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Для наукових працівників, практиків, викладачів, аспірантів, студентів.

В выпуске представлены исследования актуальных проблем экономической теории; экономики и предпринимательства; партнерство высшего образования, науки и бизнеса; методы ценообразования предприятия; социализации экономики; развития социального предпринимательства; экологизации экономики; экологический аудит; экологические риски и экологическая безопасность, а также пути и средства решения этих проблем.

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The research results on current problems of economic theory, economy and entrepreneurship; partnership of higher education, science and business; methods of enterprise's pricing; socialization of economy; social entrepreneurship development; economy ecologization; ecological audit; ecological risks and ecological safety, the ways and means of solving these problems are released in the issue.

For researchers, practitioners, teachers and students.

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NATURE OF INTELLECTUAL PROPERTY INSURANCE AND ITS ROLE IN MODERN ECONOMY

Article is devoted to theoretical analysis of nature and mechanism of intellectual property insurance. Types of intellectual property relations and its role in public reproduction are investigated. Peculiarities of intellectual property relations are considered. Classification of intellectual property objects depending on their most essential features is analyzed. Different approaches to classification of intellectual property subjects are considered. Nature and preconditions of origin of intellectual property insurance are investigated. Goals and functions of intellectual property insurance are specified. Risks that related to disposal and commercialisation of intellectual property and connected with peculiarities of intellectual property objects are analyzed. Three groups of risks concerning disposal and commercialization of intellectual property objects are singled out: risks related to loss or abridgement of intellectual property rights; risks related to possible losses, contingencies and half-received profits connected with commercialization of intellectual property objects; risks of professional responsibility of participants of intellectual property rights; liability insurance of the intellectual property subjects; professional responsibility of participants of intellectual property rights; liability insurance of the contractors concerning intellectual property and property subjects; professional liability insurance of the contractors concerning intellectual property disposal. Factors that restrains development of intellectual property insurance in Ukraine are analyzed.

Keywords: intellectual property relations, insurance, risk management, objects and subjects of intellectual property insurance, intellectual security.

Introduction. At the present stage of development of productive forces and formation of a postindustrial society, intellectual property relations turn from sphere of realisation of human potential to a basic source of social and economic development of the nation. Nowadays intellectual property relation transformed in important component of social and economic basis of a society, and objects of intellectual property turned into defining factor of a social reproduction.

Intellectual activity results being embodied in intellectual property objects turn in important components of intangible assets of the enterprise. Objects of intellectual property are used in different spheres of economic activities, provide manufacture of innovative products, promote development of sphere of services and increase profitability of enterprise activity. Besides, usage of intellectual property objects allows to increase and effectively utilize business reputations of enterprise, effectively administrate and develop intellectual capital of the enterprise.

At the same time, the openness of national economy under globalisation increases quantity of participants of intellectual property relations and forces enterprises to start economic rivalry with the foreign companies for national markets. In these conditions, usage of intellectual capital and effective commercialisation of intellectual property objects allow enterprises to support its competitiveness and keep steady position in the market. Simultaneously, practice testify growing rate of intellectual property rights infringements both in Ukraine, and in the European Union countries within last decade. The growing competition in the international markets creates preconditions for infringement by unfair businessmen of copyrights, related rights, industrial property rights, rights to individualization tools for the purpose of outlet expansion and greater profit reception. Besides, use of somebody else's intellectual product does not demand realisation of considerable expenses and, at the same time, allows to receive an additional revenue from trade in counterfeit goods. Thus, considering risks of application of administrative, financial or criminal sanctions and high profitability of counterfeit activity, a part of economic players dare on intellectual property rights infringement.

In our opinion, under formation of postindustrial society active utilisation of intellectual capital in economic activities forms one of primary factors of enterprise competitiveness. Thus, effective protection of intellectual property rights and defence of intellectual capital of the enterprise forms main precondition of economic safety of enterprise and basis for preserving of its economic potential and outlet expansion. At the same time, for intellectual property subjects protection of intellectual property rights connected with additional expenses for representation and judicial protection of their interests in court and state authorities. In these conditions, usage of intellectual property insurance allow intellectual property subject to compensate losses related to intellectual property rights protection.

All of it causes necessity of the analysis of peculiarities of intellectual property and nature of intellectual property insurance for the purpose of intellectual security provision and maintenance of effective protection of the sole and property rights of subjects of intellectual activity, and also working out of effective strategy of intellectual security ensuring. Thus, the urgency of research of intellectual property insurance is defined by specificity of a postindustrial stage of civilization development which transforms the intellectual capital into a basic component of productive forces of a society.

Nature and theoretical principles of intellectual property relations realization have been considered in the economic and legal literature. The appropriate place in working out of this scientific research area belong to Sergeyev A., Svyatotsky O., Orlyuk O., Drobyazko V. and others. Mechanism and tasks of intellectual property insurance have been disclosed in scientific studies of M. Simensky, E. Osterberg, A. Tsyganov, J. Kumar, N. Parnami and others. At the same time, issues concerned research of preconditions of origin, economic functions of intellectual property insurance and problems of its development, in our opinion, remain partly undiscovered.

The purpose of the article consists in research of peculiarities of intellectual property objects and role of intellectual property in postindustrial society, in-depth analysis of primary types of intellectual property insurance, definition of preconditions of origin and economic functions of intellectual property insurance, consideration of problems of development of intellectual property insurance in Ukraine.

Results. It is necessary to investigate nature and peculiarities of intellectual property so as to define primary preconditions of origin of the respective form of insurance.

Peculiarities of intellectual property and its objects. Intellectual property relations are system of social and economic relations which arise concerning appropriation and commercialisation of intellectual activity results. Commercialisation of intellectual activity results is a system of procedures concerning their introduction in economic overturn for the purpose of creation of the added value and generating of additional profit. Involvement of intellectual activity results in the sphere of relations of appropriationalienation turns it to intellectual property objects. At the same time, in the process of commercialisation an intellectual property objects turns into major factor of production.

In our opinion there are several types of intellectual property relations:

 Relations of appropriation of intellectual activity results in the way authorised by a society;

• Relations of commercialisation which arise concerning introduction of intellectual property object in economic overturn for the purpose of profit reception;

• Relations of disposal of intellectual activity results which provide cession of intellectual property rights to other persons on different conditions and in different volume;

• Relations of possession which provide actual domination of the party to intellectual property relations over intellectual activity results that directly and indirectly is not connected with its use.

It is necessary to notice that intellectual property characterized by several distinguishing features:

• The intellectual property right is the sole right that arise from the law, and not from civil agreements;

• The intellectual property right is limited in time and space, that is protected during certain term and in certain territory;

• The overwhelming part of intellectual property objects demands the state registration for effective protection of corresponding intellectual property rights;

 Intellectual property objects are inexhaustible, that is they do not wear out and do not lose characteristics as a result of long use. At the same time, they are subject to an obsolescence and can lose an urgency as a result of scientific and technical progress;

 Intellectual property objects are non-material by the nature but stored on the material carrier;

• The property on intellectual property objects directly is not connected with the property on material objects in which they are embodied;

• As a result of non-material character intellectual property objects are inaliennable, therefore within the limits of the order only intellectual property rights is alienated [1, p.146];

 Indispensable condition of granting of legal protection to intellectual property object is novelty (originality), and also their embodiment in the certain objective form;

• Intellectual property objects grow out of art, scientific, literary or technical intellectual activity of the person and consequently always have creative character [1, p.144];

• Intellectual property objects thanks to the non-material nature can be easily duplicated and consequently demand special legal, technical and organizational protection.

Considered above peculiarities of intellectual property transforms it into an especial kind of relations of the property to which it is difficult to apply traditional approaches of the political economic analysis. For this reason nowadays intellectual property relations represent a separate kind of relations of the property which is regulated by separate institution of civil law.

As it was marked above, under formation of a postindustrial society the intellectual property relations start to play defining role in a social production. In our opinion, it is connected with those functions, which carry out intellectual property relations (further – IPR) in public reproduction. *First,* IPR provide distribution of results of a social production between all party to relations of appropriation of intellectual activity results: the subject of intellectual activity receives the income, the investor who puts means in commercialisation of intellectual property objects, receives percent on the invested capital, the state – receives tax revenues in the budget, the enterprise – receive the additional value created on the basis of use of the intellectual capital.

Secondly, IPR accelerates scientific and technical progress providing redistribution of a part of public product for benefit of creators of an intellectual product, stimulating them in such a way to the further intellectual activity.

Thirdly, IPR predetermine an innovative orientation of a social production and modernisation of economy on the ground of introduction of intellectual activity results in economic activities.

Fourthly, IPR modify class structure of a modern society therefore within the limits of economy the role of technocrats, representatives of branch of science and education who are engaged in intellectual activity, carriers of knowledge and creators of an intellectual product are significantly grows.

Fifthly, IPR carry out system function at the present stage of social production's evolution, they form basis of economic system, predetermine formation of the new factor of production – the intellectual capital, and provide formation of preconditions of transition of a society on a new postindustrial stage of development.

Objects and subjects of intellectual property relation.

It is necessary to notice that today, the legislation does not contain criteria of classification of intellectual property objects (further - IPO), and only defines them. According to Convention on creation of the World organisation of intellectual property signed in 1967, objects of intellectual property embrace [2]: literary, art and scientific products; execution, sound recordings, on-air broadcasting transfers; inventions in all fields of activity of the person; discoveries; industrial samples; trade marks, service marks, company names and commercial designations; protection against an unfair competition; all other rights which concern intellectual activity in industrial, scientific, literary and art spheres. At the same time, according to according to article 420 of the Civil code of Ukraine objects of intellectual property embrace: literary and works of art; computer programs; databases; execution; soundtracks, videogram, on-air broadcasting transfers; discoveries; inventions, utility models, industrial designs; configuration of integrated microcircuits; rational proposals; grades of plants, breeds of animals; commercial names, trade marks, geographical indications; trade secrets [3].

From our point of view, depending on its characteristics, which is based on the analysis of their most essential features, specificity of their protection, features of realization of property and sole rights, intellectual property objects could be divided on: copyright and relative rights objects, objects of industrial property, individualization tools, untraditional objects of intellectual property. After all individualization tools, objects of industrial property, copyrights and relative rights objects own important patrimonial features.

Objects of copyrights and relative rights embraces literary works and works of art, computer programs, execution, soundtrack, videogram, on-air broadcasting transfers. They belong to results of art-literary intellectual activity; registration of objects is not obligatory; property rights on noted objects are protected by the state during long term; copyright and relative rights extend only on the form of expression of intellectual activity result; a legal protection condition is originality, instead of novelty of product; protection is given irrespective of art level and art value of product. **Objects of the industrial property** embraces inventions, utility models, industrial designs. They belong to results of scientific and technical intellectual activity of the person; their registration is obligatory; property rights on objects of the industrial property are protected by the state during rather short term; they should be suitable to use in the industry or other branch of manufacture; they form the basic part of intangible assets of the enterprises; objects of the industrial property can be embodied in plane or volume forms, products or processes.

Individualization tools embraces commercial names, trade marks, geographical indications. In direct understanding individualization tools do not belong to results of intellectual activity as their value is defined not by a creative contribution of author, art or a product technological level, but depend on business reputation of the enterprise or region; their registration mainly is obligatory; property rights on individualization tools are continuously protected by the state; the intellectual property right on noted objects does not provide non-property right; they reduce uncertainty and carry out information function.

To untraditional IPO can be referred: scientific discoveries, rational proposal, grades of plants and breed of animals, trade secrets, know-how, configuration of integrated microcircuits. In our opinion, separate untraditional IPO – scientific discovery, rational proposal, trade secret, know-how, can be attributed to separate group of incorporeal objects. Noted objects, in a counterbalance to configuration of integrated microcircuits or selection achievement, represent the information in the pure state, they can concern any field of activity, do not demand registration and do not provide reception of any certificates.

