22	0,12	0,27	0,04
y10	0	0,0001	0,0002	0,0004
y11	0,21	0,12	0,18	0,04
y12	2,04	1,48	2,25	1,35

The data in Tab. 1 shows that some financial stability indexes of OJSC "KZVA" correspond to the standard values throughout the whole period under study (y1, y2) or only in some moments of this period (y3, y12) and the others do not correspond to the standard. Besides that, all the ratios, except y7, have a favourable development in definite periods of time.

Financial stability indexes OJSC "Electrotechnical plant"

Ratio	2009	2010	2011	2012
y1	0,86	0,77	0,75	0,82
y2	0,17	0,32	0,37	0,24
y3	1,44	1,35	1,15	1,70
y4	0,78	0,78	0,79	0,85
y5	0	0,12	0,17	0,10
y6	0,73	0,68	0,65	0,76
y7	0	0,64	0,95	0,74
y8	0,55	0,50	0,38	0,48
y9	0,07	0,06	0,07	0,03
y10	0,1	0,06	0,17	0,14
y11	2,42	3,17	3,22	4,88
y12	5,65	6,82	8,18	9,31

Tab. 2 shows the data for OJSC "Electrotechnical plant" for the period between 2009-2012. As it is seen from the data ratios y1 – y4, y10, y12 correspond to the standard, ratio y10 corresponds to the standard in one of the periods and ration y9 does not correspond to the standard values in any of the time periods under study. Ratios y4, y11, y12 have a favourable dynamic pattern in all the periods of time and all the other ratios (except y7) have a favourable dynamic pattern at least in one of the comparison periods.

The analysis of the financial stability indexes of OJSC "Electrotechnical plant" in 2009-2012 on the basis of the data in Table 2 allows us to make a conclusion that the financial stability level of OJSC "Electrotechnical plant" is higher than the level of OJSC "KZVA". Nevertherless, the data in tab. 1-2 does not give the possibility to define this level quality, so it is not possible to specify the type of financial stability (absolute, normal, critical, catastrophic (fragile condition)).

Financial stability indexes OJSC "AIZ Energiya"

Ratio	2009	2010	2011	2012
y1	0,28	0,29	0,82	0,33
y2	2,54	2,52	0,74	11,35
y3	0	0,17	5,32	6,38
y4	0	0,05	0,71	0,82
y5	0	0	0	0
y6	0	0,05	0,71	0,82
y7	0	0	0	0
y8	0,93	1	1	1
y9	0,90	0,80	3,20	1,27
y10	0,06	0,08	0,44	0,07
y11	0,96	0,90	3,64	1,33
y12	1,05	1,02	4,26	1,40

The data in tab. 3 shows that in 2009-2012 OJSC "AIZ Energiya" had , in general, a little lower financial stability level than OJSC "Electrotechnical plant" but higher than OJSC "KZVA". So, only ratio y11 either excesses the standard (in 2011-2012) or is within the limits of the standard (in 2009 – 2010) throughout the whole period under study. Ratio y9 excesses the standard in three time periods (out of four), ratios y3 – y4 excess the standard in two time periods and ratios y6, y10, y12 do it in one. In doing so some ratios have a favourable trend in all the compared periods, for instance y3 – y4, y6. Four ratios (y1 - y2, y9 - y10) have a positive dynamics in two periods and two ratios (y11 - y12) have it in one compared period.

So, the majority of OJSC "AIZ Energiya" financial stability indexes are higher than those of OJSC "KZVA" but lower than those of OJSC "Electrotechnical plant".

The analysis of the financial stability indexes carried out using the data in tab. 1-3 gave the possibility to arrange the enterprises under study depending on their financial security level, but it did not allow us to quantify every level and relate it to the level quality, namely, absolute, normal, critical stability or fragile financial condition.

Ratio scoring was carried out to compare the relative indexes of the enterprise financial stability with quantitative evaluation of their development as well as to quantify the integrated financial stability level of a definite enterprise.

So, if during the period under study the ratio value was higher than its standard or its upper limit (if ratio value increase is the favourable trend) or it was lower than its standard or its lower limit (if ratio value decrease is the favourable trend) then the ratio scored 2 points. So, in the year under study each enterprise can have maximum 16 points (8·2=16) for eight ratios which have a standard value (y1 – y4, y9 – y12.

Besides that, a ratio development trend is important, that is every successive period is compared to the preceding one and if the development trend is favourable, the enterprise scores 1 point and if it is unfavourable, the enterprise scores 0 point. So, all the ratios score. It is maximum 12 points (12·1=12) in total.

So, during the period under study (one year) the maximum score for each enterprise is 16+12=28, which is the upper limit of the maximum financial stability level. This limit corresponds to the situation when all the relative ratios are higher than standard and have a favourable development trend which is the evidence of the absolute financial stability.

If the value of the ratio having a standard is exactly the same as its standard in every year of the period under study, the enterprise scores 1 point, so in total it can score 8 points (1·8=8) per year. If in doing so the ratio development trend in the given period is favourable, the enterprise can additionally score 12 points (1·12=12). In total, the given situation is characterized as the lower limit of the absolute financial stability as all the ratios are within the limits of the standard and have a favourable development trend throughout the period under study. This limit equals 20 points (8+12=20).

In such a way the level of the absolute financial stability is in the range [20;28] points.

The normal financial stability in its worst case (its lower limit) is observed when all the financial stability ratios correspond to the standard (8 points) but do not have a favorable development trend (0 points), that it is in the range [8;20] points.

The lower limit of the critical financial stability level is observed when all the ratios are lower than the standard (0 points) but at least half of them have a favorable development trend (12:2 =6 points). So, the critical level of the financial stability is in the range [6;8] points.

Consequently, the enterprise fragile financial condition (the catastrophic level of financial stability) is in the range [0;6] points.

It is also necessary to note that the so-called "grey area" was taken into account in the calculations, this area equals ±10% of the threshold value of the ratio having a standard [6, p.31].

The integral evaluation of the financial stability level of the electrotechnical enterprises in Ukraine for the period between 2010-2012 was given based on the calculation results (tab. 4).

