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15 June 2009

Online at <https://mpra.ub.uni-muenchen.de/15745/>
MPRA Paper No. 15745, posted 16 Jun 2009 00:31 UTC

MODELING RISK OF INTERNATIONAL COUNTRY RELATIONS

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Abstract

In this article we consider the modeling principles and model for estimation of tension of international relations of a country with other countries. We use the tension of international relations as partial indicator of international political-economical country-risk. The model bases on estimation of coincidences and contradictions of views of countries concerning decision of political, economic, military, domestic and international problems and projects. The model aggregates detailed estimations of separate problems into composite estimation of relations tension with using of fuzzy measures and integrals. The model allows receiving quantitative estimations of tension of international relations which are necessary for making investment decisions. We use this model for estimation of international political-economical risk of Ukraine.

Keywords: model, international relations, fuzzy measure, political-economical risks

Introduction

The dependence of investments risk into country from its international relations appreciably rises in conditions of globalization. The stability of international relations is especially important factor for investment into export-oriented industries of developed and post-soviet countries. The tense relations with neighboring states or states - world leaders in policy sphere or in safety sphere very often negatively influence export-import streams. Therefore the detailed studying and analysis of structure of international relations is today especially topical.

The analysts evaluate the risk of investments into country by means of country-risk. The well-known researches consider various aspects of country-risk. In (Bourke and Shanmugam, 1990), for example, the authors consider the country-risk as the risk that the country will be unable to service its external debt due to an inability to generate sufficient foreign exchange. The country risk model (www.riskmodel.eiu.com) calculates the country-risk as additive convolution along hierarchical system of financial, economic and political risk-categories: debt structure, fiscal policy, liquidity, political stability and others. This model includes the indicator <international relations> into category <political stability> only as one parameter. In many publications (Andrade and Kuhl, 2004; Simpson, 1997; Arin, Molchanov and Reich, 2007; Hammer, Kogan and Lejeune, 2004, 2007; Erdogdu, 2006) authors reveal the dependences between various risk-indicators (including political). Moser, Nestmann and Wedow (2006) reveal the dependence of necessary governmental guarantees of exporter-country and of political risks of importer-country. Lensink, Hermes and Murinde (2000) investigate the dependence between capital outflow and political risks in developing countries. Brewer and Rivoli (1997) consider the dependence of domestic political relations and country-risk. At the same time many papers point out on role increase of international relations at evaluation of country-risk.

The well-known researches consider mainly the risks of domestic economic policy of country: government stability, social and economic conditions, corruption and so on (International Country Risk Guide). These researches do not give due attention to the risks which arise because of negative

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international relations. However the investments efficiency into export-oriented industries greatly depends on relations conditions of exporter-country and importers-countries. For example, not looking at favorable domestic economic conditions for foreign investors, there is a big investments risk into metallurgy of country which has the tense relations with country - large metallurgical importer because there is decline possibility of export markets. For other example, it is gas warfare between Russia and Ukraine which arouses on background of exacerbation of interstate contradictions. Such situations often arise in post-soviet countries which haven't of stable political traditions and also haven't of interests balance in international relations. Moreover the generalized risk-rating of country not always adequately estimates investments risk because of details lack. For investor it is important to know about detailed structure of problems in international country relations to have a tentative estimation of possibility of critical situations on foreign markets.

The International Country Risk Guide estimates the political risk along several weighed components (government stability, internal and external conflicts, ethnic tension and others). The risk components can have subcomponents. The Guide measures the components values and subcomponents in points. The experts assign the values according to prescribed scales. Such technique has two shortcomings.

1. This technique propose to the expert to answer questions, for example: evaluate the level of political relations between Ukraine and Russia. But the person cannot evaluate simultaneously more than 5-7 factors. The limited opportunities of the person are a source of the most widespread errors in problems of expert evaluations. Saaty (1980) draws this conclusion in researches. Moreover the high level of questions generalization often doesn't allow the expert to give exact answer. For example, it is complex to give an unequivocal estimation for international ethnic relations if these relations with one state develop positively, but with another they develop negatively.

2. This technique uses linear convolution with weight coefficients for calculation of composite evaluation of country risk on the basis of partial evaluations. This linear convolution is an additive measure and has properties of probability measure. As is well known, the main shortcoming of additive measure is smoothing and the independence requirement of partial evaluations. Smoothing leads to loss of method sensitivity. Researchers do not recommend using such measures at generalization more than 5-7 factors. If these factors are dependent among themselves, linear convolution cannot be used at all. In case of factors dependence inevitably arise a systematic errors. It is necessary to use special methods for exception of correlations influence. We emphasize that the international relations greatly depend from each other. Compromises in relations are mutual concessions along different problems. Besides, additive measures do not allow modelling the threshold phenomena in the international relations, when quantitative changes after accumulation provoke the qualitative changes of relations.

Therefore we propose the new model for estimation of international relations which has no these shortcomings.

The basic concepts

The political-economical forces. The basic elements of system of international relations are political-economical forces: the states, states coalitions, international corporations. The political-economical forces have own interests. We consider the forces interests as the most deep and latent stimulators of relations development.

The power of political-economical forces. For interests achievement the political-economical force uses various material and non-material resources which we consider as political and economic instruments. The generalized estimation of resources quantity characterizes the power of political-economical force.

The aggressiveness of political-economical forces. Each political-economical force has volition (propensity, aspiration) to resources use for interests' achievement. This volition depends on political traditions, personality of political leaders, own estimation of situations and other conditions. The volition to resources using characterizes force aggressiveness. Taking into account aggressiveness the forces use the resources for economic expansion, economic sanctions and restrictions, for support of domestic political forces, financing of mass media, military intervention, etc.