Party to relations of intellectual property (further – subjects of intellectual property – SIP) take part in relations concerning disposal of intellectual activity results. Active development of intellectual property relations predetermines attraction to participation in this relations growing quantities of economic subjects. Therefore necessity of profound discovery of a circle of participants of intellectual property relations does not lose an urgency.

In our opinion, subjects of intellectual property are physical and legal bodies who directly or indirectly take part in process of disposal and commercialisation of intellectual activity results, and also provided with corresponding rights and commitments within the limits of civil-law relations of intellectual property.

Depending on their role in intellectual property relations subjects can be divided into four groups: 1. Subjects that are initially provided with intellectual property rights thanks to direct participation in creation of intellectual property object (first of all it concerns objects of copyright, relative rights and industrial property); 2. Subjects that are initially provided with intellectual property rights due to passage of registration procedure and reception of the corresponding certificate (it concerns individualization tools which usually registered on legal bodies and literally does not grow out of intellectual activity); 3. Subjects that provided with intellectual property rights as a result of inheritance or contract execution; 4. Subjects that represent interests of subjects of the two first groups or carrying out mediatory functions or acting as professional participants of intellectual property market; 5. Official bodies and the arbitrary organisations which regulate intellectual property relations.

It is necessary to notice that in the scientific literature is widespread the division of all intellectual property subjects on primary and secondary depending on the way of appropriation of intellectual property right [4, p.13]. To primary subjects referred authors of science works, works of literature and art, executors, manufacturers of soundtracks,

videogram, programs of on-air broadcasting, inventors, authors of the utility models, industrial designs, configurations of integrated microcircuits, grades of plants, breeds of animals. To secondary subjects referred assignees and successors who get intellectual property rights on the basis of the contract execution or inheritance. In our opinion, the given classification is ill-posed, after all is based on the assumption that subjects of intellectual property relations are only owners of corresponding property and nonproperty sole rights. The given approach to understanding of subject structure of intellectual property relations narrows a circle of participants of intellectual property relations and does not consider subjects who carry out regulating and mediatory functions in the intellectual property market. Besides, being based on the definition of primary subjects of intellectual property given above, it is impossible to refer owners of individualization tools to whom concept "author" cannot be applied during to specificity of nature of trademark, geographical Indications and other individualization tools. At the same time, the classification of SIP on 5 groups covers all participants of intellectual property relations. Besides, primary SIP for individualization tools singled out in separate group which considers specificity of trade marks, geographical indications and company names as tools of individualization which reduce uncertainty, carry out information function and in direct understanding do not belong to intellectual activity results.

Beside the approach considered above it is important to pay attention to classification of SIP depending on their economic functions. In our opinion, in this context it is necessary to single out three groups of SIP: 1. Institutional subjects that take direct participation in creation of intellectual property objects (objects of copyright, related rights or industrial property) or carry out primary registration of intellectual property rights on individualization tools. Noted subjects create object of intellectual property relations, constituting the market of intellectual property and forming institutional basis of existence of intellectual property relations. 2. Economically active subjects that take direct participation in commercialisation of intellectual property objects, that is carry out their introduction in economic overturn for the purpose of profit reception. To the given group mainly belong legal bodies who transform objects of intellectual property into the intellectual capital which takes part in a social reproduction and provides profit reception. Economically active subjects take up risks of commercialisation of intellectual property objects, provide production with use of objects of intellectual property, create innovative products and provide redistribution of a part of income for benefit of institutional subjects, stimulating them in such a way to the further intellectual activity. 3. Financial institutions which carry out mobilisation of financial resources of the separated small owners of the capital and their transformation in the investment into the intellectual capital, creating in such a way material basis for commercialisation of intellectual activity results. Mediate transactions of economic agents and providing movement of financial resources, financial institutions carry out accumulation of free financial resources of the separated owners of the capital by issue and sale of own financial assets, and then invest them in the financial instruments issues by economically active subjects of intellectual property relations. It is necessary to notice that in modern conditions the role of financial institutions in the intellectual property market is defining. After all the considerable part of projects of IPO commercialisation is characterised as unsecured, and the enterprises which are engaged in intellectual activity constantly feel deficiency of own financial resources. Therefore financial institutions under intellectual property relations form

the financial mechanism of commercialisation of intellectual property results, accelerating economic overturn of the intellectual capital and providing preconditions for transformation of intellectual product in a flows of incomes.

Nature of intellectual property insurance and preconditions of its origin.

As it was noted above, over the last 10 years the quantity of intellectual property rights infringements has dramatically grown up. In particular, in Ukraine during second half of 2013 has been exposed over 2,1 thousand infringements of intellectual property rights. In the European Union growing rate of intellectual property rights infringements also is observed. In EU the number of applications for action committed by intellectual property's right-holders constantly increased, from 1.671 in 2002 to 23.134 in 2012. Also number of cases opened by EU Customs in consideration of intellectual property rights infringement increased, from 7.553 in 2002 to 90.473 in 2012 [5, p.9-11]. In noted circumstances, effective protection of intellectual property rights and defence of intellectual capital of the enterprise forms main precondition of economic security of enterprise and basis for preserving of its economic potential and provision of its global competitiveness.

For intellectual property subjects protection of intellectual property rights connected with additional expenses for representation and judicial protection of their interests in court and state authorities. In these conditions, usage of intellectual property insurance allow intellectual property subject to compensate losses related to intellectual property rights protection. Thus, commercialisation of intellectual property related to additional risks connected with peculiarities of intellectual property and growing rate of intellectual property rights infringements. That is why acquisition, disposal and economic overturn of intellectual property should always be coupled to application of respective forms insurance services.

In our opinion, there are following preconditions of origin and development of IP insurance:

Growing number of infringements of IP rights in the world;

• Competition activization in the international markets related to globalisation of world economic communications which stimulates corporations to use active strategy of IP rights protection as instrument of competitive activity;

 Transformation of IP objects into the basic component of capital of enterprises in consequence of postindustrial society formation;

• Tremendous role of intellectual security in provision of a steady position of enterprises in globalized markets;

• Specific characteristics of IP objects which raise riskiness of their economic overturn and commercialization;

• Exclusive character of IP right which predetermines its limitation in space owing to what the right to similar intellectual activity results in different countries can belong to different subjects;

• Property right on considerable part of intellectual activity results accrue only after passing registration procedure thanks to what risks of investments into development of new innovative products are grow.

As it is known, there are several objects of insurance: valuable interests related to ownership, using and disposal of property; an obligation to compensate the harm done to the third parties; risks of entrepreneurial activity. Risk should correspond to following conditions to become insurable [6, p.13]:

• Risk should possess casual character, and time of its realization should be not known;

 There should be a possibility of estimation of probability of risk realization and valuation of probable losses from risk realization.

Thus, insurance is provided, when the probability of insured event can be estimated. Estimation of risk probability should be based on the statistical data. Absence of such data can complicate or make impossible an estimation of risk probability and financial consequences of insured event. Risks related to realization of IP relations and commercialization of IP objects completely correspond to these criteria. Thus, they could be an object of insurance protection without any doubts.

From our point of view, risks of use and commercialization of IP objects can be divided into three groups:

1. Risks related to loss or abridgement of intellectual property rights:

Risks of loss of the intellectual property rights;

Risks of abridgement of intellectual property rights;

Risks of divulgation of the commercial information concerning intellectual property objects;

2. Risks related to possible losses, contingencies and half-received profits connected with commercialization of IP objects [7, p.32]:

• Risks connected with counterfeit production, including the half-received profit and costs for prosecution of infringers;

• Risk to be prosecuted by third parties for IP rights infringement;

• Risks connected with blocking entrance to regional markets owing to the fact that IP rights belong to third parties;

• Risks related to necessity of the conclusion of license agreement when IP rights on produced goods belong to third parties;

• Financial risks connected with license agreements, for example refusal of transfer of royalties, including the half-received profit and costs for prosecution of infringers;

 Risks related to stop of the economic activities of company due to legal action connected with IP rights infringement;

3. Risks of professional responsibility of participants of intellectual property market:

• Risks of professional responsibility of experts which carry out formal and qualified examination of intellectual property objects;

• Risks of professional responsibility of patent attorney which form and submit on behalf of the principal documents on registration of intellectual property rights;

• Risks of professional responsibility of appraisers of intellectual property rights.

Intellectual property insurance is a system of economic relations concerning protection of valuable interests of intellectual property subjects in case of insured event occurring provided at the expense of the monetary funds formed by insurers from paid insurance premiums. IP insurance used by IP subjects to hedge against risk of a uncertain loss related to IP objects commercialization.

The purpose of IP insurance is protection of valuable interests of participants of economic relations concerning assignment and commercialisation of intellectual activity results that increase level of intellectual safety of enterprises.

The primary goals of IP insurance, in our opinion, are:

• Reimbursement of insured person in case of insured event occurred in the sphere of intellectual property relations;

• Financing of process of commercialization of IP objects at the expense of insurance fund;

• Stimulation of development IP market at the basis of reduction of riskiness of disposal and commercialization of intellectual activity results;

• Prevention of IP rights infringements and increase of effectiveness of intellectual capital management system;

• Decrease of transaction costs in intellectual property market.

Nature and tasks of IP insurance are implemented in its economic functions:

1. Stimulation. Insurance promotes development of IP market of intellectual property at the basis of reduction of transaction costs, decrease in riskiness and increase of commercial appeal of IP commercialisation.

2. Accumulation. Insurer consolidate insurance premiums and form special insurance fund which can be used for protection of valuable interests of insured persons in case of insured event occurring, and also for investment in various financial assets.

3. Compensation of risks. Insurance provides a covering of losses of the insured person which have resulted from insured event occurring and are connected with realization of IP relations.

4. Risk management. Intellectual property insurance forms the effective mechanism of management of the risks concerned commercialization of IP objects, and significantly increase intellectual security of insured person.

5. Investment. Insurance reserves can be used by the insurer for acquisition of financial assets which provides redistribution of economic resources through financial market, meet demand of securities issuers, and also provides possibility of reception of income on the invested capital.

6. Control. The insurer performs constant control of activity of the insured person for the purpose of information asymmetry reduction and increase of accuracy of an estimation of probability of insured event occurrence, reduction of likelihood of losses concerning discrepancy of the size of an insurance premium to level of the insured risks.

7. Prevention. Insurer do all that he can to decrease moral risk, prevent occurrence of insured event or minimize losses from insured event occurrence. Insurer use establish unconditional franchise and putting on the insured person an obligation to take measures concerning decrease risks connected with IP objects disposal or commercialization.

Primary types of intellectual property insurance and their peculiarities.

From our point of view, it is possible to single out four principal types of IP insurance at the basis of international experience investigation.

1. *Insurance of intellectual property rights* which provides protection of valuable interests of the insured person in case of loss of intellectual property right or reduction of intellectual property value owing to [7, p.37-38]:

• Improper execution of documents submitted for intellectual property right registration;

• Invalidity of documents submitted for intellectual property right registration;

• Losses of the right of a priority or closing of certain national markets because of improper execution of documents submitted for intellectual property right registration;

Contest of intellectual property right by the third parties;

• Discrepancies of intellectual property object to conditions of protectability;

• Disability of the subject transferred intellectual property right to the current proprietor, because of existence of co-authors of intellectual property object;

• Divulgation of the confidential commercial information concerning intellectual property objects, transformation of intellectual activity result into public domain and impossibility of effective protection of intellectual property rights. Insured event in case of insurance of IP rights is the fact of incurring losses in connection with loss, contest, depreciation of intellectual property rights or refusal in IP rights registration.

The key moment of insurance of IP rights is estimation of value of corresponding property rights and probability of insured events occurrence which allows to specify precisely size of an insurance premium. It is necessary to notice that, according to hands-on experience, if the insurance sum specified in the agreement, exceeds real value of IP rights, the agreement is avowed as nugatory in that part of the insurance sum which exceeds value of IP rights.