Table 4

The integral evaluation of the financial stability level of the electrotechnical enterprises in Ukraine

Total points	OJSC "KZVA"			OJSC "Electrotechnical plant"			OJSC "AIZ Energiya"		
	2010	2011	2012	2010	2011	2012	2010	2011	2012
Points	5	17	5	14	17	20	7	22	11

Tab. 4 shows that OJSC "Electrotechnical plant" had the most favourable financial condition as the enterprise financial stability level steadily increased throughout the whole period under study and in 2012 it reached the level of absolute stability. OJSC "KZVA" had the worst financial condition, its financial stability level was critical in 2010 and 2012 and in 2011 it was normal. The integrated financial stability level of OJSC "AIZ Energiya" was critical at the beginning of the period under study, then it reached its absolute value and by the end of 2012 it had become normal.

Conclusions.

The enterprise financial stability is the characteristic of the financial condition of such an enterprise which has the possibility to perform operating and other activities in the planned volume and can develop and renovate, that is, it has sufficient amount of financial resources and efficiently allocates and manages its working capital.

Financial stability is a complicated economic category; it is characterized by many different ratios, which, on the one hand, facilitates a comprehensive analysis of the enterprise financial stability, but, on the other hand, makes it difficult to have an integral evaluation which esplicitly testifies the enterprise financial stability level.

In the paper the integrated level of the enterprise financial stability in the definite period was evaluated on the basis of scores when comparing how close the relative ratios of the enterprise financial stability to their standard values and taking into account the development trends of these ratios. Such a unique evaluation of financial stability, which is a complicated category, enables to make a unique

conclusion about the financial stability level of the definite enterprise within the definite period.

An integral evaluation of the enterprise financial stability level in its dynamics enables to see the level development trend, predict it and plan the activity based on it.

Besides that, monitoring the scores of enterprise financial stability level helps to identify the problems in the enterprise activity and give recommendations how to improve its operation which, in the long term can strengthen the enterprise financial stability and secure its financial safety.

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THE PROSPECTS OF DEVELOPMENT OF ECONOMIC COOPERATION AMONG BRICS COUNTRIES IN THE SPHERES OF RENEWABLE ENERGY RESOURCES

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Abstract. Almost all the BRICS countries have a very large population and are interested in getting new sources of energy for their rapidly developing economies. By the recent times Russia had purchased solar collectors and other equipment in the European countries for getting renewable energy. But due to the economic and geopolitical crises, Russia has to look for some new partners in this industry. The possibilities of mutually beneficial cooperation among BRICS countries in the sphere of renewable energy are studied in the article.

Keywords: global problems, renewable sources of energy, BRICS countries cooperation, employment of the population.

Nowadays the humanity faces a number of global problems and one of the most vital among them is a search of new sources of energy. In spite of the fact that BRICS countries possess abundant natural resources, they are really concerned about developing of a renewable energy and are eager to use their economic and political potential in implementation of a new energy strategy all over the world. By this time, for example, China, India and Brazil had already made an important technological breakthrough in production of solar collectors, wind turbines and usage of different biofuel [1]. As for Russia, it had mainly used to purchasing of innovative equipment for this industry from Germany or the Netherlands until recently. But being put into a strained position due to economic and geopolitical crises, our country has to seek new partners in order to start a new production and provide future generations with safe and non-exhaustible energy. That is why, cooperation between BRICS countries in the sphere of renewable energy, to our mind, is one of the most promising aspects of our future relationships.

Even 50 years ago people did not suppose that such sources of energy as oil, coal and wood can become exhaustible. But due to a rapid growth of population, ever increasing tempos of energy consumption, the humanity has found itself under the threat of energy deficit. This problem has become especially urgent for such countries as China and India, whose combined population exceeded 2.5 bln people in 2014, that makes about 37% of global population. According to the prognoses, by 2020 India will have left China behind and become the largest country in the world in the terms of population. If to speak about the total population of all the countries of BRICS it has reached 42% of global population (2.83 bln people). At the same time in the world more than 1.3 bln people do not have any access to electricity [2]. So it is obvious that the problem of energy supply is of great significance for these countries. On the other hand, all BRICS countries are characterized as newly industrialized countries with large, fast-growing, technologically advanced

economies. By all means the industries of the countries require huge amounts of energy. For example, China occupies the world's first place in energy consumption, Russia – the fourth, and India – the fifth. High prices for energy or energy deficit hold back development in transport, medicine, education and livable environment. That is why a necessity of finding new sources of energy that can be non-exhaustible and rather cheap are absolutely vital for these countries.

One can say that BRICS countries possess everything what is required for the developing of renewable energy in general: sunlight all the year round, wind on some areas, ocean tides, etc. But it goes without saying that only availability of natural resources is not enough to change people's mind and to start implementing of new technologies instead of burning coal or gas. Only the united efforts of governments, nongovernmental organisations, scientists and engineers, research and academic institutions as well as a good will of rank-and file people can bring a success in such a complicated activity as developing of renewable energy.

For this reason, the most technologically advanced countries, realizing the necessity of investment and integration across all the sectors, worked out various scenarios that projected levels of renewable energy for 2020. But thanks to innovative technologies and governmental support these levels were already surpassed in 2010. In 2014 China, the USA, Brazil, Canada and Germany were top countries for total installed renewable power capacity; China also heads the list of top countries for non-hydro capacity, followed by the USA, Germany, Spain, Italy and India. In three countries of BRICS union – China, India and Brazil – there are special governmental policies of renewable energy development. For example, in 2014, in spite of some financial reduction in this sphere, China invested more into renewable energy than all the countries of Europe combined. As a result, China occupied a leading position among all the countries in total renewable power generation, including hydro and wind power, solar water heating and geothermal heating [1].

It should be also mentioned that number of companies involved into production or operation of renewable energy technologies and equipment has been growing every year. We have studied the official sites of the Chinese, Indian and Brazilian companies which offer solar collectors, solar systems, wind turbines and other equipment and then we have come to the following conclusions:

–There are hundreds of such companies on the territory of the above mentioned countries, so this type of business is very profitable and competitive.

–The companies are usually small – about 25-30 people – that makes their business flexible and oriented towards innovations.

– On the whole, 2.6 mln people in China, 894,000 – in Brazil, 391,000 – in India are employed in renewable energy industry that helps significantly in the areas with high level of unemployment.