The structure of relations. The relations between forces arise in decision context of domestic and international problems. For example, the first force prefers one decision variant of problem, but other force prefers other decision variant. The contradiction between preferences (views) of these forces concerning problem decision provokes the contradiction between forces. And vice versa, the coincidence between views of forces concerning the problems decision stimulates development of friendly relations. The contradiction and coincidence levels which we compose along all problems with taking into account power and aggressiveness of forces describes the tension of international relations.

The structure of model

The figure 1 shows structure of model with explanations of partial estimations.

This model is the set of interrelated elementary concepts which describe preferences of political-economical forces concerning various problems and also describe the various aspects of estimation of these preferences. The quadrangles (graph tops) show the concepts of model. The arrows between the tops show the connections between the concepts. The arrows also show the direction of calculations and estimations movement. The top in arrow-ending is consideration context (view-point) for the top in arrow-beginning. For example, the model considers the concept <Problem 1> from view-point of concepts <Force 1>, <Force 2> and so on.

The algorithm moves the estimations from the top in arrow-beginning to the top in arrow-ending. The model formalizes the set of entrance estimations as the membership of fuzzy set. In the each top the user previously determines the set of fuzzy measures which describe the contexts of corresponding concept. The number of fuzzy measures corresponds to number of contexts of this top. The algorithm integrates entrance membership along each fuzzy measure and calculates the resulting estimations.

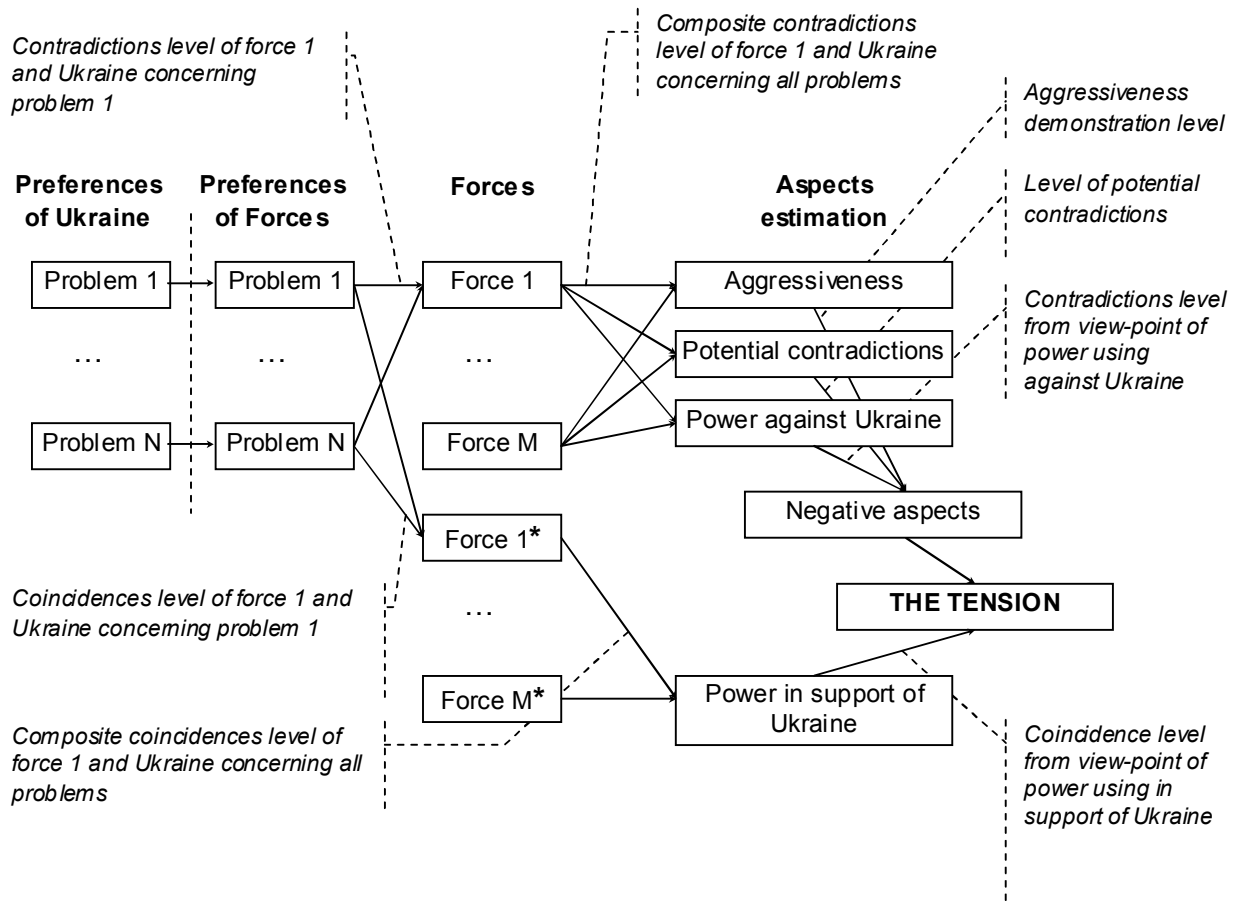


Fig.1. The structure of model

For example, in the top <Force 1> the user determines the fuzzy measure which describes the importance of problems from view-point of aggressiveness of this political-economical force. To entrance of top the algorithm moves estimations of contradictions levels between Ukraine and this force concerning each problem. In the top the algorithm calculates composite contradictions level between Ukraine and this force concerning all problems. The algorithm fulfills analogous calculations for all contexts of top <Force 1>.

The algorithm uses the fuzzy integral Sugeno (1972) for integration of membership $h(x) : X \rightarrow [0,1]$ along contextual fuzzy measure $g(\cdot) : 2^X \rightarrow [0,1]$:

$$L = \int_X h(x) \circ g(x), \quad (1)$$

where X is universal set.