Besides, insurance rules stipulate an obligation of the insured person to report immediately to insurer about changes in the circumstances, reported to the insurer at contract formation if these changes can essentially affect increase in insurance risk: information concerning increase in probability of contest of IP rights by third parties; information concerning conclusion of license agreements; information concerning changes in attributes of protectability IP objects.

Insurance of IP rights provides reimbursement of insured person concerning the losses connected with:

• fee of the lawyer and a legal cost related to judicial protection of intellectual property rights;

 decrease in market value of IP objects owing to divulgation of the confidential information concerning intellectual property;

 loss of market value of IP objects owing to refusal in IP rights registration;

 half-received profits connected with commercialization of IP objects.

2. Liability insurance of the intellectual property subjects. While the previous kind of insurance concerns property insurance, the given kind of insurance provides insured person with compensation of legal cost relating to judicial disputes initiated by the third parties.

Protection of intellectual property rights is a component of a customs policy of each developed country in the world. Thus, goods which are produced or distributed with infringement of IP rights cannot be imported on territory of the corresponding country. Therefore, today one of the primary methods of competitive activity in the global markets is the aggressive policy of intellectual security when corporations actively use legal claims for pressure upon economic actors which, in their opinion, infringe their intellectual property right. Some corporation close certain national markets for goods of competitors in such way. An example is long patent war between Apple and Samsung.

In such conditions, liability insurance allows intellectual property subjects to reduce risks of application of an aggressive competitive policy by third parties and make it possible to compensate expenses connected with judicial protection of intellectual property rights.

Liability insurance provides compensation of costs connected with:

Reception of consultations under legal questions;

• Fee of the lawyer on representation of interests of intellectual property subject in court and state authorities;

• Payment of court taxes and penalties;

Fee of experts in the sphere of intellectual property right;

 Request of corresponding documents from state and public authorities required for judicial protection of interests of insured person.

Insured event in case of liability insurance of IP subjects is usual determined as fact of participation of the insurer in proceeding in connection with charge in infringement of intellectual property rights.

For reduction of moral risk and negative influence of information asymmetry insurers in the agreement of liability insurance stipulates that insurance protection don't cover risks concerned with [8]:

• Renunciation of insured person of services of patent attorney or experts in sphere of intellectual property right without concurrence of insurer;

• Use by the insured person services of lawyers or experts which have no corresponding qualification and experience in sphere of protection of intellectual property rights without concurrence of insurer;

• Legal claims which the insured person bring against the third parties in connection with infringement of intellectual property rights, except the counter actions initiated after the concurrence of insurer;

• Legal claims brought against insured person under the order of the state or municipal authorities;

• Legal claims brought by third parties against employees or employers of the insured person.

Important part of the agreement of liability insurance of IP subjects can be insurance of costs connected with compensation of a losses, suffered by the third parties owing to wrongful acts of the insured person. In this case the size of an insurance premium and insurance compensation essentially increases, so long as the losses, suffered by the third parties are essentially bigger compared to a legal costs. Insured event in this case is usual determined as fact of causing by the insured person a damage to the third parties in connection with infringement of intellectual property rights belonging to them, and due to the activity stipulated by insurance agreement.

For the purpose of reduction of negative influence of information asymmetry, insurance usually cover costs of insured person connected with compensation of losses of third parties that was inflicted and brought an action throughout the period of validity of insurance agreement. For minimization of moral risk insurance agreement stipulate unconditional franchise.

Due to peculiarities of intellectual property, and also specificity of risks which accompany their commercialization, fast and imprudent insurance contract formation of can threaten the insurer with considerable losses in the future. For this reason the conclusion of the insurance agreement concerning intellectual property is usual preceded by in-depth study of business reputation, economic activities and system of management of the insured person. Preliminary research of the insured person has for an object an estimation of probability insured event occurrence and valuation of the size of possible losses from its occurrence. For preliminary profound studying of the insured person insurer can involve patent attorneys, specialists in intellectual property right, professional appraisers of intellectual property, experts in the sphere of intellectual security [7, p.50].

Besides, terms of the insurance agreement could stipulate the obligation of the insured person to carry out preventive measures concerning decrease in level of the risks connected with disposal of intellectual property. Among noted measures could be singled out:

Complete legal protection of IP objects;

Intellectual security ensuring;

• Profound patent research for the purpose of estimation of protectability of IP objects and their commercial potential;

• Revision of license agreement and other documentation of the insured person to meet the requirements of intellectual security;

• Research of the intellectual property market for the purpose of determination of a potential competitors and an estimation of probability of occurrence of counterfeit goods;

• Carrying out guidance of personnel of insured person for the purpose of ensuring of intellectual security and preserving of intellectual capital.

3. Professional liability insurance of participants of intellectual property market (patent agents, professional appraisers and experts). Always there is a probability of an inaccuracy, inadvertence or blunder during formal and qualified examination of intellectual property objects for compliance of protectability conditions; during formation and submission of documents on registration of intellectual property. Committed by professional participants of intellectual property market errors cause losses for owners of intellectual property rights. Therefore, thee try to compensate losses, addressing in court. In these conditions, insurance of professional participants of intellectual property market to perform efficient control of risks connected with their activity.

Insurance of professional liability of participants of IP market usually covers:

1. Risks of patent attorney which are connected with:

 Mistakes committed during forming and submission on behalf of the principal documents on registration of intellectual property rights which have caused refusal in IP right registration or abridgement and depreciation of intellectual property rights;

 Unintentional divulgation of a confidential commercial information concerning intellectual property objects which have caused refusal in IP right registration or abridgement and depreciation of intellectual property rights;

 Unintentional loss or spoil of documents and other materials which have been given by the client to the patent attorney;

2. Risks of professional experts which are connected with:

 Mistakes committed during formal or qualified examination of intellectual property objects for compliance of protectability conditions which have caused refusal in IP right registration or abridgement and depreciation of intellectual property rights;

• Unintentional divulgation of a confidential commercial information concerning intellectual property objects received during examination which have caused abridgement and depreciation of intellectual property rights;

3. Risks of professional appraisers which are connected with:

 Mistakes committed during valuation of intellectual property objects which have caused overestimation or underestimation of IP objects and, accordingly, losses or halfreceived profit during intellectual property commercialization;

 Mistakes committed during valuation of intellectual property objects which have caused underestimation of IP objects and, accordingly, indebtedness to state budget concerning payment of taxes;

 Unintentional divulgation of a confidential commercial information concerning intellectual property objects received during valuation which have caused loss, abridgement, depreciation of intellectual property rights or half-received profit during intellectual property commercialization;

• Unintentional loss or spoil of documents and other materials which have been given by the client to the appraiser.

Among the widespread mistakes which appraiser can commit: insufficient taking into account of peculiarities of corresponding intellectual property objects; technical errors during valuation procedure; an incorrect estimation of risks and incorrect determination of the rate of discounting and rate of capitalization; application of an incorrect technique of an estimation; incorrect forecasting of cash flows from IP commercialization.

Insured event in the case of professional liability insurance is usual determined as fact of losses caused to the third parties due to the professional activity stipulated by insurance agreement.

For the purpose of reduction of negative influence of information asymmetry, professional liability insurance usually cover costs of insured person connected with compensation of losses of third parties that was inflicted and brought an action throughout the period of validity of insurance agreement. On the other hand, there is a practice when professional liability insurance usually cover costs of insured person connected with compensation of losses of third parties that was only inflicted or only brought an action throughout the period of validity of insurance agreement [9, p.331-332].

Professional liability insurance is usual provides compensation of costs connected with:

• Obligation of the insured persons to compensate to the third parties the losses caused due to their professional activity owing to an inexact estimation or untimely execution of their obligations, including half-received incomes and expenses on elimination of drawbacks;

• Legal cost connected with representation and protection of interests of insured persons in court and state authorities;

 Payment of penalties owing to infringements in professional activity.

In most cases the insurance agreement also stipulate that in case the insured person has deliberately hidden the information on the mistakes committed during professional activity from the insurer, it forms a basis for refusal in payment of insurance compensation.

For reduction of moral risk and negative influence of information asymmetry insurers in the agreement of professional liability insurance stipulates that insurance protection don't cover risks concerned with :

• Compensation of a moral damage or the harm caused to business reputation of the third parties owing to professional activity of the insured person;

• Deliberate actions of the insured person during professional activity;

• Act of God circumstances;

• Activity of state authorities (confiscation of documents, temporary suspension of license).

Thus, professional liability insurance allows professional participants of the intellectual property market to reduce risks connected with their activity, rise commercial appeal of their activity and also promotes development of an infrastructure of intellectual property market. Therefore in the separate countries, for an example in the Russian Federation, appraisers as professional participants of intellectual property market are forbidden to be engaged in professional activity without formation of agreement of professional liability insurance.

4. Liability insurance of the contractors concerning intellectual property rights disposal. The primary forms of commercialization of intellectual activity results are contractual forms: assignment of IP rights; licensing of IP rights; investment of IP rights in authorized capital of the enterprise. Thus always there is a risk of opportunistic behaviour, that is refusal of one of the contractors from accomplishment of terms of agreement for the purpose of reception of additional benefits. Thus, liability insurance of the contractors concerning intellectual property rights disposal plays extremely important role in commercialization of intellectual activity results and promotes protection of valuable interests of subjects of commercialization process.

Liability insurance of contractors concerning intellectual property rights disposal is usually provides compensation of costs connected with:

 Untimely or incomplete payment of the royalties or other payments stipulated by agreement;

 Divulgation of a confidential commercial information concerning intellectual property objects received according to terms of agreement;

 Breach of contract which has caused losses or halfreceived profit during intellectual property commercialization;

• Legal cost connected with representation and protection of interests of insured persons in court and state authorities.

Insured event in the case of liability insurance of contractors usually determined as fact of non-execution or improper execution of a contract concerning intellectual property rights disposal which caused losses to insured person.

As well as in case of other kinds of intellectual property insurance, liability insurance of contractors usually preceded by technological and financial audit, and also indepth study of business reputation, economic activities and system of management of the insured person. Preliminary research of the insured person has for an object an estimation of probability of insured event occurrence and valuation of the size of possible losses from its occurrence.

For reduction of negative influence of information asymmetry insurers in the agreement of liability insurance of contractors stipulates that insurance protection don't cover risks concerned with:

 Compensation of a moral damage or the harm caused to business reputation of the insured person owing to insured event occurrence;

• Deliberate actions of the insured person during their activity stipulated by terms of contract;

• Act of God circumstances;

Activity of state authorities (confiscation of documents, temporary suspension of license).

Thus, existence of different types of intellectual property insurance creates preconditions for development of the market of intellectual activity results, allows economic actors to manage the risks connected with commercialization of intellectual property, and also ensure postindustrial society formation owing to increase in commercial appeal of introduction of the intellectual capital in social reproduction.

Conclusion. Summing up research it is necessary to notice that relations of intellectual property under formation of a postindustrial society form an important component of basis of economic system and carry out stimulating, distributive, system and innovative functions within the framework of a public reproduction. Besides, active utilization of intellectual capital in economic activities forms one of primary factors of enterprise competitiveness.

We discovered nature and peculiarities of intellectual property, analyzed classification of intellectual property objects. Different approaches to classification of intellectual property subject have been considered: depending on their role in relations of intellectual property and depending on their economic functions, which allow to consider their role in the process of commercialization of IP objects.

There was considered nature, preconditions of origin and goals of IP insurance. Also, we specified functions of intellectual property insurance, and singled out three groups of risks concerning disposal and commercialization of intellectual property objects.

On the basis of the carried out analysis of hands-on experience we singled out 4 types of IP insurance: Insurance of intellectual property rights; Liability insurance of the intellectual property subjects; Professional liability insurance of participants of intellectual property market; Liability

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insurance of the contractors concerning intellectual property disposal.