However Russia is still at the beginning of the process of introducing renewable energy industry on the territory of our country. We have been studying this problem for some years and, basing on the results, which we were able to gather in Rostov-on-Don (the city where we live) and after taking part in "Start-up – 2015 (Rostov-on-Don), we have made some conclusions:

1) Many regions of our country, for example, the South of Russia and the Rostov Region namely, possess all the conditions to introduce renewable energy technologies. We have more than 150 sunny days per year; there are also regions with prevailing strong winds. The energy of tides and hydro power can be used as well. Besides agriculture that is highly developed in the South of Russia, produces a lot of biomass and, on the other hand, desperately needs cheap energy. Besides natural resources we have developed science, engineering facilities and many enthusiastic entrepreneurs. Moreover there are some documents on the levels of the Rostov Region Governor and Rostov Mayor which were meant to promote the development of non-exhaustible energy.

2) The number of projects in our Region dealing with renewable energy is less than a dozen. In the majority of them the equipment which was given by German or Dutch companies with a purpose of promotion or charity is used. Sometimes it is even installed but does not work because there is no interest in its operation. For example, we have studied the efficiency of using solar collectors installed on the roof of Electrotechnical College in Rostov. They were presented by a German company Dena to our city as a realization of the promotion project "Dena-Solardachprogramm", supported by the German Federal Ministry of Economy anв Technologies. So, it turned out, that this equipment is used only with a purpose of demonstration, but it does not work constantly, and even the students of this college do not know about its existence. The problem is that that the college building is old and needs repairing. Its windows are so old that all the heat saved by solar collectors will be lost through the cracks.

3) Public utility energy organisations are not interested in the development of renewable energy projects in spite of the fact that these programmes are supported by local government. Moreover one can see that utility monopolies even hold these attempts back. Actually, there are no bonuses for those families who have installed innovative equipment and who are really concerned about the future of our planet.

Consequently, we would like to say that being a member of such an advanced group as BRICS, Russia can take a lot of advantages, firstly in the sphere of adopting a complex of different documents and regulations which will support both – entrepreneurs and consumers, willing to achieve progress with renewable energy technologies. Secondly, basing on the experience of our partners in BRICS Russian government will be able to determine the most profitable areas of investment among the numerous types of renewable energy sources. And, finally, it is more advantageous to buy some equipment from China or India or to establish joint ventures and invite skillful engineers to teach our employees who will produce innovative equipment than to pay huge amount of euros to Germany and other European countries, especially in the period of economic crisis.

Under the circumstances, multileveled cooperation of BRICS countries in different branches of economy and environment protection, including such a prospective aspect as renewable energy, can be mutually beneficial to all our great nations.

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UKRAINIAN CONSUMER BASKET: REALITIES AND PROSPECTS

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Summary. A retrospective study of the structure and dynamics of the consumer basket of Ukrainian citizens is made, it is stated the need to bring it to the actual physiological needs. The basic regulations aimed at ensuring of normal human existence and its development are highlighted. There are researched the approaches to the minimum wage and the analysis of the mechanism of adjustment and alignment of social standards in Europe and the world. The problem of mismatching between inflation rate and increasing of the guaranteed minimum wage in Ukraine, which requires urgent attention at the national level, is revealed.

Key words: consumer basket, cost of living, social guaranties, minimum wage.

Introduction. Human for existence requires appropriate set of food and non-food products, which should ensure its worthful living. In Ukraine the consumer basket consists of more than 290 goods and services; but it evokes compassion of the world community, because its parameters are the same as "Basket of survival" during the war. It should be noted that the consumer basket is a base of formation of the cost of living. Unfortunately Ukrainian consumer basket now doesn't allow to the average Ukrainian to meet even minimum needs. So we get a logical question – Is this a basket of survival or normal human existence?

Analysis of recent researches and publications. This theme is extremely important and it causes a big scientific interest. Significant number of works of local scientists, including Bystritskaya O., Burlutskyi S., Verb'yanyi V., V.I. Rotchuk, Saliy N.A. and others, are devoted to investigation of the mechanism of formation of social guarantees in the context of consumer spending. But in terms of crisis growing in the economy and, consequently, social security of citizens of Ukraine these question requires constant attention and thorough investigation.

Objective. Research objective is to disclose the essence of social standards and features of their formation in Ukraine and developed countries.

The main material. Consumer basket is a minimum set of essential for the life food, non-food products and various services [5]. This is a range of products that characterizes the typical level structure and monthly (annual) consumption of a person or a family. This set is used to calculate the minimum consumer budget, based on the cost of the consumer basket in current prices.

Consumer basket content of the average Ukrainian at present is governed by the Resolution of Cabinet of Ministers of Ukraine N 656 of 14.10.2000, and since that time it wasn't thoroughly reviewed [5]. By the information from the Ministry of Social Policy of Ukraine, last time our consumer basket has changed in 2012 (was reduced amount of bread and increased vegetable amount), so it is unlikely to change it up to 2017, though the Ministry recognizes that a minimum set of goods and services needs to be increased [10].

It should be noted that under the law of Ukraine the basket is reviewed every 5

years because of price changing, economic situation in general and tastes of consumers [5]. According to the methodology used in Ukraine, the decisive criterion for adding in the consumer basket of a product (service) is its part in total cash spending of households - not less than 0.1% for food and 0.2% - for other products and services. Thus, the consumer basket primarily includes goods and services that are more and more often consumed by households, regardless of whether the prices (tariffs) for them have regulated (set) or free (market) character [8] .

Ukrainian consumer basket is calculated by the method of Leningrad Institute of Food Hygiene, developed in 1990 and since that time it became outdated [5]. According to experts, the norms established as subsistence minimum for citizens of Ukraine are significantly lower than physiological, and non-food items do not cover many needs of modern man. [9]

Experts are sure that the content of consumer basket should be increased by 20-25%, cause modern standards are too low and do not meet the real needs of the person (for example, basket includes 53 kg of meat per year, but a real need - 83 kg, 148 kg of milk, but physiological norm is 380 kg). Ukrainian consumer basket for adults contains no coffee, cocoa, tea, spices and even salt [5].