From view-point of systems analysis, the measures with softer axiomatics are more adequate tools for modelling. Sugeno (1972) and Pospelov (1986) in detail describe the advantages of a fuzzy measure. Fuzzy measure Sugeno is generalization of probability measure of Kolmogorov. This measure has higher sensitivity and does not demand the factors independence at generalization. The measure has nonlinear properties and can well model the threshold phenomena.

The algorithm fulfills the calculations step by step.

Step 1. The calculation of contradictions levels and coincidences levels of Ukraine preferences and preferences of political-economical forces for each problem of international relations.

Calculation of contradictions levels. The algorithm fulfills the calculations of contradictions levels in the tops <Problem 1> - <Problem N> out of group <Preferences of forces>. In each top the user determines the gradations set as the possible variants of problem decision. On this set the user also determines the fuzzy measure which describes the preferences of forces concerning problem decision variants.

The user determines the set of fuzzy measures for contexts which we denote by the tops <Force 1> - <Force M> (tops group <Forces>). These measures describe unacceptability (undesirability) of decision variants from view-point of various political-economical forces. Figure 2 demonstrates the gradations set and one fuzzy measure in top <Integration of Ukraine into EU> from view-point of EU, that is measure describes the EU preferences concerning this problem. It's evidently that EU prefers the associate membership of Ukraine.

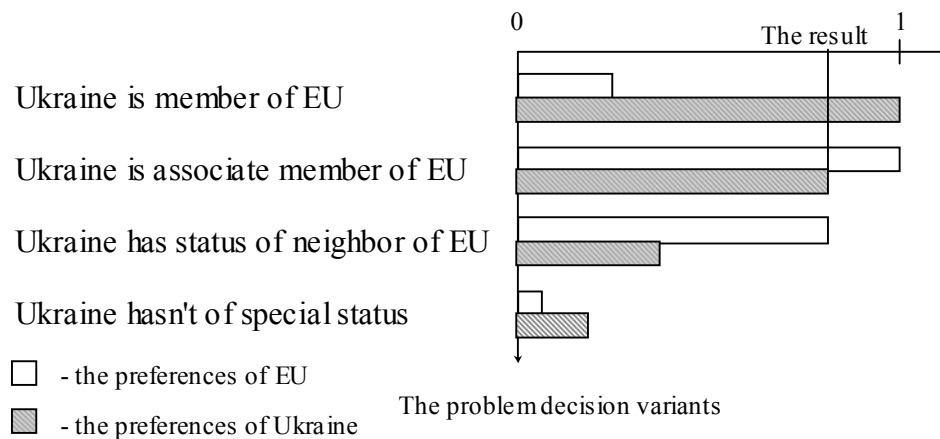


Fig. 2. The formalization of concept <Integration of Ukraine into EU>

The user determines the Ukraine preferences also on corresponding gradations sets in the tops <Problem 1> - <Problem N> out of group <Preferences of Ukraine> (see fig. 2). The integration results are contradictions levels of Ukraine preferences and preferences of each political-economical force concerning each problem. If preferences of force we describe by the possibility measure the fuzzy integral calculates the result by analogy with maximin rule (see fig. 2). But this comparison isn't the full analogy from view-point of mathematic of fuzzy integral.

Calculation of coincidences levels

The algorithm fulfills the calculations of coincidences levels also in the tops <Problem 1> - <Problem N> out of group <Preferences of forces> by analogy with the calculation of contradictions levels. However the algorithm fulfills the calculations for other contexts which we denote by the tops <Force 1*> - <Force M*> (tops group <Forces>). For these contexts the user determines the fuzzy measures with reverse sense - as the measures of variants desirability. The integration results are the coincidences levels of Ukraine preferences and preferences of each political-economical force concerning each problem.

Step 2. The generalization along all problems and the calculation of composite contradictions levels and composite coincidences levels of preferences between Ukraine and each political-economical force.

The algorithm fulfils the calculations in each top out of group <Forces>. In the tops <Force 1> - <Force M> the algorithm calculates composite contradictions levels of preferences. In the tops <Force 1*> - <Force M*> the algorithm calculates composite coincidences levels of preferences.

Calculation of composite contradictions levels of preferences

In the tops <Force 1> - <Force M> the user influences the fuzzy measures of problems importance for each political-economical force from view-point of three contexts:

- the aggressiveness demonstration of political-economical force;
- the level of potential contradictions;
- the power using against Ukraine.

We consider the contradictions in the three different contexts because political-economical forces differently perceive contradictions for determination of intentions and actions. For example, Georgia can accept the declaration for Ukraine support concerning problem <The using of sea-shelf of Serpent-island>. However Georgia hasn't objective prerequisites for use of power and resources because for Georgia this problem is not important.

To entrance of the tops <Force 1> - <Force M> the algorithm moves the estimations of contradictions levels of preferences along each problem and calculates three composite contradictions levels between Ukraine and political-economical forces.

Calculation of composite coincidences levels of preferences

In the tops <Force 1*> - <Force M*> the user determines the fuzzy measure of problems importance for each political-economical force from view-point of power using in support of Ukraine. To entrance of these tops the algorithm moves the estimations of coincidences levels of preferences along each problem and calculates the composite coincidence level of preferences. This level describes the possibility of Ukraine support by these forces.

Step 3. The calculation of aspects estimations of international relations.

The algorithm fulfills the calculation in tops out of group <Aspects estimation>.

In these tops the user determines the following fuzzy measures:

- in the top <Aggressiveness> - the aggressiveness measure of political-economical forces (we form the measure with help of expert's or with help of special model);
- in the top <Potential contradictions> - the measure of influence (the measure of the importance) of political-economical forces;
- in the top <Power against Ukraine> - the power measure of political-economical forces (we form the measure with help of expert's or with help of special model);
- in the top <Power in support of Ukraine> - the weakness measure of political-economical forces (it is inverse measure of forces power).