We had been proved that commercialisation of intellectual property related to additional risks connected with peculiarities of IP objects and growing rate of intellectual property rights infringements. That is why acquisition, disposal and economic overturn of intellectual property should always be coupled with application of respective forms insurance services.

In Ukraine IP insurance development acquires an especial topicality as can decrease risks of intellectual activity results commercialization, and increase appeal of investments in intellectual capital. Active development of sphere of services and transformation of intellectual capital into basic factor of production are fundamental attribute of a postindustrial society. Thus, forming of IP insurance system in Ukraine turns to the important task of the state economic policy. Unfortunately, development of IP insurance in Ukraine restrains variety of factors.

Firstly, low efficiency of IP rights protection in Ukraine coupled with significant number of IP rights infringements considerably raise riskiness of business operations with intellectual activities results. Thereby, insurer cannot compensate properly the expenses related to granting of insurance services at the expense of use of right of recourse or subrogation. Besides, it increases cost of insurance services and reduces a market demand for such services.

Secondly, complexity of an estimation of IP objects value and absence of universal techniques of valuation of the given objects raises riskiness of business operations with intellectual activities results, increase cost of IP insurance services and forces insurers to concern with care this type of insurance services.

Thirdly, Ukrainian economy has industrial basis and primary property objects in Ukraine are tangible assets. Thereof, Ukrainian enterprises are not inclined to invest in intellectual capital, and share of IP objects in structure of domestic enterprises capital remains insignificant. It considerably reduces demand for IP insurance services.

Fourthly, Ukrainian insurance companies have no appropriate experience in sphere of IP insurance. They are

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characterized by insufficient capitalization and under high market volatility and instability of national economy they are not inclined to increase riskiness of insurance portfolio providing services of IP insurance.

Thus, forming of effective system of IP insurance in Ukraine restrained by both demand factors, and supply factors. Therefore, without appropriate state support prospect of IP insurance development in Ukraine remain doubtful.

The topicality of a problem of effective institutional regulation of intellectual property relations, protection of intellectual property rights, creation of preconditions for effective commercialisation of intellectual activity results testify objective necessity of the further theoretical and practical research of functions and mechanism of intellectual property insurance. It is necessary to analyze approaches to effective risk management of intellectual property commercialization, methods of intellectual property objects valuation, and activity of professional participants of intellectual property. Thus, urgency of carrying out of the further researches for the given direction does not raise the doubts.

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СУТНІСТЬ СТРАХУВАННЯ ІНТЕЛЕКТУАЛЬНОЇ ВЛАСНОСТІ ТА ЙОГО РОЛЬ В СУЧАСНІЙ ЕКОНОМІЦІ

Стаття присвячена теоретичному аналізу сутності та механізму страхування інтелектуальної власності. Досліджено зміст та особливості відносин інтелектуальної власності та їх роль у суспільному відтворенні. Розглянуто класифікацію об'єктів та суб'єктів інтелектуальної власності. Проаналізовано сутність, завдання та функції страхування інтелектуальної власності. Визначено передумови виникнення страхування інтелектуальної власності, а також охарактеризовано ризики розпорядження правами інтелектуальної власності та комерціалізації результатів інтелектуальної діяльності, що підлягають страхуванню. Досліджено основні види страхування інтелектуальної власності та проаналізовано проблеми його розвитку в Україні.

Ключові слова: відносини інтелектуальної власності, страхування, ризик-менеджмент, об'єкти та суб'єкти страхування інтелектуальної власності, інтелектуальна безпека.

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СУЩНОСТЬ СТРАХОВАНИЯ ИНТЕЛЛЕКТУАЛЬНОЙ СОБСТВЕННОСТИ И ЕГО РОЛЬ В СОВРЕМЕННОЙ ЭКОНОМИКЕ

Статья посвящена теоретическому анализу сущности и механизма страхования интеллектуальной собственности. Исследовано содержание и особенности отношений интеллектуальной собственности и их роль в общественном воспроизводстве. Рассмотрена классификация объектов и субъектов интеллектуальной собственности. Проанализирована сущность, задания и функции страхования интеллектуальной собственности. Определены предпосылки возникновения страхования интеллектуальной собственности, а также охарактеризованы риски распоряжения правами интеллектуальной собственности и коммерциализации резуль татов интеллектуальной деятельности, которые подлежат страхованию. Исследованы основные виды страхования интеллектуальной собственности и проанализированы проблемы его развития в Украине.

Ключевые слова: отношения интеллектуальной собственности, страхование, риск-менеджмент, объекты и субъекты страхования интеллектуальной собственности, интеллектуальная безопасность.

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ABOUT FORMS, EFFICIENCY AND ASSESSMENT OF ENVIRONMENTAL MANAGEMENT

We suggest a holistic framework for analyzing, assessment and improvement of environmental management using "agrarian sector" as an example. It incorporates an interdisciplinary approach (Economics, Organization, Law, Sociology, Ecology, Technology, Behavioral and Political Sciences) and includes: specification of managerial actors, needs and spectrum of governing modes (institutional environment; private, collective, market, public modes) at different level of decision-making (individual, farm, eco-system, local, regional, national, transnational, global); specification of critical socio-economic, natural, technological, be-havioral etc. factors of managerial choice, and feasible spectrum of managerial forms; defining and assessing comparative and absolute efficiency of eco-management forms and system; improvement of forms of public intervention in eco-management.

Keywords: environmental management; agriculture; mechanisms and forms of governance; eco-managment indicators.

Introduction. Modern economy and agrarian sector in particular significantly affect the state and the sustainable exploitation of natural resources being a major factor for environmental degradation (pollution, destruction, extortion) as well an important contributor for the conservation and improvement of natural environment. Consequently, the issues associated with the effective environmental management are among the most topical in public, political, business and academic debates around the globe [Baba et al.; Dugos and Dupaz; Defrancesco et al; EC; Hagedorn; Hart and Latacz; Mitchell; Peerlingsa and Polman; Reed; Scozzari and Mansouri; UN]. This paper suggests a new holistic framework for assessment and improvement of environmental management in agriculture.

1. Definition and scope of eco-managment

Unlike the literal meaning of the words the environmental management means management of activities and behavior of individual agents for preservation and improvement of natural environment and its individual components (soils, waters, landscape, atmosphere, biodiversity, climate, eco-system services). Environmental management in agriculture (or agro-eco-management) comprises environmental management associated with agricultural (food, fibber, bio-fuel, raw material, diverse ecosystem and related services) production. It (is to) involves management of the activities, relations, and impacts of diverse agrarian (farm managers, resource owners, agricultural labor, etc.) and non-agrarian (upstream and downstream businesses, consumers, residents, interest group, etc.) agents. A significant part of the agricultural production is managed and carried out by different type of farms¹ individual, family, cooperative, corporative, public, hybrid, etc. Therefore, the agro-eco-management is to be studied as an integral part of the system of farm management (along with the management of production, labor, finance, innovation, inputs supply, marketing) and the system of eco-management in the society.

In some instances, the eco-activities constitute a relatively independent and/or a specialized part of the farming activity as in the case of environmentally friendly collection, storage and disposal of garbage, organic production, etc. Very often the eco-management is an integral part of the farm and/or its individual functional areas (investment, labor, land management, crop production and protection). That necessitates to evaluate the comparative and absolute potential (internal incentives, capability, costs, intentions) of different type of agricultural farms (subsistent, family, commissioned, cooperatives, corporation, public,

etc.) for eco-friendly production and innovation, conservation and restoration of natural resources, long-term ecoinvestment, minimization of direct and indirect negative eco-effects, dealing with major eco-challenges, minimizing eco-costs and risks, effective adaptation, etc. For the upper(farm) levels of management the eco-management is either integrated in the main mechanisms of influence (e.g. requirement for "eco-compliance", "good agricultural practices", etc.) or it is a specialized structure (programs for agro-ecology, mandatory eco-standards, etc.).

The entire "system" of agro-eco-management is to be analyzed including: various agents participating in the agroeco-management; and diverse mechanisms and forms governing the behaviors and relationships of these agents. The environmental protection, restoration and improvement requires an effective private, collective and public order, which is to govern individual (agrarian) agents behavior and their relations with other agrarian agents (farm managers, resource owners, hired labor) and non-agrarian agents (agrarian and related business, residents of rural areas, consumers of farm products and services, interest groups, state and local authorities, international organizations, etc.). Therefore, a critical moment of the analysis of the agro-eco-management is to identify the personality of agents of agro-eco-management and the specific character of their relations, interests, objectives, power positions, dependence, effects, and conflicts. For instance, Figure 2 presents agents and relations in the agro-eco-management at the ecosystem level.

Individual agrarian agents (farmland owners, farm entrepreneurs, farm labor, etc.) may have quite diverse interests and strategies in terms of environmental protection. All these interests and strategies are to be carefully analyzed and identified.

According to their ideologies and environmental ethics, the awareness of environmental risks, the managerial and technical ability, the financial capability, some individual agents may have direct natural resources conservation goals. Accordingly these "green" individuals will pursue natural resources conservation strategy in their everyday life and activity. For instance, for the natural resource owners the sustainable exploitation (conservation) of owned assets is often a primary concern and often it determines the type of farms they set up, and other ventures they participate (e.g. group or cooperative farms), or lease out contracts they sign. Similarly, a proenvironment farm entrepreneur establishes green (individual, cooperative, firm) farming structure following own or collective voluntary eco-code of behavior. Finally, farm labor may seek employment in a green cooperative or companies with eco-social responsibility.

Furthermore, in recent years there have been developed a great number of farms and farming enterprises with © Bachev H., 2015

¹ there are many instances where agricultural production is integrated by outside agent (processor, retailer, exporter) and carried as a part of larger (industrial, input supply) activity. "Farmers" are hired labor taking part in "internal" non-agricultural division of labor.

a primary or a major mission the environmental conservation and improvement. For instance, in many EU countries the environmental cooperatives have been very popular, there are numerous green agri-firms, etc Nevertheless, most farm structures in the modern world have other goals and pursue other (than natural environment conservation) strategies - e.g. the agri-firms are "profitoriented" and their primary strategy is to maximize profits for shareholders; the cooperatives are "member-oriented" and carry out strategy to increase benefits for members, etc. However, there have been increasing consumer demands for the environmental conservation, and for the related organic, eco- and specific products from agriculture. Consequently, many market-oriented farms change their behavior in order to meet this growing market demand while keeping traditional (profit-making) strategy.

Finally, in modern societies there are a great number of formal and informal norms and restrictions related to the exploitation of natural resources. For instance, in the EU there is a huge body of environmental legislation and various environmental conservation programs. These institutional rules impose individual agents and farming structures mandatory norms and/or offer incentive to join voluntary schemes aiming at limiting environmental pressure, securing sustainable exploitation of natural resources, preservation of biodiversity, reducing pollution and emission of harmful substances, etc. This new public order modifies the individual strategies and behavior, and eventually leads toward conservation of natural environment. Thus achieving the effective natural environment conservation in agriculture will always be result of implementing of *multiple* voluntary or induced by market, community, public policies etc. individuals, farms, businesses, consumers, and public strategies.