Proper nutrition with the consideration of conditions of life and work provides a human health, functioning of various organs and systems, harmonious development, high efficiency. Nutrition is reasonable, precisely balanced providing of food to a human, which primarily provides accordance of food to physiological needs and energy consumption of the body. [6] According to the Resolution of 14th of April 2000 N 656 "On approval of food sets, non-food sets and sets of services for major social and demographic groups" food set for working and non-working persons is different, but not much (Figure 1, 2).
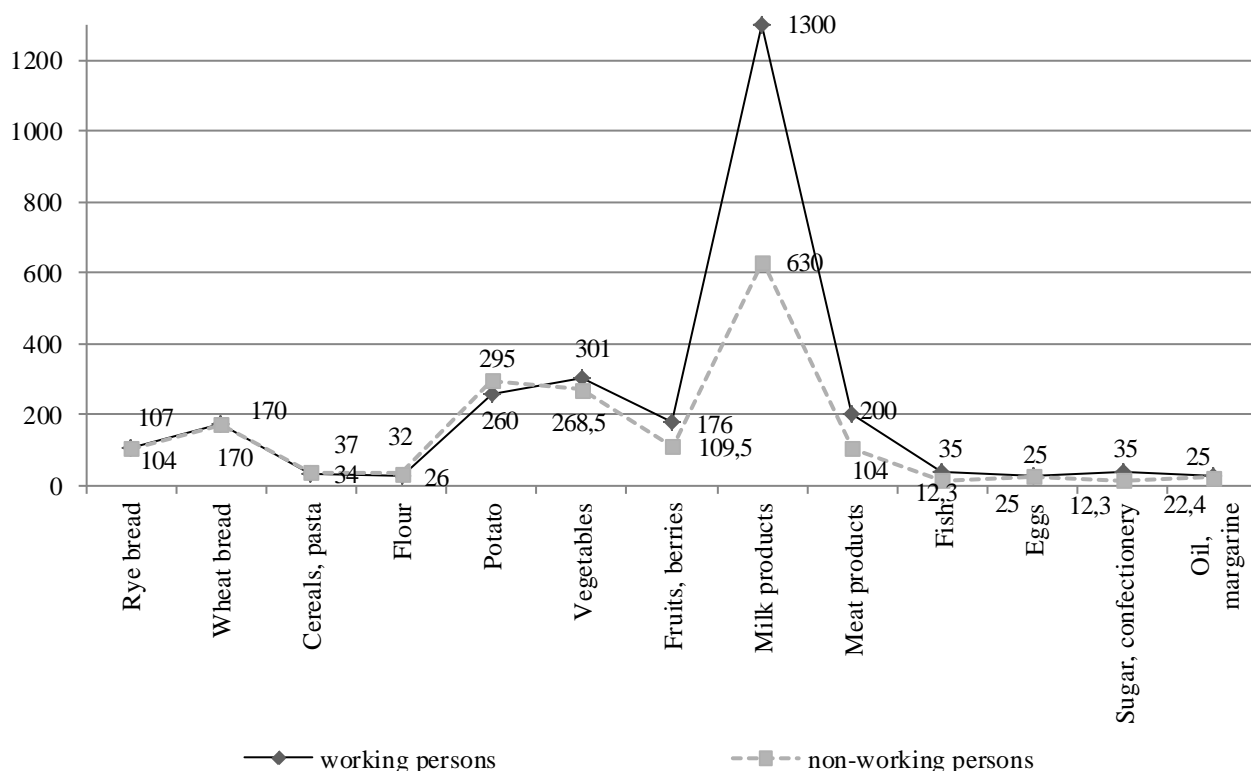

Fig. 1. Food set for working and non-working population g / day [6]

A working person should eat during the day 47% more food than non-working that makes 2694 g to obtain 2586 kcal [6].
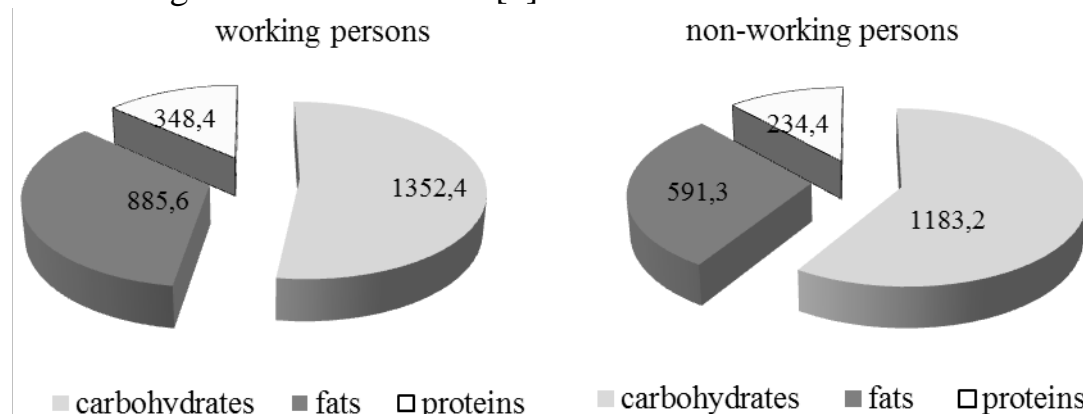

Fig. 2. Calorie of main food for working and non-working people, g/day [6]

Thus, according to approved 15 years ago consumer basket, Ukrainian can eat 800 grams of flour (various products of flour), 300 grams of pasta, 200 grams of buckwheat, rice, beans, 100 grams of oatmeal, 8 kg of potatoes, 5 kg vegetables, 300 g of cheese, glass of sour cream, about 2 kg of meat, 18 eggs and 600 grams of fish per month,. However, the amount of money for food is constantly changing, because the cost of food increased almost every weekl for more than a year. Utility bills and the cost of drugs increased as well [11].