The algorithm moves the composite contradictions levels of preferences of each political-economical force, integrates these levels along listed measures and calculates three estimations:

- the aggressiveness demonstration level of political-economical forces in attitude to Ukraine - A_{Σ} ;
- the level of potential contradictions between Ukraine and other forces (objective prerequisites for contradictions) - dI_{Σ} ;
- the possibility of power using against Ukraine - M_{Σ} .

The algorithm also integrates the composite coincidences level of preferences of political-economical forces along weakness measure of these forces and calculates the possibility estimation of power using in support of Ukraine - M_U .

Step 4. The calculation of tension of international relations.

The algorithm fulfills the calculations in the tops <Negative aspects> and <The tension> according to logic formula:

$$N = (A_{\Sigma} \vee M_{\Sigma} \vee dI_{\Sigma}) \wedge \overline{M_U},$$

where \vee, \wedge - the symbols of logic operations <OR> and <AND> which the algorithm fulfills by means the integration along the subadditive and superadditive fuzzy measures;

N - the tension of international relations of Ukraine.

The formula shows that the high level of aggressiveness; the high potential contradictions; the high using possibility of power against Ukraine; the low using possibility of power in support of Ukraine provoke the high tension of international relations.

The tension estimation of international relations of Ukraine in 2007

Figure 3 shows the screenshot of program realization of model. In model we analyze the full set of international relations of Ukraine with other political-economical forces of region: with the neighbouring states and the states - world leaders. We use the special models for calculation of aggressiveness and power of political-economical forces. We not consider these models for abridgement of article.

We have collected the information messages (publications, reports, reviews, articles) which have been published in mass media during 2007. We have used these messages for preferences identification of political-economical forces concerning domestic and international problems. After that we have introduced the formalized preferences of forces into model.

Figure 4 shows the topicality of problems of international relations as the number distribution of information messages along all problems with taking into account the mention frequency of forces in these messages.