The next step in the analysis is to define the "needs" for eco-management. They are associated with the necessity

for building mechanisms for reviling the eco-problems and risks, stimulation of appropriate eco-behavior and cooperation, exchange of information, conflict resolution, payback and minimizing eco-costs, etc. of participating agents. According to (awareness, symmetry, strength, harmonization costs of) the interests of agents associated with the natural environment there are different needs for management of actions. Figure 1 illustrates diverse managerial needs with an example with the agro-ecosystem services. Here the Farm 1 has to manage its efforts and relations with the Farm 2 since both receive services from the Ecosystem 1 and affect (positively or negatively) the service supply of that ecosystem. Besides, both farms are to manage their relations with the consumers of services from the Ecosystem 1 (agents in Social system 1) to meet the total demand and compensate costs for the maintaining ecosystem services to that direction. In addition, the Farms 1 and 2 have to coordinate efforts with the agents in the Social system 1 to mitigate conflicts with the agents in the Social system 2 (affecting negatively services of the Ecosystem 1). Furthermore, the Farm 1 is to manage its relations with the Farm 3 for the effective service supply from the Ecosystem 3, and manage its interaction with the Ecosystem 2. Moreover, the Farms 1 and 3 have to manage their relations with the Farms 4 and the agents from the Social system 1 (consumers of the services of the Ecosystem 3) and the Social system 2 (consumers and destructors of the Ecosystem 3 services). Finally, the Farm 1 affecting adversely the Ecosystem 4 services is to manage relations with the agents in the Social system 2 (consumers of the Ecosystem 4 services) to reconcile conflicts and secure effective flow of the ecosystem services. Therefore, the Farm 1 is to be involved in seven systems of governance in order to assure an effective supply of the services from the ecosystems of which it belongs or affects.



Fig. 1. Management needs for effective supply of agro-ecosystem services

Source: composed by authors' calculations

Next, it is to be analyzed the extent in which the management needs for the environmental management in agriculture is "satisfied" from the existing governance forms and mechanisms. In certain cases, the eco-management in agriculture is entirely archived through the individual actions of autonomous agents (farms) within the Sector "Agriculture". For instance, a good care and sustainable use of privately owned agricultural lands and water sources are typical in a family farm since they are integral part of the strategy for sustainable development of that family enterprise. Similarly, many group farms have a primary goal for sustainable development or are set up as green farms. Even when the individual strategies of farm's components (e.g. a hired labor, a family or a group member) do not coincide with the overall farm strategy, the effective management (the "internal order") is able to achieve the goals for farm's sustainable growth. However, the effective management of agro-eco-activity often requires complex and polyvalent forms, which have to be identified and analyzed. For instance, the inclusion of a farmer in the "organic products" chain coordinates well relations between the producers and the final consumers. Nevertheless, the positive eco-effect could be minor, if simultaneously a form for the coordination of relations (collective action) with other farmers in a particular region or eco-system is not established to achieve the minimum (optimal) required scale for positive eco-impact. The effective environmental management often necessitates concerted (collective) actions and ecostrategies of a number of farms as it is in the case of sustainable use of a common pasture and limited water supply, protection of local biodiversity, effective provision of agro-ecosystem services, etc.

Furthermore, modern farming activity is often profitoriented and frequently associated with significant positive and/or negative externalities. Implementation of individual strategies of different farmers not always leads to overall conservation of natural resources. That requires a "common" strategy and managing relations (cooperation, reconciling conflicts, recovery of costs) between different farms, and increasingly between the farmers and non-farmers. For example, the adverse effects of agricultural activities on water and air quality are often felt by the residents and businesses in neighborhood and/or more remote regions. Similarly, the agricultural contribution to the ecosystem services benefits a large number of residents, visitors, consumers, businesses, and interest groups requiring certain collective actions for a sustainable supply. In all these instances, the environmental management goes beyond the simple (technical, agronomic, ecological) "relations with the nature" and embraces the governance of relations and collective actions of agents with diverse interests, power positions, awareness, capabilities etc. in large geographical, sectoral, and temporal scales [Bachev 2011a].

What is more, modern environmental management is associated with growing needs for the "additional" actions

(monitoring, coordination, investments, etc.) and integral management of natural resources and eco-risks at national and progressively at transnational scale. The later include the water and garbage management, biodiversity conservation, climate change, etc. issues demanding effective regional, nationwide, international, and global governance. For instance, the effective management of the biodiversity "component" of the natural environment includes multilevel (individual, sectoral, national, EU, worldwide) and multilateral initiatives of numerous farmers, businesses, consumers, residents, interests groups, etc. The same is true for the waters, lands, air, ecosystem services, etc. management. Thus the effective conservation of natural environment will be achieved by coordinated collective actions and implementation of multisectoral and multilevel strategies of individual, family, partnership, private juridical, public juridical, state, etc. agents with diverse immediate goals, positions, capability and interests.

2. Forms and levels of eco-management

The individuals behavior (actions, restriction of actions) are affected and governed by a number of distinct modes and mechanisms of management which include (Figure 2): First, the institutional environment (or the "rules of the game") - that is the distribution of rights between individuals, groups, and generations, and the system(s) of enforcement of these rights and rules [Furuboth and Richter; North]. The entire spectrum of rights is to be analyzed embracing material assets, natural resources, intangibles, certain activities, clean environment, food security, intra- and inter-generational justice, etc. A part of the rights and rules is constituted by the formal laws, regulations, standards, court decisions, etc. In addition, there are important informal rules and rights determined by the tradition, culture, religion, ideology, ethical and moral norms, which is to be clarified.





Source: composed by authors' calculations

Furthermore, an analysis is to be made on the system of enforcement of the rights and rules done by the state, community pressure, trust, reputation, private modes, and self-enforcement by agents. After that, an assessment is to be made on which extent the institutional environment creates incentives, restrictions and costs for maintaining and

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as environmental preservation, eco-system services, etc. The later cases have to be identified and analyzed. Forth, the *public modes* (the "public order") – these are various forms of public (community, government, international) intervention in the market and private sectors – e.g.

various forms of public (community, government, international) intervention in the market and private sectors – e.g. public guidance, public regulation, public taxation, public assistance, public funding, public provision, property right modernization, etc. Analyses is to be made on existing forms for public "involvement" in the agro-eco-management through provision of eco-information and eco-training for private agents, stimulation and (co)funding of their voluntary actions, enforcement of the obligatory eco-order and sanctioning for non-compliance, direct organization of ecoand related activities (state eco-enterprise, scientific research, monitoring, etc.). The role of public (local, national, transnational, etc.) governance has been increasing along with the intensification of activity and exchange, and the growing interdependence of socio-economic and environmental activities. In many cases, the effective management of individual behavior and/or the organization of certain activity through a market mechanism and/or a private negotiation would take a long period of time, be very costly, could not reach a socially desirable scale, or be impossible at all. Thus a centralized public intervention could achieve the willing state faster, cheaper or more efficiently. Nonetheless, there are a great number of "bad" public involvements (inaction, wrong intervention, over-regulation, mismanagement, corruption, etc.) leading to significant problems of sustainable development around the globe [Bachev, 2010]. All these cases of public "failure" are to be identified and analyzed.

Fifth, the *hybrid forms* – some combination of the above three modes like public-private partnership, public licensing and inspection of private organic farms, etc.

All existing and other practically feasible (potential) forms for agro-eco-management is to be identified, analyzed and assessed as well as their complementarities (mutual or multiplication effect) and contradictions between individual forms and mechanisms of agro-eco-management specified. For instance, often the private (eco)initiatives of individual agents are in "conflict" with each other and/or the interests of third parties; usually, public, collective and private forms are mutually complementary, etc.

The efficiency of the individual management modes is quite different since they have unlike potential to: provide adequate eco-information, induce eco-friendly behavior, reconcile eco-conflicts and coordinate the eco-actions of different parties, impact environmental sustainability and mitigate eco-risks, and minimize the overall environment management (conservation, third-party, transaction) costs, for agents with different preferences and capability, and in the specific (socio-economic, natural, etc.) conditions of each eco-system, community, industry, region, and country. For instance, providing appropriate eco-information (by a state agency, NGO, etc.) would be enough to induce voluntary actions by a "green" farmer, while the most commercial enterprises would need outside incentives (such as price premium, cash compensation, punishment, etc.): market prices would usually coordinate well relations between the water suppliers and the users, while the requlation of relations of water polluters and users would require a special private or public order; independent strategies and actions of farms would improve the state of local eco-systems, while dealing with most of the (regional, national, global) eco-challenges requires collective actions in large geographical and temporal scales, etc.

improving the natural environment, intensifying ecoexchange and cooperation, increasing eco-productivity, inducing private and collective eco-initiatives, developing new eco- and related rights, decreasing eco-divergence between social groups and regions, responding to ecological and other challenges, etc. Driving forces and the prospects of institutional "development" are to be also specified. The modernization of the institutional environment is initiated by the public (state, community) authority, international actions (agreements, assistance, pressure, etc.), and the private and collective actions of individuals. It is associated with the modernization and/or redistribution of the existing rights; and the evolution of new rights and the emergence of novel (private, public, hybrid) institutions for their enforcement. In modern society a great deal of the individuals' activities and relations are regulated and sanctioned by some (general, specific) formal and informal institutions. However, there is no perfect system of preset "outside rules" that can manage effectively the entire eco-activity of individuals in all possible (and quite specific) circumstances of their life and relations associated with the natural environment.

Second, the market modes (the "invisible hand of market") – those are various decentralized initiatives governed by the free market price movements and the market competition - e.g. spotlight exchanges, classical contracts, production and trade of organic products and origins, etc. It is to be analyzed the extent in which the "free" market contributes to coordination (direction, correction) and stimulation of the eco-activities and eco-exchanges, and the effective allocation of environmental resources. The individual agents use (adapt to) markets profiting from the specialization and the mutually beneficial exchange (trade) while their voluntary decentralized actions govern the overall distribution of efforts and resources between activities, sectors, regions, eco-systems, countries, etc. There are many instances of lack of individual incentives, choices and/or unwanted exchanges related to natural environment conservation - e.g. "missing" markets, monopoly and power relations, positive or negative externalities, etc. Consequently, the free market "fails" to manage effectively the entire eco-activity, eco-exchanges, and ecoinvestments of individuals. Therefore, the cases of "failure" of market are to be determined, which lead to lack or insufficient individual incentives and choice and/or unwanted exchange associated with the environmental protection.

Third, the private and collective modes (the "private or collective order") - those are diverse private initiatives, and special contractual and organizational arrangements - e.g. voluntary eco-actions, codes of eco-behavior, ecocontracts, eco-cooperatives, etc. It is to be determined the extent in which the individual agents can take advantage of the economic, market, institutional etc. opportunities and deal with the institutional and market deficiency by selecting or designing mutually beneficial private modes (rules) for governing their eco-behavior, relations and exchanges. The private mode negotiates "own rules" or accepts (imposed) existing private or collective order, transfers existing rights or gives new rights to counterpart(s), and safeguards absolute and/or contracted rights of agents. In modern society a great part of the agrarian activity is managed by the voluntary initiatives, private negotiations, the "visible hand of the manager", or collective decision-making. Nevertheless, there are many examples of private sector deficiency ("failures") in governing of socially desirable activity such

"Governance matters" and depending on the (efficiency of) system of management "put in place" the individual communities and societies achieve quite dissimilar results in the eco-conservation and improvement. Consequently, the extend of conservation of natural environment in agriculture (the type of exploitation of natural resources by agriculture and the agricultural impact on environment) would differ quite substantially in the different stages of development and among the diverse farming structures, eco-systems, regions, and countries.

The analysis of the system and the forms of agro-ecomanagement is to be done for the system as a whole and/or for the individual components of the natural environment – soils, waters, atmosphere, biodiversity, landscape, climate, eco-system services, etc. In the later cases, the analysis of relatively independent (*sub*)systems of management is concerned – agricultural lands, agricultural waters, agricultural emissions, agrarian and related biodiversity, rural landscape, agricultural impact on climate, and agro-ecosystem services.

For each of the elements of the nature the analysis further deepens for sub-components as well. The later are characterized with significant specificity in terms of management forms, factors, and efficiency. For instance, as elements of the component "soils" could be included cultivated farmland, lands with permanent crops, permanent grasslands and pastures, etc.; for the component "waters" – surface waters, ground waters, waters for irrigation, drinking waters, etc.; for the component "biodiversity" – agro-biodiversity, natural biodiversity, etc.; for the component "atmosphere" and "climate" – greenhouse gas emissions, dust, odors, other pollutants, etc.