Table 1

Consumer basket of Ukrainian in different periods, kg / year [5]

Food	USSR (1989)	1990	2000
Meat and meat products	42	49,51	53
Milk and milk products	209,6	238,88	148,5
Bakery	-	93,53	123,4
Fish and fish products	24,5	15,88	13
Eggs	-	254	220
Potato	-	89,93	95
Vegetables and melons	-	106,09	110
Fruits and berries	-	67,65	64
Sugar, confectionary	8,5	28,14	37
Oil and margarine	-	7,4	9,1

The content of food in the consumer basket of Ukrainian almost didn't change comparing to the 90th years. The proposed food set slightly increased the amount of bread, meat, potatoes and vegetables, decreased the amount of dairy products, fish and fish products, eggs. Also since 2000 Ukrainian start to consume more sweets (Table 1) [5].

For comparison, in 1941 the ration for a German prisoner of war held in Stalin's camps was 600 g products, and in particular, it contained bakery, tomato puree, and in better times - peas, beans, fruits and coffee. [7] Captive Germans in the Soviet Union were given 600 grams of bread per day, not 277 g as now provided to each of

us. According to the dietician Alexander Kirilenko, it is possible to survive with our food set of the consumer basket, though it contains too many carbohydrates (bread, potatoes, sugar) and half the norm of white meat (beef), fish and cereals, while the variety of manufactured goods and especially services is extremely limited. As considers the president of Ukrainian analitic centre A. Okhrimenko, the government uses the basket primarily in order to figure out what may be the lowest cost of labor, so an employee could survive on money earned. "The principle of formation of this minimum we still use from the Soviet Union times: it was thought that pereson should eat enough just to be able to work, dress modestly and have a minimum of pleasure" [10].

So, today acutely appeared the problem of the acccording and amount of minimum products of the consumer basket to medical standards. Serious doubts causes the adequacy of a content of minimum consumer basket of goods. Thus, a set of food, non-food items and sets of services in present basket can be considered illegitimate.

Living wage does not considers a number of essential spendings: the construction or purchase of housing or paying the rent, education, vacation, maintenance of children in pre-school, cost of medical services and so on. Changes in the consumer basket due to changes in the housing and communal services are not considered as well. It is also worth noting that in calculating of the overall rate in Ukraine regional differences in prices for food and non-food products are not taken into account. According to experts, if the basket was filled with real content, the expenditure side of the budget should be at least tripled. [9]

Usually this set value determines subsistence level and, consequently, the amount of pension and minimum wage [1, 11].

A living wage - cost of sufficient minimal set of food and non-food products and minimal set of services to ensure the normal functioning of the human body, maintaining his health, meet basic social and cultural needs of the individual.

The subsistence minimum is established by the Cabinet of Ministers of Ukraine after scientific examination of existing food set, a set of non-food products and set of services and is approved by Verkhovna Rada of Ukraine in the Law about National Budget of Ukraine for the proper year [2, 3].

As notes the former First Deputy Minister of Labour and Social Policy Pavlo Rozenko, "A living wage is a minimum acceptable standard of living, which guarantees the state. If a person wants to develop, to have savings, it must be achieved through the efforts. The calculations of Federation of Trade Unions show that the size of the new living wage should be three times higher". The dynamics of the living wage in Ukraine is shown on Figure 3 [4].

On the basis of sociological researches can be confirmed that 9 out of 10 Ukrainians are not satisfied with their salary, because over 50% of salary should be spent on food and this despite the fact that food cost should not exceed one third of the living wage. For example in Spain, France and Germany spendings on food do not exceed 13%. In general, European citizens spend on food less than 20% [11].
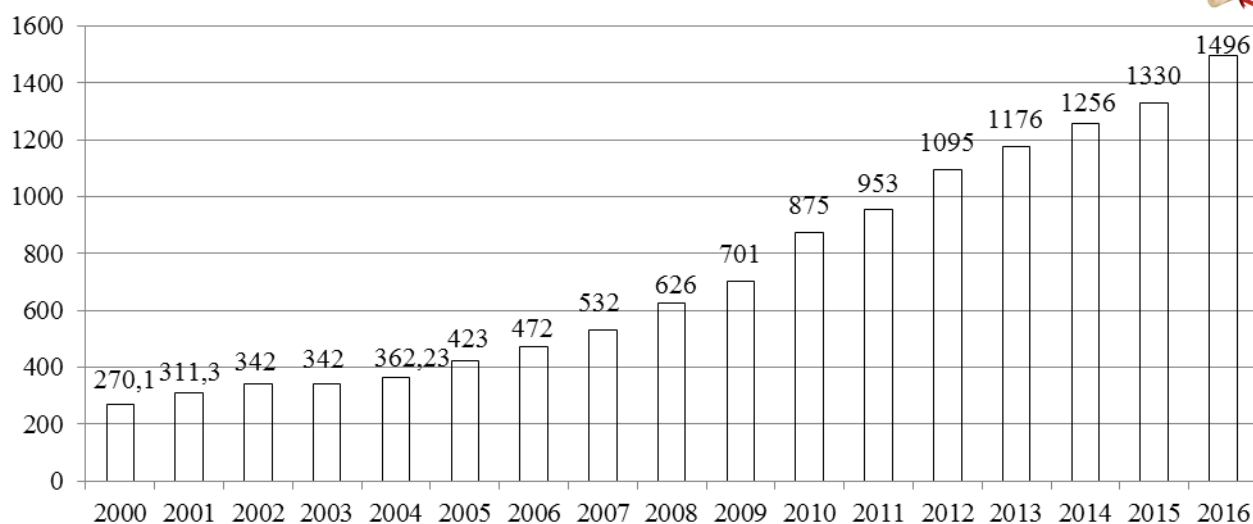
Figure 3. The dynamics of the living wage in Ukraine [2]

20-25% of spendings of Ukrainians are utility costs. The cost of drugs needed for some of the respondents is disastrously high: there are people who spend the amount similar to 7 monthly salaries per year or monthly spend one third of their salary. In general the medications take around 10-15% of the salary. The cost of non-food products takes 20-25% of salary. We should note that almost half of Ukrainians are buying clothing that has been in use to save. Around 12% goes for vacations and only 1% is spent on cultural development (cinemas and theaters). Thus, the average worker spends minimum 102-127% of his salary [13].