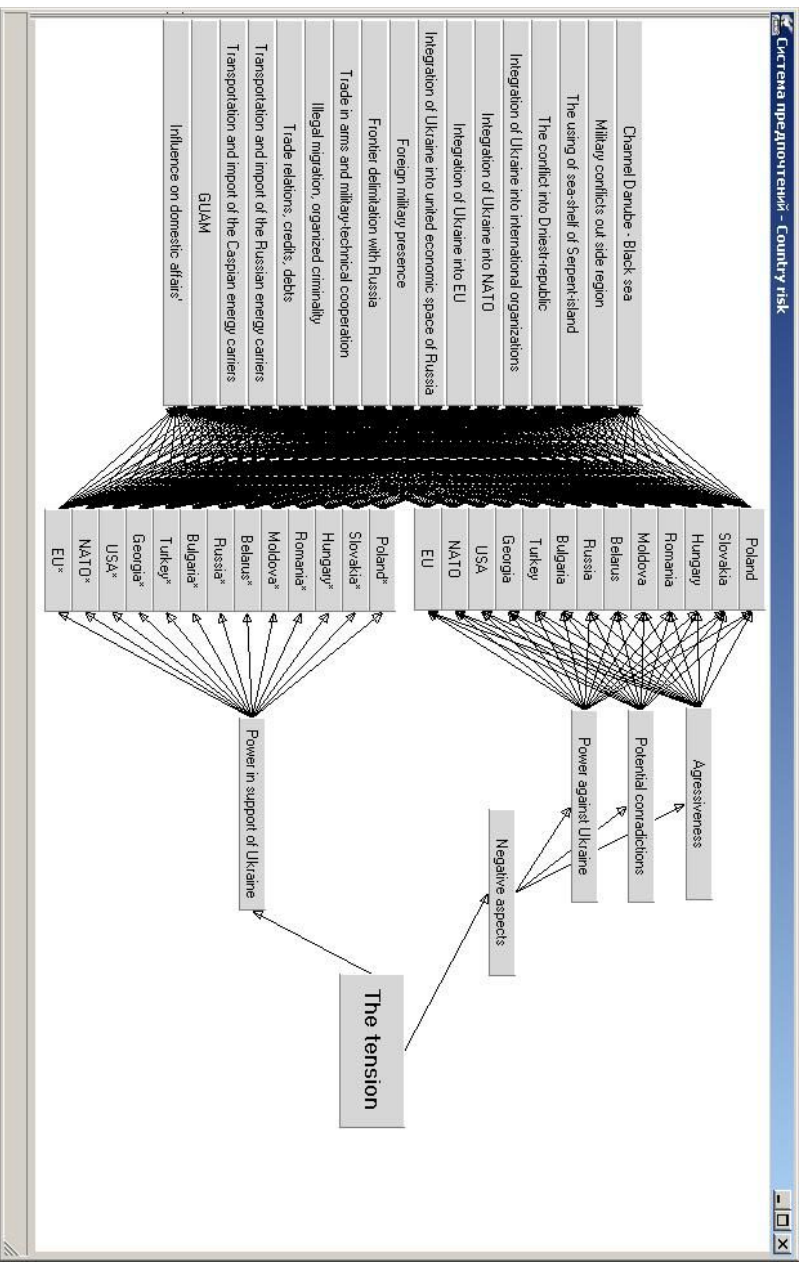


Fig. 3. The screenshot of program realization of model

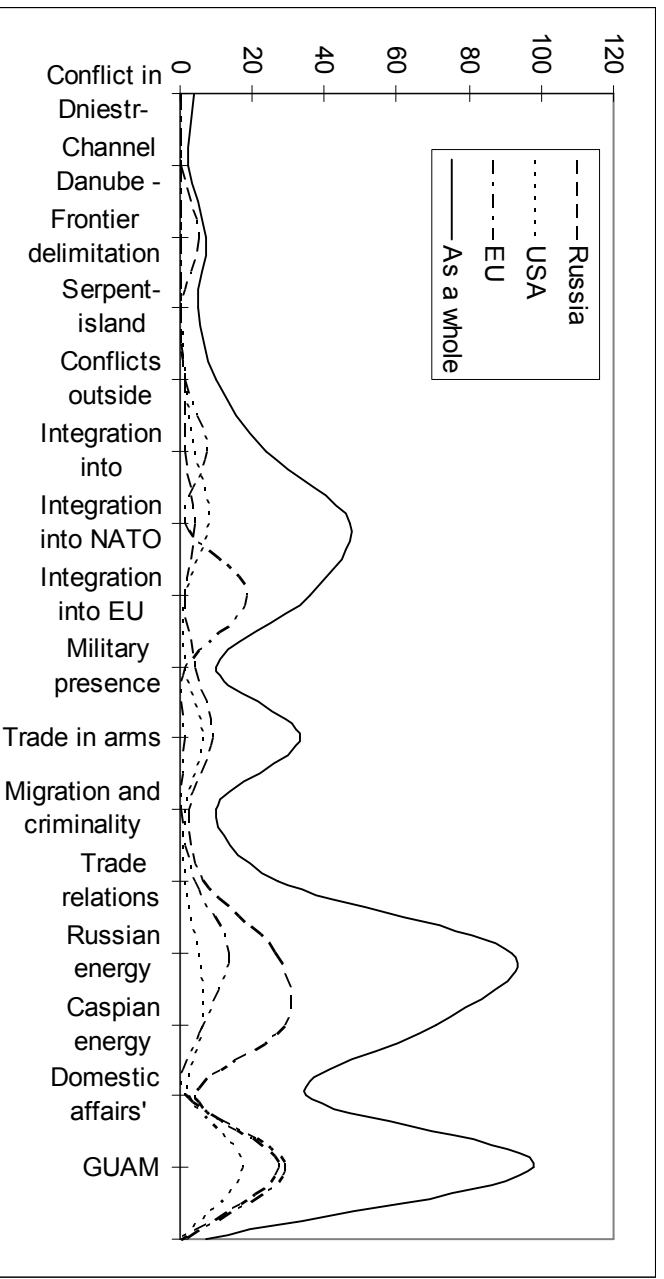


Fig. 4. The number distribution of information messages along all problems

The greatest intensity of information field has been concentrated along the problems: <Influence on domestic affairs'>, <Trade relations> (trading wars, export-import restrictions), <Integration of Ukraine into NATO and EU>. The problem <Transportation and import of the Russian energy carriers> (so-called <Gas warfare>) has lost the topicality in comparison to 2006.

Contradictions between preferences of political-economical forces

The table 1 demonstrates the estimations of contradictions between Ukraine and other political-economical forces which we differentiate concerning positive and negative aspects of international relations.

Table 1. Contradictions estimations on the end of 2007

Political-economical forces	Aspects of international relations			
	Negative			Positive
	Level of potential contradictions	Contradictions for power using against Ukraine	Aggressiveness demonstration	Preferences coincidences for power using in support of Ukraine
Belarus	0,25	0,26	0,27	0,75
Bulgaria	0,18	0,09	0,18	0,88
Georgia	0,16	0,16	0,18	0,84
EU	0,54	0,27	0,54	0,73
Moldova	0,27	0,18	0,29	0,86
NATO	0,28	0,27	0,28	0,73
Poland	0,36	0,18	0,36	0,82
Rumania	0,39	0,36	0,43	0,64
Russia	0,55	0,45	0,64	0,45
Slovakia	0,18	0,18	0,18	0,82
USA	0,36	0,21	0,43	0,8
Turkey	0,27	0,26	0,27	0,82
Hungary	0,18	0,15	0,18	0,85

In comparison to 2006 the structure of political-economical forces which have the least contradictions with Ukraine has changed. The relations of Ukraine and Bulgaria, Georgia, Moldova, Slovakia, Hungary, Turkey and NATO were traditionally quiet. Per 2007 Belarus also has been included into this list.

Poland has left the list of states which have the least contradictions with Ukraine. The import prohibition of poor-quality meat from Poland and unclear the Poland preferences concerning building of oil-pipeline <Odessa - Brody> provoke the tension increase of relations.

The estimations structure along aspects of international relations in 2007 almost has not changed. The tensest aspects of relations (in compliance with number of political-economical forces which have the maximal contradictions) were aspects: the level of potential contradictions and the aggressiveness demonstration. In these aspects Ukraine had the tensest relations with Russia, EU, Romania, Poland and USA. Russia, USA and EU are countries - world leaders. Therefore the tense relations with them confirm key importance of Ukraine for the further development of regional relations. These tense

relations also are the evidence of views division of influential political-economical forces concerning Ukraine.

The estimations of international relations from the view-point of power using against Ukraine in comparison to other aspects have low values and not exceed level 0,5. As well as in 2006, Russia and Romania had the greatest reasons for power using against Ukraine. The Russia had the minimal coincidence of preferences (0,45) from the view-point of power using in support of Ukraine. This level is very near to 0,5 and shows transition to new qualitative conditions of relations between Ukraine and Russia.

Contradictions with Russia, USA and EU along problems of international relations

These political-economical forces basically form the international relations in region. The figure 5 illustrates the contradictions levels along problems on the end of 2007.