It is to bare in mind that a great part of the employed modes of agro-eco-management are integral, and affect two or more relatively independent elements or subcomponents of the natural environment. Besides, the improvement of one aspect of the management through a particular form often is associated with the negative effects for other aspect, component or element. Therefore, in addition to the "private" efficiency always it is to be taken into account the overall efficiency (direct and indirect effects and costs) of a particular forms or the system of management as a whole.

According to the specific objective the analysis of the system of agro-eco-management is made at different management levels: *farm level* (individual farm, farms of a particular type – family, cooperative, crop, livestock, organic, semi-market, etc.); *eco-system* – individual eco-system (e.g. Danube river basin; Northern Rockies; Dobrudja plain) or type of agro-eco-system (plain, mountainous, semi-mountainous, riverside, coastal, etc.); *regional* (major administrative, economic or geographical regions of the country); *Industry/sector* – major sectors and subsectors of agriculture (crop production, livestock production, grain production, horticulture, poultry, dairy cattle, etc.); *national* (Ukrain, California, Australia); *trans-national* (Western Balkans, European Union, global).

Specification of the individual elements of the system of agro-eco-management in each level is to be done carefully. For instance, at the individual farm level most of the forms of public intervention (mandatory norms and standards, sanction mechanisms, etc.) play a role of "external" environment, while at the national and/or industry level they are internal mechanisms of management. Similarly, some of the dominant forms and mechanisms of management at a national or sectoral level may not be relevant for the individual farm or farms of a particular type. For instance, most of the (eco)instruments of the EU CAP do not impact at all the majority of Bulgarian farms due to the impossibility for participation in public programs (formal restrictions, high costs), low interests, enormous difficulties and costs for detection of non-compliances and for sanction by the authority, etc. [Bachev, 2010].

At certain level of analysis (e.g. eco-system, region) there may be no specific (formal) structure of management at all, and the agro-eco-management to be "carried out" by other (main) organizations (e.g. farms and farm organizations) and/or the general system of eco-management in the country. As a rule, the eco-effects and the eco-costs at a particular level and upper management level are not simple sums of those of the composite elements or those at lower levels of management. Therefore, it is to be taken into consideration the necessity for "collective actions" for achieving a minimal ecological and technological size for a positive effect, mutual and multiplication effects and spillovers, contradictory effects and costs, and externalities in different subjects and management levels, in space and time horizon.

3. Factors and efficiency of eco-management

The evolution of the system of agro-eco-management and the choice of one or another form of eco-management by agents depend on diverse natural, economic, political, institutional, behavioral, technological, international, etc. factors (Figure 4). For instance, the type of the development of agro-eco-management strongly depends on the (eco)preferences and the experiences of farmers and other participants in the process, the extent of degradation and pollution of the natural environment, the social demands and the pressure for sustainable exploitation of natural resources, the economic development and capabilities for eco-investments, the public policies and the implementation/enforcement of international (eco)conventions, the natural evolution of environment, etc.

Therefore. the specific factors for agro-ecomanagement is to be identified and their importance and compatibility at the each stage of agricultural development analyzed. The experience demonstrates that the natural environment is "valued" less and the good ecomanagement is not a priority, when there is no institutional stability (unspecified and/or not enforced agrarian, contractual and eco-rights, restructuring, unsustainable policies, etc.) and when the financial and economic situations of household, farms and the state deteriorate. Likewise, the monitoring, enforcement and disputing of many of the terms of eco-contracts is extremely difficult (costly) or practically impossible, and therefore supporting voluntary ecoinitiatives of farmers is often more effective than the mandatory norms and "contracts". Similarly, due to technological, ecological or socio-economic reasons some of the widely used forms could be impossible for the conditions of a particular subsector, region, eco-system or (type) farm.

Most environmental activity and exchange in agriculture could be managed through a great variety of *alternative* forms. For instance, a "supply of environmental preservation service" could be governed as: voluntary activity of a farmer; though private contracts of the farmer with interested or affected agents; though interlinked contract between the farmer and a supplier or processor; though cooperation (collective action) with other farmers and stakeholders; though (free) market or assisted by a third-party (certifying and controlling agent) trade with special (eco, protected origins, fair-trade, etc.) products; though a public contract specifying farmer's obligations and compensation; though a public order (regulation, taxation, quota for use of resources/emissions, etc.); within a hierarchical public agency or by a hybrid form.



Fig. 4. Factors for managerial and strategy choices for agro-eco-management

Source: composed by authors' calculations

Commonly the natural and the institutional environment evolve very slowly over a long-term periods. Therefore, in the specific natural, socio-economic and institutional environment, the choice of the management mode would depend on a number of key factors including:

• the personal characteristics of individual agents – preferences, believes, ideology, knowledge, capability, training, managerial experience, risk-aversion, bounded rationality, tendency for opportunism, reputation, trust, power, etc. For instance, benefits for farmers from the eco-management could range from the monetary or non-monetary income; profit; indirect revenue; to pleasure of involvement in environment and biodiversity preservation activity.

• the formal and informal institutions – often the choice of management mode is (pre)determined by the institutional restrictions as some forms for carrying out farming, environmental, etc. activities could be socially unacceptable or illegal. For instance, market trade of farmland, natural resources, and (some) eco-system services are not allowed in many countries.

Furthermore, the institutional environment considerably affects the level of management costs and thus the choice of one or another form of organization. For instance, in conditions of well-working public system of regulations (quality standards, guarantees) and laws and contract enforcement, a preference is given to spotlight and classical (standard) contracts. On the other hand, when rights on major agrarian and natural resources are not defined or not well defined, and the absolute and contracted right effectively enforced, then the high transaction costs could create difficulties (or block) effective eco-management - costly unsolvable disputes between polluting and affected agents, disregards of interests of certain groups or generations, etc. Consequently, the institutional structures for carrying out the agrarian and environmental activities become an important factor, which eventually determines the outcome of the system (the efficiency) and the type of development (the sustainability).

• the natural and technological factors – ecomanagement strongly depends on the type of the environmental challenge (spatial and temporal scale, risks, etc.) and the natural recourses endowment as well as on the development of farming, environmental, monitoring, information, etc. technologies. For instance, management of water resources depends on the advancement of water conservation, use, recycling and monitoring technologies, etc.

In a long-term the state of the natural environment and its individual components, and the associated risks, conflicts and costs, depends on the efficiency of the "established" system of eco-management in a particular society, community, sector, region, economic organization, etc. However, in each specific moment or a shorter-period of analysis not always could be found adequate data and/or determine direct links between the system of agro-ecomanagement (and its individual forms) and the state of the natural environment. The later is caused by:

• the time period (delay) between the management actions ("improvement" of the system of management), and the changes in the eco-behavior of agents, and the positive, negative or neutral effects on the state of natural environment and its individual elements;

• the "impossibility" for adequate assessment of the natural environment and the associated risks and costs, due to the lack of "full" knowledge on the state and the processes of environmental change, the type of correlation with agrarian activities and the new (nano, genetically-modified, etc.) products and technologies, on future costs associated with the deterioration, restoration and conservation of natural environment, etc.;

 insufficient factual data for the extent of ecodegradation and pollution in agriculture due to lack of monitoring, precise measurements, and/or research studies in that area;

• "undervaluation" of the natural resources by individual agents, social groups and/or society as a whole and/or the "lack" of any system of agro-eco-management.

Also, it is to be taken into consideration that the state and the changes in the natural environment are consequences not only of the system of agro-eco-management in a particular farms, region, subsector, or country, but other factors as well such as: the impacts of other industries in the country and at international scale, the natural evolution of environment, etc. Consequently, the real improvement or deterioration of the eco-management in a particular farm, group of farms in a region, subsector, or in the country could result in a lack or controversial change in the quality of waters, soils, air, biodiversity and climate.

In many cases, it is impossible to "influence" the natural environment through (agro)eco-management at all, and the effective adaptation is the only possible strategy for overcoming the socio-economic consequences for the agriculture and other sectors of human activity [Bachev, 2013a]. Therefore, at all levels of analysis the diverse "external" and "internal" factors are to be identified and their importance estimated in order to assess adequately the efficiency of the system of agro-eco-management and the farm adaptation.

The proper understanding the efficiency of agro-ecomanagement greatly depends on the understanding the role of transaction costs and the governance [Bachev, 2004, 2010, 2013b]. The problem of "social costs" does not exist in the conditions of zero transaction costs² and welldefined private property rights [Coase]. Then the state of maximum efficiency is always achieved independent of initial distribution of rights between individuals and the mode of governance. All information for the effective potential of activity and exchange (optimization of resources, meeting various demands, respecting assigned and transferred rights) would be costlessly available to everybody. Individuals would costlessly coordinate their activities; define, adapt and implement their strategies, define new rights, and protect their (absolute and contracted) rights³, and trade owned resources (and rights over them) in mutual benefit with the same (equal) efficiency over the free market (adapting to price movements), and the private modes of different types (contracts, firms), and the collective decision making (cooperative, association), and in a nationwide hierarchy (a single private or state company). Then the ecological requirements for sustainability and the technological opportunities for economies of scale and scope (the maximum environmental conservation/enhancement and productivity of resources, "internalization of externalities") and the maximum welfare (consumption, conservation of natural resources) would be easily/costlestly achieved⁴. However, when transaction costs are significant, then costless contracting, exchange and protection of individual right is impossible. Therefore, the initial distribution of property rights between individuals and groups, and their good definition and enforcement are critical for the overall efficiency and sustainability. For instance, if the "right on clean and conserved natural environment" is not well-defined, that creates big difficulties for efficient eco-management - costly disputes between polluting and affected agents; not respecting interests of certain groups or generations, etc.

What is more, in the conditions of well-defined rights the eco-management is usually associated with significant transaction costs as well. For example, the agents have costs for identification and protection of various rights (unwanted take overs from others); studying out and complying with diverse institutional restrictions (norms, standards, rules, etc.); collecting needed technological, environmental, etc. information; finding best partners and prices; negotiating conditions of exchange; contract writing and registration; enforcing negotiated terms through monitoring, controlling, measuring and safeguarding; disputing through a court system or another way; adjusting or termination along with the evolving conditions of production and exchange, etc. Therefore, in the "real world" with not completely defined and/or enforced rights, and the positive transaction costs, the *mode* of agro-eco-governance is crucial and eventually (pre)determines the extent of degradation, conservation and improvement of natural environment [Bachev 2010]. That is because the different modes have unequal efficiency (benefits, costs) for governing the same eco-activity in the specific socio-economic and natural environment.

Moreover, often the high transaction costs deteriorate and even block organization of otherwise efficient (mutually-beneficial) for all participants' eco-activity and exchange. It has to be distinguished the transaction from the proper conservation or "production" (agronomic, opportunity, etc.) environmental costs. In modern conditions the later are significant economic costs, which are to be recovered like other technological costs from the beneficiaries of conserved or improved natural environment. Often that is the farmer, who invests for maintaining productivity of the natural resources (soil fertility, water purity, ecosystem services, etc.), and recover these costs similarly to other investments thought flow of future benefits (productivity, profitability, market position, etc.). More frequently, these are other agents, who pay for used eco-services directly (buying eco-products and services) or indirectly (though collective organizations, taxes and fees, etc.).

The effective modes for agro-eco-management optimize the *total* (transaction *and* conservation costs) for agrarian activity – minimizing the transaction costs and allowing (otherwise mutual beneficial) eco-exchange to be carried out in a socially desirable scale, and allowing achievement of minimum/optimum environmental requirement, and/or exploration of pure technological economies of scale and scope of farm, environmental conservation, etc. activities. In very rare cases, there is *only one* practically possible form for governing of natural resources, ecoactivity and eco-exchange⁵. However, usually there are a number of *alternative* modes for governing of ecoconservation activity.