There are two kinds of living wage in the world: social, which takes into account the cultural needs of the population, and physiological needed for the physical human survival, namely the consumer basket. The consumer basket was created in case of war. Meanwhile, for example in England, the consumer basket contains champagne and beer, and even an MP3 player with music tracks. Consumer basket of the United States provides expenditures on tobacco and alcoholic products, spending on education, mobile and computer communication [4]. If you compare the list of the Ukrainian consumer basket with American one, we see that our range of products is almost twice poorer. Ukrainians must consume ten times less seafood, six times less fish and five times less meat. Americans consume 20 kinds of vegetables, while the biggest part of Ukrainian diet is potatoe. Even pork fat, which is a national Ukrainian product, has bigger share in the diet of people in the US [5]. In France people have in the consumer basket money for a child nanny, apparatus for teeth correcting, car rental, travelling by taxi and food for cats and dogs. [4]

In many Western European countries and the US part of the consumer basket includes the cost of catering (cafes, restaurants), food at school and at work. For example, Germans have the possibility to visit the cafe once a week and to order a pizza for home delivery. Britain laid in a basket champagne and beer. US citizens may also afford alcohol - beer, wine, whiskey at home and in the restaurant [5]. The part of the food in the structure of the consumer budget should not exceed 30%, non-food products - 47%, other goods and services - 23% [14]. According to UN calculation global limit of monthly income should be not less than 510 dollars, while

in Ukraine - a little more than 48 dollars. [11]

Consumer basket is also a base of comparison of calculated and real levels of consumption. Consumer basket value depends on the level of retail prices of goods and tariffs for paid services (utilities). This practice is used throughout the civilized world. With each type of needs the calculation includes the purchase of relatively cheap goods, usually at state fixed prices. But if the product or service is sold on the market cheaper, the basis is the lowest price [8].

In the EU, the basket is not formed the same way as in Ukraine: they analyze what spents the money on the average consumer, and in our country we are pointed what should be bought at the minimum wage. The Polish basket contains 2000 products and it varies each year depending on the structure of household consumption. The decision to revise makes Polish government. According to the German Bureau of Statistics, their consumer basket includes all goods and services that are most purchased and its composition is updated every 5 years. [10]

It should be noted that in the former Soviet situation with consumer basket is about the same (Figure 4) [5].
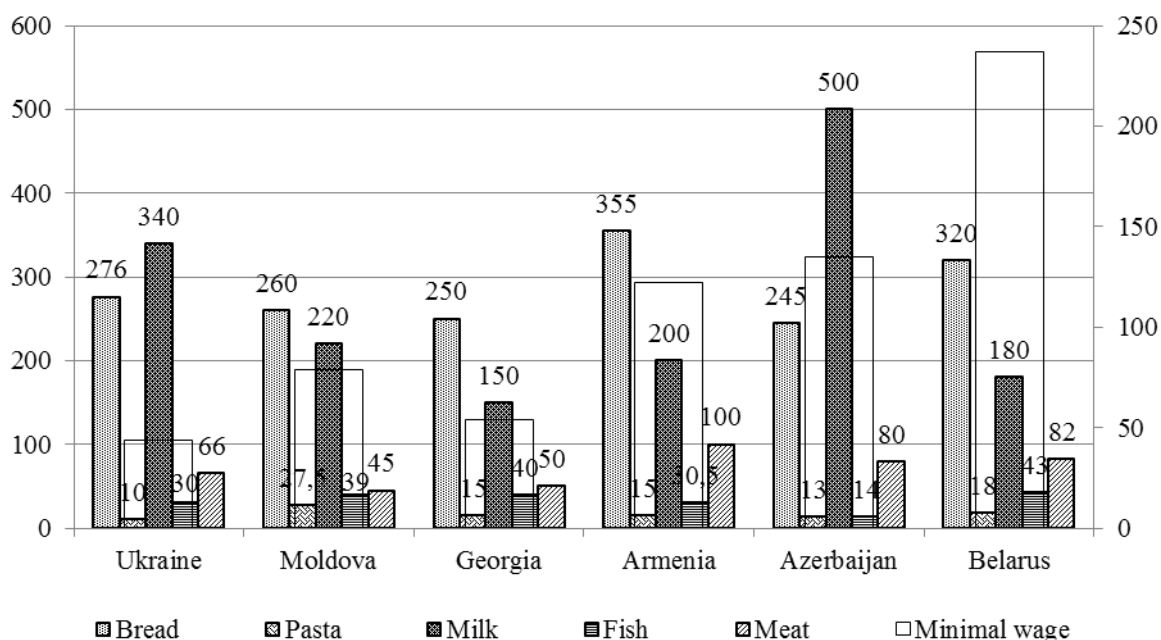

Figure 4 . Market Basket (grams per day) and minimum wages (USD) in Ukraine and Eastern Partnership as on 1.01.2015.

According to officials, the content of the basket allows Ukrainians not to starve, to look after appearance, to dress up more or less decently even to join the beautiful - the "basket" calculates even a visit to the concert or theater (once per year).

Considering that the food takes about 52-53% of income, the government kindly offers to spend on food 20 UAH per day from the total amount of the minimum wage. Thus, even the poor food set provided by food basket has to be cut twice.

Ukrainian government also believes that to spend money often on clothes is not necessary. For example, one man can wear the same trousers 4 years, tracksuit and sweater - 3 years, seven pairs of socks for year is enough for him, and there is no need to change the trunks more often than once per 10 years. Women's wardrobe consists of 1 bra for a year, one skirt and one dress for 5 years, three tights for a year,

one winter coat for 8 years and one pair of winter boots for five years. Also Ukrainians are offered to cut the hair three times a month, to visit cinema, theater, circus, zoo and various cultural events - 1 time per year. 2 times per year Ukrainians can use dry cleaning service and once per year visit sauna. [12]

The international community has developed basic regulations aimed to provide normal human existence and its development. Our government is obliged to consider these regulations, because these acts are ratified by our country and Ukraine is a member of many international organizations. In particular: the Convention of the International Labour Organization (ILO) №131 "Minimum Wage Fixing with particular reference for developing countries" (ratified by Ukraine on 19th of October 2005), ILO Convention №117 «Basic Aims and Standards of Social Policy" of 1962 year (ratified by Law of Ukraine number 692-VIII of 16.09.2015), the Universal Declaration of Human rights adopted by the UN General Assembly, International Covenant on economic, social and cultural rights of 1966. However, the policy of our government shows that it actually commits a crime against their people by setting inadequate size of the consumer basket and subsistence level [15].