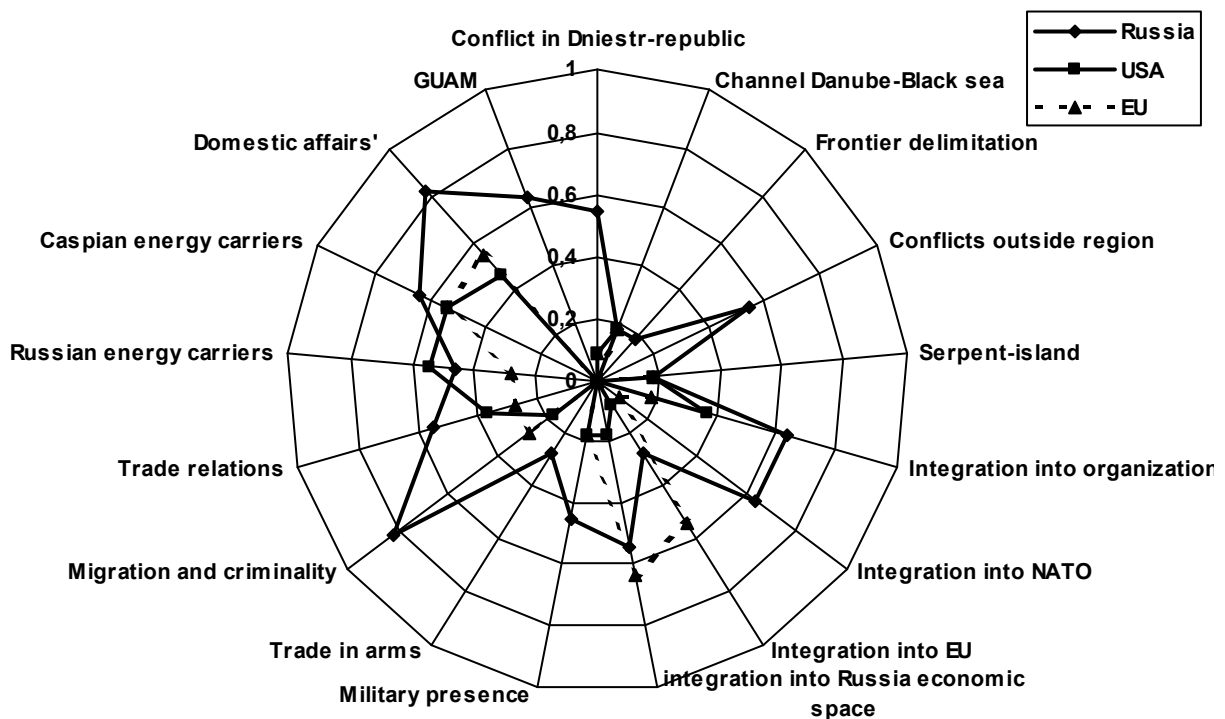


Fig. 5. The contradictions levels along problems with Russia, USA and EU

In comparison to 2006 (see fig. 6) the composite contradictions level of Ukraine and Russia has increased. The problems structure also has changed. The most contradictory problems of relations between Ukraine and Russia are:

Influence on domestic affairs':

- the non-recognition by Russia of Ukrainian views concerning famine, the translation of interstate rhetoric into international organizations (in particular, into United Nations);
- the creation in Ukraine of museum of Soviet occupation;
- the publication in mass media (including foreign mass-media) of articles and declarations where one party negatively characterizes other party;

- the harsh estimations of parliamentary crisis in Ukraine;
- the Russia's refusal from negotiations concerning the property of former USSR;
- the Ukrainian accusations of concealment of functionaries who have poisoned Ukraine President;
- the vandalism actions of Russian public organization concerning Ukrainian state symbols, the monuments dismantling of Great domestic war in Ukraine;
- the declarations of Russian politicians about unselfish support of Ukrainian economy by the low gas-prices, the accusations of ingratitude of Ukraine;

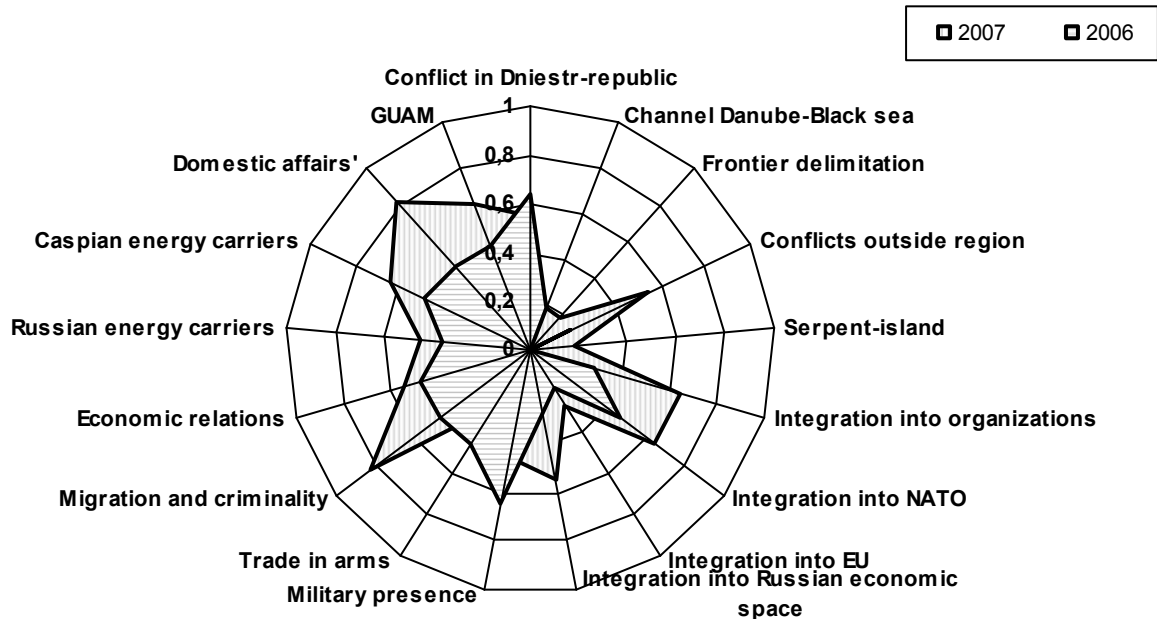


Fig. 6. The contradictions levels with Russia on the end 2006 and 2007

Migration problems:

- the accusations of unobstructed transit through Ukraine of foreign hirelings into conflicts zones' on Northern Caucasus;
- drawing up lists of politicians - persons non grata;
- the cancelling by Russia the agreements about registration of Ukraine citizens in territory of Russia;

Integration problems into international organizations:

- the accusations of political pressure of Russia at the time of negotiations between Kirghizia and Ukraine for the integration of Ukraine into WTO;
- the negative expectations of Russia of negotiations with Ukraine for integration of Russia into WTO;

Integration Ukraine into NATO:

- the negative expectations of Russia of disposition of NATO military bases near frontiers, the access possibility of NATO forces to Azov sea, the vulnerability increase of strategic objects;
- the declarations of Russian politicians about cooperation restriction with Ukraine in military-technical and economic area;

Transportation and import of Caspian energy carriers:

- the negative attitude of Russia to transit of energy carriers from Kazakhstan, Turkmenistan, Azerbaijan around of Russia;
- the building by Russia of gas pipeline from Central Asian countries around of Ukraine (Near-Caspian gas pipeline, second line of gas pipeline <The Blue stream> through Black sea up to Bulgaria);

Transportation and import of Russian energy carriers:

- the building by Russia of gas pipeline for transportation of Russian gas around of Ukraine (<Nord Stream> through Baltic sea up to Germany, the second line of gas pipeline <Jamal - Europe> through Belarus and Poland);
- the volumes decreasing of oil transportation through Ukrainian oil pipeline <Friendship> owing to increasing of transit volumes through Russian port Primorsk;
- the refusal of Russia from building of gas pipeline <Bogorodchany - Uzhgorod> through Ukraine;
- the refusal of Russia from fixed price of gas-deliveries into Ukraine;
- the intention of Ukraine to agree the prices of transit and gas.

Moreover the contradictions of Ukraine and Russia along problems of foreign military presence and economic relations have decreased. Ukraine and Russia have found the reciprocal compromise between the problems of basing the Russian Fleet in Crimea and the export of meat and milk into Russia.

The list of problems with contradictory preferences between Ukraine and USA in 2007 has changed in comparison to 2006. In 2006 Ukraine had the contradictions with USA along problems of transportation of Russian energy carriers and influences on domestic affairs' (different views on parliamentary elections). In 2007 the rhetoric activity concerning elections problem has decreased. But the contradictions along problem <Transportation of Caspian energy carriers> have increased. The persistence and tone of declarations demonstrate that the formation principles of the price of Central-Asian gas (which Russia buys and delivers to Ukraine) not satisfy USA. The USA considers the intermediary (company RosUkrEnergo) as the corrupt branch. Also the USA does not agree with transportation route of Caspian energy carriers through Ukraine. The declaration of former ambassador of USA in Ukraine concerning completion hopelessness of oil pipeline <Odessa - Brody> up to Gdansk (Poland) confirms these views of USA. The USA prefers the transportation of Caspian energy carriers through Turkey - through old ally of USA.

Moreover the Ukraine propagandizes the route of gas pipeline <Nabucco> through the own territory and wants to take part in consortium for building of this gas pipeline. However the Ukraine intention does not meet support USA which is the main political engine and initiator of this project. Also USA continues influence attempts on domestic affairs' of Ukraine. The top-level consultations with Ukrainian opposition and the criticism of export policy of Ukrainian government confirm this statement.

In comparison to 2006 the contradictions structure of Ukraine and EU has little changed. The problems with contradictory views of Ukraine and EU are:

Influence on domestic affairs':

- the declarations concerning disclosing murder of journalist G.Gongadze;
- the accusations of corruption of Ukrainian officials;
- the promulgates of parliament dissolution of Ukraine;
- the criticism of constitutional reform of Ukraine;
- the visits cancelling of Ukraine President into some European countries;
- the accusations against Ukraine in participation in confidential program of CIA concerning transportation of people, which CIA considers as terrorists;

Transportation of Caspian energy carriers:

- EU not interests the participation of Ukraine in project of gas pipeline <Nabucco>;
- EU not interests the passage of gas pipeline <Nabucco> through territory of Ukraine;
- EU not supports the project for continuation of oil pipeline <Odessa - Brody> up to Europe;

Transportation of Russian energy carriers:

- EU not interests the transit concentration of all Russian gas through territory of Ukraine;

Integration Ukraine into EU:

- the refusal of membership prospect of Ukraine in EU;
- the signing retardation of agreement with Ukraine about simplification of a visa mode.

In 2006 there were no problems with high contradictions simultaneously for all three forces (Russia, the USA and EU). However in 2007 we have observed the high contradictions between Ukraine and all these forces in problem <Influences on domestic affairs'>. This fact is evidence of influence intensification on domestic and international policy of Ukraine and evidence of intensification of geopolitical struggle between world leaders.

Tension of international relations

The table 2 and figure 7 show the calculation results of aspects estimations of international relations and composite tension.

Apparently, among negative aspects the level of potential contradictions has the least value. The estimation of this aspect (0,39) continues the decrease tendency. The research of model has shown that the estimation level basically depends on contradictions between Ukraine and USA: the low level of contradictions with USA compensates the high level of contradictions with Russia. The maximal value among negative aspects has aggressiveness demonstration level (0,64) which basically depends on contradictions with Russia.

In comparison to 2006 the estimations structure of international relations has changed. In 2006 among negative aspects the contradictions level for use of power against Ukraine had minimal value and the aggressiveness demonstration level had the maximal value. In 2007 objective prerequisites for intentions and actions against Ukraine and for tension growth of international relations is absent: the level of potential contradictions is low. The situation in 2007 becomes similar to situation in 2005 after presidential elections of Ukraine. In 2005 the tension of international relations has increased on background of problems which we not connect with real economy. Pay attention, what the demonstration level of aggressiveness in 2007 has exceeded 0,5. This exceeding is the transition evidence of international relations into new qualitative conditions.