Different management modes are alternative but not equally efficient modes for the organization of ecoactivities. Each form has distinct advantages and disadvantages to protect eco-rights and investment, coordinate and stimulate socially desirable eco-behavior and activities, explore economies of scale and scope, save production and transaction costs, etc. For instance, the free market has a big coordination and incentive advantages ("invisible hand", "power of competition"), and provides "unlimited" opportunities to benefit from the specialization and exchange. However, market management could be associated with a high uncertainty, risk, and costs due to the lack of (asymmetry) of information, low "appropriability" of some rights ("public or collective goods" character), price instability, a great possibility for facing an opportunistic behavior, "missing market" situation, etc.

The special contract form ("private ordering") permits a better coordination and intensification of eco-activity, and safeguards agent's eco-rights and eco-investments. However, it may require large costs for specification (and writing) contract provisions, adjustments with constant changes in conditions, enforcement and disputing of negotiated terms, etc. *The internal organization* allows a greater flexibility and control on activity (direct coordination, adaptation, enforcement, and dispute resolution by a "fiat").

² The costs for *governing* relations between individuals – for protection and exchange of individual rights.

³ When transaction costs are zero then definition (redistribution) of *new rights* of individuals, interests groups, and society as well as effective enforcement of the new rights would be easily achieved.

⁴ Presently there is a *principle agreement* ("social contract") for global sustainable development. Nevertheless, depending on the specific social preferences that "social consensus" not always is expressed in maximum environmental conservation and improvement. At certain stages of development a social priority could be given to economic growth at the "price" of certain degradation of natural resources – "over" pollution and emissions, unsustainable exploitation, partial or complete exhaustion.

⁵ E.g. in Japanese agriculture with small paddy fields water supply could not be carried out by individual farms (high mutual assets dependency, non separability of use) and since ancient time water supply organization is governed as public projects [Mori].

However, the extension of internal mode beyond family and small-partnership boundaries (allowing achievement of "minimum" technological or ecological requirements; exploration of technological economies of scale and scope, etc.) may command significant costs for development (initiation, design, formal registration, restructuring) and for current management (collective decision making, control on coalition members opportunism, supervision and motivation of hired labor). The separation of the ownership from the management (cooperative, corporation, public farm/firm) gives enormous opportunities for growth in productivity, and environmental and management efficiency - "internal" division and specialization of labor; achieving ecosystem's requirements; exploration of economies of scale and scope; introduction of innovation; diversification; risk sharing; investing in product promotion, brand names, relations with customers, counterparts and authorities, etc. However, it could be connected with huge transaction costs for decreasing information asymmetry between management and shareholders, decision-making, controlling opportunism, adaptation, etc. The cooperative and non-for profit form also suffers from a low capability for internal long-term investment due to the non-for-profit goals and the nontradable character of shares (so called "horizon problem"). What is more, the evolution and maintenance of large collective organizations is usual associated with significant costs - for initiating, informing, "collective| decision-making and internal conflict resolution, controlling opportunism of (current and potential) members, modernization, restructuring, liquidation, etc. Finally, the pubic forms also command high internal (internal administration and coordination) and outside (for other private and public agents) costs - for establishment, functioning, coordination, controlling, mismanagement, misuse by private and other agents, reorganization, and liquidation. What is more, unlike market and private modes, for public organizations there is no "automatic" mechanism (such as competition) for the selection of (in)effective forms. Here public "decision making" is necessary which is associated with huge costs and time, and often affected by the strong private interests (the power of lobbying groups, politicians and their associates, bureaucrats, employees in the public forms) rather than the efficiency.

Principally the "rational" agents tend to use and/or design such modes for governing their diverse activity and relations which are the most efficient in the specific institutional, economic and natural environment - forms maximizing their overall (production, ecological, financial, transaction, etc.) benefits and minimizing their overall (production, environmental, transaction, etc.) costs [Bachev 2010]. However, a result of such private strategies and optimization of management/activity is not always the most socially effective distribution of resources and the socially desirable (maximum possible) conservation of natural environment. It is well known that the agricultural activity is often associated with significant undesirable negative environmental effects such as soils degradation, waters pollution, biodiversity termination, air pollution, considerable green-house gases emissions, etc.

Therefore, the system of agro-eco-management is to be improved, and that frequently necessitates a *public* (state) involvement in the agrarian and environmental management. Nevertheless, the public intervention in (eco)management is not always more effective, since *public failure* is practically possible. Around the globe there are many examples for inappropriate, over, under, delay, or too expensive public intervention at all levels. Often the public intervention either does not correct the market and private sector failures, or "correct| them with higher overall costs.

Thus the criterion for assessing the efficiency of agroeco-management and strategies is to be whether socially desirable and practically possible environmental goals are realized with the minimum possible overall costs (direct, indirect, private, public, production, environmental, transaction, etc.). Accordingly, inefficiency is expressed either in failure to achieve the feasible (technically, politically, economically, etc.) environmental goals (conservation of natural resources, overcoming certain eco-problems, diminishing existing eco-risks, decreasing eco-losses, recovery and improvement of natural environment, etc.) or achieving of set up goals with more costs comparing to another feasible form of management. Contemporary socio-economic, institutional and (more often) natural environment are changing very fast and often unpredictably⁶. Consequently, any strategy for the effective environmental management is to be an adaptive strategy. Accordingly, dominating and other feasible (market, private, public, hybrid, etc.) forms are to be assessed in terms of their absolute and comparative (adaptation) potential to protect eco-rights and investments of agents, assure socially desirable level of environmental conservation (enhancement), minimize overall costs, coordinate and stimulate eco-activities, reconcile conflicts, and recover long-term costs for organizational development in the specific economic, institutional and natural environment.

4. (The most) effective forms for eco-management

Usually "evolution" of the natural and the institutional environment is quite slow and in long periods of time. Therefore, to a great extent the efficiency of the system of agro-eco-management depends on the level of transaction costs. The transaction costs have behavioral origin: namely individual's bounded rationality and tendency for opportunism [Williamson]. The agrarian agents do not possess full information about the system (eco-benefits and costs, effects on others, formal requirements, development trends, etc.) since collection and processing of such information would be either very expensive or impossible (multiple spillover effects and costs in a large geographical and temporal scale, future events, partners intention for cheating, etc.). In order to optimize the decision-making and the activity the agents have to spent costs for "increasing their imperfect rationality" - for monitoring, data collection, analysis, forecasting, training, consulting, etc.

Besides, the economic agents are given to (precontractual, post-contractual, and non-contractual) opportunism. Accordingly, if there is opportunity for some of the transacting sides to get non-punishably an extra benefit/rent from voluntary or unwanted exchange, he will likely take advantage of that. Usually it is very costly or impossible to distinguish the opportunistic from non-opportunistic behavior because of the bounded rationality of agents. What is more, in the real life there is widespread noncontractual opportunism⁷, namely unwanted "exchange" or stealing of rights from a private and/or public agents without any contracting process (because of the lack or asymmetry of information, capability for detection and protection, weak negotiating positions, etc.). Therefore, individual agents have to protect their rights, investments and transactions from the hazard of opportunism through: ex ante efforts to find a reliable counterpart and to design efficient mode for partners credible commitments; ex post investments for overcoming (through monitoring, controlling, stimulating co-

⁶ There have been many financial, economic, food, environmental crisis in recent years inducing fundamental changes in economic structure and institutional rules at local, national, transnational and global scales.

⁷ Most economic analysis focused on pre-contractual ("adverse selection") and post-contractual ("moral hazard") opportunism. Widely distributed *non-contractual* opportunism is usually ignored.

operation) of possible opportunism during the contract execution stage; and *permanent efforts/costs* for protection from unwanted non-contractual exchange though safeguarding, diversification, cooperation, court suits, etc.

The eco-opportunism is also widespread in agriculture. For instance, the farmer knows or eventually recognizes that his activity is harmful for the environment, but in order to save additional costs continues to execute risk operations when the negative effects are for other agents (the owners of natural resources, other farms, non-agrarian agents, society as a whole). Similarly, farmer sells conventional products as "organic" and profit price premium from the unaware buyers; or he joins the public agro-ecoprograms to get subsidies, but does not comply with the "contracted" eco-obligations⁸.

Part of the transaction costs for the eco-management could be determined relatively easily - e.g. costs for licensing, certifications, tests, purchase of information, hiring consultants, payments for guards and lawyers, bribes, etc. However, the assessment of another (a significant) part of the transaction costs in eco-activity is often impossible or very expensive [Bachev, 2011a]. That is why the Comparative Structural Analysis is to be employed [Williamson]. This analysis would align eco-activities/transactions (which differ in their attributes) with the governance structures (which differ in their costs and competence) in discriminating (mainly transaction cost economizing) way. Frequency, uncertainty, assets specificity, and appropriability are identified as critical dimensions of the eco-activity and transaction⁹ – the factors responsible to the variation of transacting costs between alternative modes of management. In the specific socio-economic and natural environment, depending to the combination of the critical factors of eco-activities and eco-transactions, there will be different the mosteffective forms of their management (Figure 5).

The eco-activity and transactions with good appropriability of rights, high certainty, and universal character of investments could be effectively managed by the free market through *spotlight* or *classical contracts*. For instance, there are widespread market modes for selling diverse ecosystem services and eco-products – eco-visits, organic, fair-trade, origins, self-production or self-pick up of yields from customer, eco-education, eco-tourism, eco-restaurants, etc.

The frequent transactions with high appropriability could be effectively managed through a *special contract*. For example, eco-contracts and cooperative agreements between farmers and interested businesses or communities are widely used including a payment for ecosystem services, and leading to production methods (enhanced pasture management, reduced use of agrochemicals, wetland preservation, etc.) protecting water from pollution, mitigating floods and wild fires, etc.

When the uncertainty is high and the assets dependency (specificity) is symmetrical the *relational ("neoclassical") contract* could be used. Since detailed terms of transacting and results are not known at outset (a high uncertainty), a framework (mutual expectations) rather than the specification of obligations of partners is practiced (opportunisms is (self)restricted due to the symmetrical dependency of investments of the partners). A *special contract* forms is also efficient for the rare transactions with a low uncertainty, high specificity and appropriability. The dependent investment could be successfully safeguarded through contract provisions since it is easy to define and enforce the relevant obligations of partners in all possible contingencies (no uncertainty exist).

The transactions and activity with a high frequency, big uncertainty, and great assets specificity have to be managed within internal organization. For instance, a good portion of the eco-investments are strongly specific to (certain land plots, eco-systems, etc.) a farm and they can be effectively implemented and "paid-back" within the borders of the particular farm. The high interdependency (specificity) of the eco-investments with other farm's assets and activity is the reason that a great part of the agro-eco-management to be executed by the different type of farms - family, cooperative, agri-firms, public, hybrid, etc. There are also cases when the farms and other agents are specialized in eco-management and entirely engaged in (aimed at) "keeping natural environment in a good condition" or "recovery or amelioration of natural environment". Here the agricultural activity either "does not exist" (e.g. prolonged follow up) or it is practiced as far as it is required by the purely agronomic, ecological and other (e.g. educational, rehabilitation, etc.) needs. According to the extent of appropriability of the results and the "universal" character of the investments, these type of farms could be marketoriented (selling eco-services to landlords or other buyers), community¹⁰ (funded by communities, interests groups) or public (e.g. for conservation of important eco-systems like national parks, natural phenomenon, etc.). Very often the effective scale of the specific investment in agro-ecosystem services exceeds the borders of the traditional agrarian organizations (family farm, small partnership, etc.). For instance, much of the eco-investments, which are done in one farm (protection of waters and air, biodiversity, etc.) benefit other farms or non-agrarian agents. Often, the dependency of eco-investments of a farm is unilateral from the agent benefiting from the positive result.