Under the Convention of the International Labour Organization (ILO) №131 "Minimum Wage Fixing with particular reference for developing countries" of 1970 "minimum wages should be an element of policy aimed to combat poverty and to ensure that the needs of workers and their families are provided. The main purpose of setting the minimum wage should be providing of social security to the employed people regarding the permissible minimum wage". The level of the minimum wage is seen as a lower limit, which should guarantee satisfaction of basic needs of the worker and his family.

According to international regulations, minimum wages are set, on the one hand, considering the interests of workers and their families, and on the other hand, considering economic development. Setting of the minimum criteria depends on the socio-economic situation of the country.

Today the world formed two approaches to determine the minimum wage. The first is based on the minimum requirements that must be provided to preserve life (basket of vital goods and services in terms of value). In this case, the minimum wage is a living wage. This approach is practiced in Ukraine. However, in developed countries it is considered acceptable for use only in wartime.

The second approach considers that the minimum guarantees should apply not only to physical but also social and cultural needs of human. In this case, the minimum wage is comparable to the level of the average wage. For example, in Japan it is about 44%, in the US - 50%, in the Netherlands it is almost 75% of the average wage. This option allows you to set the minimum wage at a level of 2-2.5 times of the subsistence minimum.

The main difference between developed countries and Ukraine is the way of calculating of the minimum wage (MWC). For example, US-based minimum wages are official statistics of the cost of living for a family of 4 people (2 adults and 2 children), Ukrainian minimum is the living wage for an able-bodied person.

According to the ILO, today more than 90% of countries have legislations governing the minimum allowable wage. However, in monetary terms there is a big

inequality. Thus, the average amount of minimum wage of 20% of the poorest countries is 57 dollars, while the 20% of the richest countries can show 1185 dollars.

As we see, mechanism of establishment and regulation of this social standard differs. In some countries the government determines the size of the minimum wage (Slovenia, Netherlands, Croatia, New Zealand, Ireland, and Greece). Often it is preceded by consultations between the government, employers and workers representatives (Latvia, Lithuania, Poland, Bulgaria, Slovakia, Hungary, Great Britain, Czech Republic). The US has federal and regional level of the minimum wage, while Japan and Canada - only regional. On the other hand, in Finland, Norway, Italy, Germany, of Denmark, Austria and Sweden there is no minimum wage laws. These countries have developed a tradition of collective agreements between the parties concerned.

In some countries, including Ukraine, there is a discrepancy between the inflation rate and increase of the guaranteed minimum wage. Thus, in 2015 in Ukraine recorded inflation at a rate of 43.3%, and the minimum wage was increased only by 13.1%. The real income in 2015 decreased to 9.9%. In 2014 the level of minimum wage in Ukraine did not change, while the inflation rate was 24.9%. So when actual prices increased in 2014-2015 for 79%, Ukraine managed to increase the cost of living only for 74 UAH.

According to statistics, Ukrainian minimum wage is significantly lower than European. Even the continent's poorest countries, Albania and Bosnia and Herzegovina, have higher minimum wage than Ukraine. Unfortunately, the level of minimum wage in Ukraine demonstrates increasing compliance to African standards. In absolute amounts Ukrainian minimum wage almost equals to Nigerian (83,8 and 81 euros respectively in 2015). Some countries of the African continent such as Algeria, Gabon, Botswana, Cape Verde are already ahead of Ukraine on this indicator [11].

Conclusions. The size of the consumer basket, the living wage and minimum wage are interrelated categories, the level of which is regulated by directive. As seen from the results of the study, none of the indicators meets their real level in the current economic reality of Ukraine. Therefore the future researches should be aimed at finding alternative ways of forming a decent subsistence level, improvement of methodological approaches to its definition and more differentiated reallocation of existing budgetary funds allocated to social security of Ukraine.

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COST OF PRODUCTION OF BIODIESEL

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Abstract: Determined costs for biodiesel production technology based on the accepted yield of sunflower seeds and rapeseed, its pollution and humidity. Mathematical modeling production cost of biodiesel.

Keywords: biodiesel, the cost of seed, rapeseed, sunflower

Introduction. Ukraine has a huge wealth − ground. However, for the harvest of the land it must be processed. At present, for agriculture Ukraine annually is necessary to have about 1900 thousand tons of diesel fuel and 620 thousand tons of gasoline, which are produced from the 4500 thousand tons of oil, mostly imported [1]

Replace petroleum diesel fuel can be biodiesel, feedstock for the production of which is grown annually in Ukraine is enough. However, there have been discussions about the feasibility of the production of biodiesel from vegetable oil. Some skeptics argue that the current high prices for this product it is advisable to sell it, and the money to buy petroleum diesel. That this issue is devoted to this article.

Analysis of recent research. In [2; 3] showed that a substantial part of the biodiesel production costs include the cost of cultivation and storage of seeds. In [2] studied the cost of cultivation of oilseeds. It is found that it depends on the yield. In addition, the cost of cultivation of winter rapeseed and soybeans, and close to 12-20% above the cost of sunflower cultivation. Storage costs oilseeds investigated in [3], where it is established that they are heavily dependent on humidity and weed seeds. In [4; 5] determined that the cost of biodiesel is 85% dependent on the cost of raw materials. However, in the literature are not investigated the degree of influence of factors on the production cost of biodiesel.

The purpose of research. The establishment of functional dependence of the production cost of biodiesel factors that affect it.

The results of research. Cost of biodiesel production was determined by the technology shown in the Table. 1, taking into account the cost of cultivation and storage of seeds.

Table 1

Flow chart of biodiesel production

Technological operation name	Unit name	Amt, pcs
Weigh the seeds	CV-20000A/9	1
Loading seeds	Airloader	1
Preparation of oil	LVPO-EKO-BIO-1.8.2.P	1
Cleaning oil	LVPO-EKO-BIO-2.09.3.3P	1
Production of biodiesel	LPDB-EKO-BIO-1.24.5.P	1
Heating plant building	Boiler P6-KOVA-50	1
Transportation cake for processing	KAMAZ-43253	1

The set values of biodiesel production costs are shown in Fig. 1, which shows that the production cost of biodiesel a significant impact exercise yields oilseeds from which biodiesel is obtained, as well as contamination and moisture content of the grain heap supplied for storage and further processing. However, the type of equipment used for cultivation, storing and processing of bio-diesel has a significant influence.