Table 2. Aspects estimations of international relations and composite tension as of the end of 2007

Aspects of international relations	Estimation
Level of potential contradictions	0,39
Contradictions for power using against Ukraine	0,45
Preferences coincidence for power using in support of Ukraine	0,46
Aggressiveness demonstration level	0,64
Tension of international relations	0,55

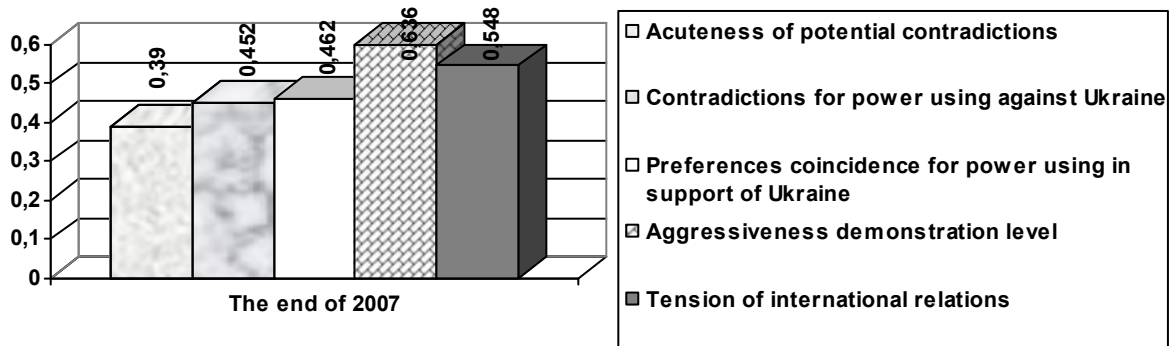


Fig. 7. Aspects estimations of international relations and composite tension as of the end of 2007

The model estimates the tension of international relations on the end of 2007 at level 0,55. In conformity with scale on figure 8, we characterize the international relations as <unstably quiet relations with aggravations attributes>.

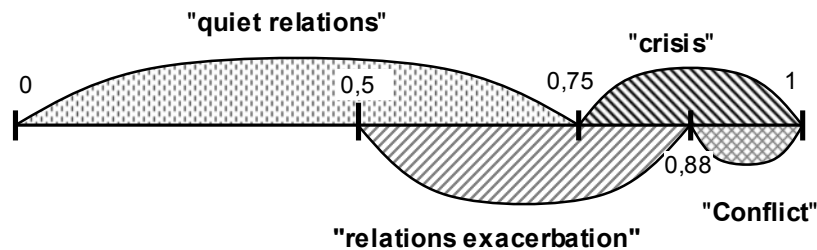


Fig. 8. Scale for quality tension estimation of international relations

Conclusions

We propose the model of international relations for measurement and detailed analysis of international political-economical risk of country. The model bases on analysis of contradictions and coincidences of states preferences concerning domestic and international problems. In algorithm of model we use the fuzzy integral Sugeno for calculation of partial and composite estimations. We have realized the model by means of special software and have used her for tension estimation and the analysis of international Ukraine relations in 2007.

The proposed model does not replace the person. The model concentrates the analysts' attention on small details (components) and on rules of their aggregation into generalized (composite) conclusions. It is very important as the data amount for real problem can be more than 1000 information units.

The model also can solve subsidiary problems:

- the determination of most important problems in international relations and most dangerous states from view-point of risk for country;
- the search of possible compromises areas and possible integration areas of states;
- the development forecast of international relations.

References

- Andrade Joaquim P., Teles Vladimir Kuhl. An Empirical Model of the Brazilian Country Risk - An Extension of the Beta Country Risk Model. Social science research network, June 2004, <http://ssrn.com/abstract=558263>.
- Arin Kerim Peren, Molchanov Alexander, Reich Otto F.. Politics, Stock Markets, and Model Uncertainty. Social science research network, November 2007, <http://ssrn.com/abstract=1010251>.
- Bourke P., Shanmugam B. An Introduction to Bank Lending. Addison-Wesley Business Series, 1990
- Brewer T.L., Rivoli P. Political Instability and Country Risk. Global Finance Journal 1997, 8 (2): 309-321.
- Country Risk Model, Economist Intelligence Unit, <http://www.riskmodel.eiu.com>.
- Erdogdu Oya S. Political Decisions, Defense and Growth. Social science research network, June 2006, <http://ssrn.com/abstract=932514>.
- Fuzzy measure and fuzzy integral. Trans. SICE, 1972, v.8, №2, 95-102.
- Fuzzy Sets in Models of Control and Artificial Intelligence, Ed. by D.A. Pospelov, Nauka, Moscow, 1986 [in Russian].
- Hammer P.L., Kogan A., Lejeune M.A. Country risk ratings: statistical and combinatorial nonrecursive models. RUTCOR Research Report RRR 8-2004, Rutgers University New Brunswick, New Jersey, 2004.
- Hammer P.L., Kogan A., Lejeune M.A. Reverse-Engineering Country Risk Ratings: Combination Non-Recursive Models. Social science research network, March 2007, <http://ssrn.com/abstract=975564>.
- ICRG. International Country Risk Guide, The PRS Group Inc., 2000 - 2006.
- Lensink Robert, Hermes Niels, Murinde Victor. Capital flight and political risk. Journal of International Money and Finance 2000. Volume 19, Issue 1: 73-92.
- Moser Christoph, Nestmann Thorsten, Wedow Michael. Political Risk and Export Promotion: Evidence from Germany. Social science research network, November 2006, <http://ssrn.com/abstract=944779>.
- Saaty T.L. The Analytic Hierarchy Process, McGraw Hill, New York, NY, 1980.
- Simpson John L.. A Regression Model of Country Risk and Risk Scoring. Curtin School of Economics and Finance. Working Paper No. 97.11., November 1997, <http://ssrn.com/abstract=280748>.