Cost of biodiesel production exceeds the cost of production of vegetable oil from which it is obtained, by 5-10 UA cents per liter.

Cost of biodiesel production with yields of 10-25 t/ha can be described by the expression:

$$C = a_1 \cdot W + a_2. \tag{1}$$

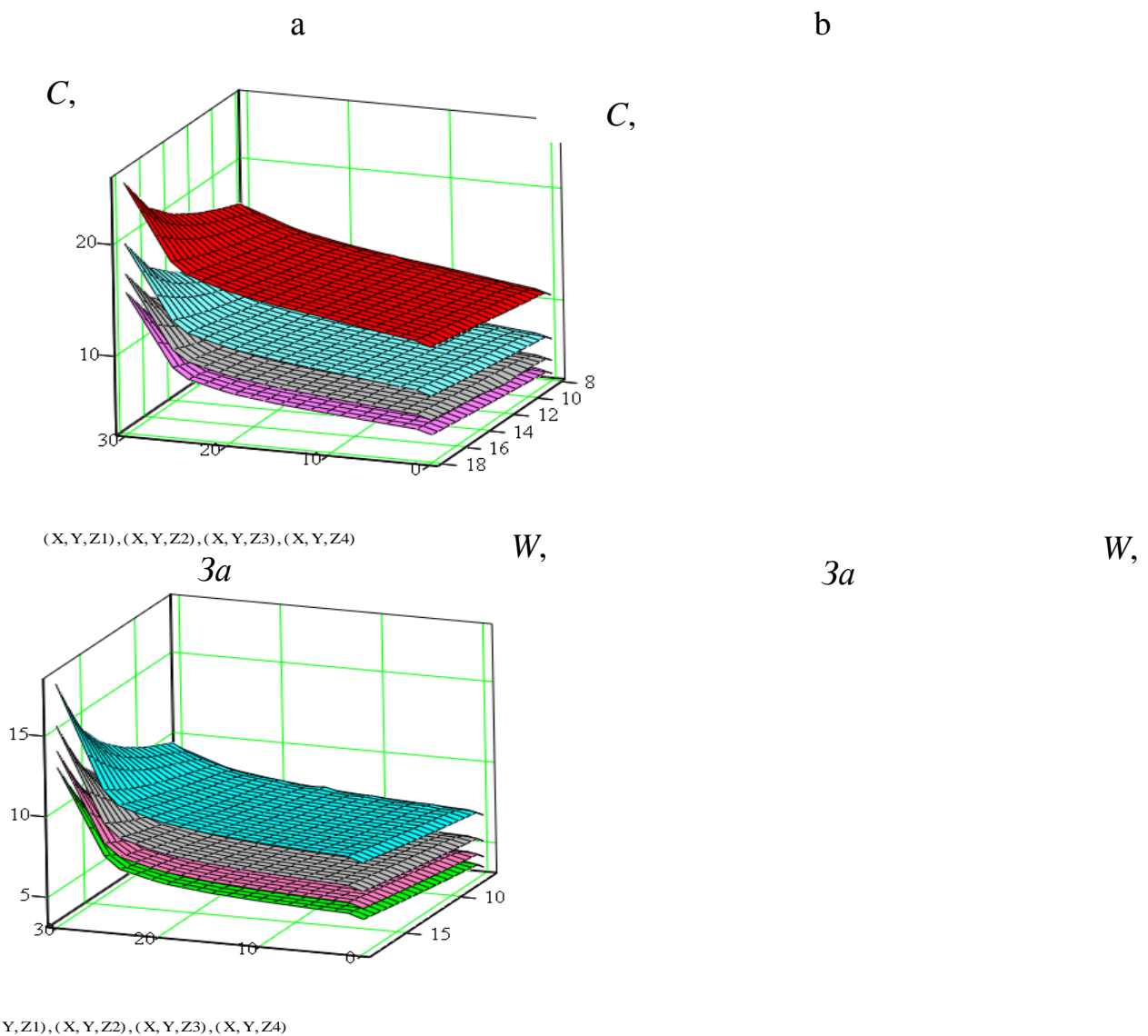The values of coefficients a_1, a_2 are shown in Table. 2.

a   b

Fig. 1. Cost of production of biodiesel: a − and rapeseed; b − from sunflower seeds;

■ − 30 cwt/ha; ■ − 25 cwt/ha ■ − 20 cwt/l ■ − 15 cwt ■ − 10 cwt/ha

Coefficients a_1 and a_2 in formula (1)

$Э, \%$	a_1	a_2	R^2	$Э, \%$	a_1	a_2	R^2
1	2	3	4	5	6	7	8
Yield 25 ц/га				Yield 20 ц/га			
25	0,2351	4,242	0,9955	25	0,2515	5,5217	0,9955
20	0,1849	4,0677	0,9984	20	0,1996	5,3166	0,9982
15	0,1675	3,8061	0,9986	15	0,1836	4,9896	0,9986
10	0,1593	3,548	0,999	10	0,1737	4,7073	0,9989
5	0,1543	3,2485	0,9989	5	0,1681	4,3587	0,9991
0,1	0,1495	2,9987	0,999	0,1	0,1635	4,0519	0,999
Yield 15 ц/га				Yield 10 ц/га			
25	0,2778	7,6473	0,9961	25	0,33	11,966	0,9965
20	0,226	7,3588	0,9983	20	0,2769	11,519	0,9986
15	0,2078	6,9749	0,9986	15	0,2573	10,991	0,999
10	0,198	6,6157	0,9988	10	0,2458	10,5	0,9989
5	0,1907	6,1962	0,9987	5	0,2367	9,9135	0,9991
0,1	0,1856	5,8101	0,999	0,1	0,2303	9,3728	0,999

Summary and Conclusions

The production cost of biodiesel depends on the yield of oilseeds and their debris and moisture. With an increase in contamination and oilseeds moisture production cost of biodiesel increases sharply due to increased costs for cleaning and drying of raw materials.

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