Besides, the positive impact of the eco-investment often depends on the minimum scale of activity and frequently requires collective action (co-investment). Consequently, the eco-activity/assets of many farms happen to be in a high mutual-dependency with the eco-activity/assets of other farms and/or non-agrarian agents in a large spacial and often temporal scale. Thus, if the specific capital (knowledge, technology, equipment, funding, etc.) cannot be effectively organized within a single organization¹¹, then effective external form(s) is to be used - e.g. joint ownership, interlinks, cooperative, joint investment in labels and origins, lobbying for public intervention, etc. For instance, the environmental cooperatives are very successful in some European countries (like, Finland, Germany, Holland, etc.) where there are strong incentives for cooperation due to the mutualdependency of farms eco-activity, evolving "market" for ecoservices, and widespread application of long-term public eco-contracts for eco-coalition. There is also rapid development of diverse associations of producers around the specific capital invested in eco-products and services, trademarks, advertisement, marketing channels, etc.

Nevertheless, the costs for initiation and maintaining of the collective organization for overcoming the unilateral dependency are usually great (a big number of coalition, different interests of members, opportunism of "free-riding" type) and it is unsustainable or does not evolve at all. That strongly necessitates a *third-party involvement* (nongovernmental or state organization) to make such organization possible or more efficient.

⁸ Not compliance with the terms of public eco-contracts by farmers is widespread even in some of old member states of EU.

⁹ *Frequency, uncertainty*", and *asset specificity* are identified as critical factors of transaction costs by Williamson [Williamson] while *appropriability* added by Bachev and Labonne [Bachev and Labonne].

¹⁰ In response to the unprecedented decrease in number of farms in Japan a "third sector" has developed – in many places community farms are established aiming at conservation of natural environment rather than farming.

¹¹ coalition made, minimum scale of operations reached, economy of scale and scope explored.

		Critical dimensions of transactions								
		Appropriability								
				H	igh				Low	
				Assets S	specificity					
Generic modes		Low				H	igh			
		Uncertainty								
	Lo	Low		High L		ow.	High			
		Frequency								
	High	Low	High	Low	High	Low	High	Low		
Free market	Ϋ́	Ϋ́								
Special contract form			Ϋ́			Ϋ́				
Internal organization					Ϋ́		Ϋ́			
Third-party involvement				60				đi,		
Public intervention									áC3	

Fig. 5. Principle modes for environmental management in agriculture

Source: composed by authors' calculations

The transaction costs analysis let us identify the situations of market and private sector failures. For instance, serious problems usually arise when the condition of assets specificity is combined with the high uncertainty and the low frequency, and when the appropriability is low. In all these cases, a third part (private agent, NGO, public authority, etc.) involvement in the transactions is necessary (through assistance, arbitration, regulation, funding, etc.) in order to make them more efficient or possible at all. The emergence and the unprecedented development of special origins, organic farming and system of fairtrade, are all good examples in that respect. There is increasing consumer's demand (price premium) for these products but their supply could not be met unless an effective trilateral management (including independent certification and control) is put in place.

The respect of others rights or granting out additional rights could be managed by "good will" or charity actions. For instance, a great number of voluntary environmental initiatives ("codes of behavior", etc.) have emerged driven by farmers' preferences for eco-production, competition in industries, and responds to the public pressure for a sound environmental management. However, the voluntary and charity initiatives could hardly satisfy the entire social demand especially if they require considerable costs. Besides, the environmental standards are usually "process-based", and the "environmental audit" is not conducted by independent party, which does not guarantee a "performance outcome" ¹².

Most environmental management requires large organizations with diversified interests of agents (providers, consumers, destructors, interest groups, etc.). The emergence of special large-members organizations for dealing with the low appropriability is slow and expensive, and they are not sustainable in a long run ("free riding" problem). Therefore, there is a strong need for a third-party public (Government, local authority, international assistance) intervention to make such eco-activity possible or more effective [Bachev 2010].

For example, the supply of "environmental goods" by farmers could hardly be governed through private contracts with the individual consumers because of the low appropriability, high uncertainty, and rare character of transacting (high costs for negotiating, contracting, charging all potential consumers, disputing, etc.). At the same time, the supply of additional environmental protection service is very costly (in terms of production and organization costs) and would unlikely be carried out on a voluntary basis. Besides, the financial compensation of farmers by willing consumers through a pure market mode (eco-fee, eco-premium to price, etc.) is also ineffective due to the high information asymmetry, and the massive costs for enforcement, disputing and excluding of "dishonest" users, etc. A third-party mode with a direct public involvement would make that type of transaction effective: on behalf of the consumers the State agency negotiates with the individual farmers a *public contract* for the "environment conservation service", coordinates activities of various agents, provides public payments for compensation of farmers, and controls the implementation of negotiated terms¹³.

5. Assessing and designing public modes for environmental management

In modern agriculture there are a *great variety* in forms and efficiency of public intervention in agri-ecomanagement. In assessment of the public modes for agroeco-management it has to be taken into account the *overall* (public *and* private) costs for the implementation *and* transaction for achievement of the social eco-goals *in comparison with another practically possible form* of intervention. The Discrete Structural Analysis is to be applied which would assist the assessment of the efficiency and the design of forms of public intervention. Depending on the *uncertainty, frequency*, and *necessity for specific investment* of public involvement different form of public intervention will be the most efficient (Figure 6).

Interventions with a low uncertainty and assets specificity would normally require a smaller public organization more regulatory modes, improvement of the general laws and contract enforcement, etc. When the uncertainty and assets specificity of transactions increases a special contract mode would be necessary - e.g. employment of public contracts for provision of private services, public funding (subsidies) of private activities, temporary labor contract for carrying out special public programs, leasing out public assets for private management, etc. And when the transactions are characterized with the high assets specificity, uncertainty and frequency, then an internal mode and a bigger public organization would be necessary - e.g. permanent public employment contracts, inhouse integration of crucial assets in a specialized state agency or public company, etc.

¹² Food safety and environmental scandals proves private schemes often fail (high information asymmetry, opportunism possibility).

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¹³ *Public eco-contracts* are the most widely used instrument for improving agro-eco-activity in European Union.

Level of Uncertainty, Frequency, and Assets specificity								
Low ←→ High								
New property rights and enforcements	Public regulations	Public taxation	Public assistance	Public funding	Public provision			

Fig. 6. Principle modes for public intervention in environmental management

Source: composed by authors' calculations

Initially, it is necessary to specify the ways to correct existing and emerging eco-problems in market and private sector (difficulties, costs, risks, failures, etc.). The appropriate public involvement would be to create an environment for: decreasing uncertainty surrounding market and private transactions, increasing intensity of exchange and cooperation, protecting private rights and investments, and making private investments less dependent. For instance, the State establishes and enforces quality, safety and eco-standards for the farm inputs and produces, certifies producers and users of natural resources, transfers water management rights to farms associations, sets up minimum farm-gate prices, etc. (Table 1). All these facilitate and intensify private eco-initiatives and (market and private) eco-transactions, and increase efficiency of the economic organizations.

Next, practically possible modes for increasing appropriability of rights, results of activity, and investment have to be considered. The low appropriability is often caused by the unspecified or badly specified private rights [Bachev, 2004]. In that case, the most effective government intervention would be to introduce and enforce new private property rights - e.g. rights on natural, biological, and environmental resources; rights on issuing and trading ecobonds and shares; tradable quotas for polluting; private rights on intellectual agrarian property and origins, etc. That would be efficient when the privatization of resources or the introduction and enforcement of new rights is not associated with significant costs (the uncertainty, recurrence, and level of specific investment are low). Such public intervention effectively transfers the organization of transactions into the market and private management, liberalizes market competition and induces private incentives

(and investments) in certain eco-activities. For instance, the tradable permits (quotas) are used to control the overall use of certain resources or level of a particular type of pollution. They give flexibility allowing farmers to trade permits and meet their own requirements according to their adjustment costs, specific conditions of production, etc. That form is efficient when a particular target must be met, and the progressive reduction is dictated through permits while trading allows the compliance to be achieved at least costs (through a private management). Tradable rights could be also used a market for environmental quality to develop. The later let private agents to realize new eco-strategy purchasing permits from market and taking them out of market turnover and utilization. In that way environmental quality could be practically raised above initially "planned" (by Government) level, and would not have been achieved without these additional private eco-initiatives.

In other instances, it would be more efficient to put in place regulations for trade and utilization of resources, products and services - e.g. standards for labor safety, product quality, environmental performance, animal welfare; norms for using natural resources, introduction of foreign species and GM crops, and (water, soil, air, comfort) contamination; a ban on application of certain chemicals or technologies; regulations for trading ecosystem service protection; foreign trade regimes; mandatory eco-training and licensing of farm operators, etc. The large body of environmental regulations in the European Union and other developed countries aim changing farmer's behavior, and directing toward new strategies, which restrict the negative impact on environment. It makes producers responsible for the "environmental effects" (externalities) of their products or the management of products uses (e.g. waste).

New property rights	Public regulations	Public taxation	Public assistance and	Public provision
and enforcement			support	
Rights for clean, beauti-	Regulations for organic farming; Regula-	Tax rebates, excep-	Recommenda-	Research, extension;
ful environment, biodi-	tions for trading of protection of ecosys-	tion, breaks;	tion, information, dem-	Market information;
versity;	tem services;	Eco-taxation on	onstration;	Agro-meteorological
Private rights on natural,	Quotas for emissions and use of prod-	emissions, products;	Direct payments, grants	forecasts;
biological, and environ-	ucts, resources;	Levies on manure	for eco-actions of farms,	Sanitary and veteri-
mental resources;	Regulations for introduction of foreign	surplus;	businesses, communi-	nary control, vaccina-
Private rights for (non)	species, GM crops;	Levies on farming or	ties;	tion, prevention
profit management of	Bans for certain activity, use of inputs,	export for innovation	Preferential credit;	measures;
natural	technologies;	funding;	Public eco-contracts;	Public agency (com-
Tradable quotas (per-	Norms for nutrition and pest manage-	Waste tax	Government purchases	pany) for important
mits) for polluting;	ment; Regulations for water protection		(water, other limited	ecosystems;
Private rights on intel-	against nitrates pollution; Regulations		resources); Price, farm	Pertaining "precaution
lectual property, origins,	for biodiversity, landscape management;		support for organic	principle";
(protecting) ecosystem	Licensing for water or agro-system use;		production, special	Eco-monitoring;
services;	Quality, food safely standards; Stan-		origins;	Eco-foresight;
Rights to issue eco-	dards for good farming practices; Man-		Funding eco-training;	Risk assessment
bonds, shares;	datory eco-training; Certifications, li-		Assistance in farm, eco-	
Private liability for polluting	censing; Compulsory eco-labeling;		associations; Collecting	
	Designating environmental vulnerable,		fees for paying ecosys-	
	reserve zones; Set-aside measures;		tem service contributors	
	Inspections, fines, ceasing activities			

 Table 1. Effective modes for public intervention in environmental management in agriculture

This mode is effective when a general improvement of the performance is desired but it is not possible to dictate what changes (in activities, technologies) is appropriate for a wide range of operators and environmental conditions (a high uncertainty and information asymmetry). When the level of hazard is very high, the outcome is certain and the control is easy, and no flexibility exists (for timing or the nature of socially required result), then the bans or strict limits are the best solution. However, the regulations impose uniform standards for all regardless of the costs for compliance (adjustment) and give no incentives to overperform beyond a certain (regulated) level.

In other instances, using the incentives and the restrictions of tax system would be the most effective form for public intervention. Different sorts of tax preferences (exception, breaks, credits) are widely used to create favorable conditions for certain (sub)sectors and regions, forms of agrarian organization, or specific types of activities. The environmental taxation on emissions or products (inputs or outputs of production) is also applied to reduce the use of harmful substances. Eco-taxes impose the same conditions for all farmers using a particular input and give signals to take into account the "environmental costs" inflicted on the society as a whole (or big communities of affected individuals). Taxing is effective when there is a close link between the activity and the environmental impact, and when there is no immediate need to control the pollution or to meet the targets for reduction. However, an "appropriate" level of the charge is required to stimulate a desirable change in farmers' behavior. Furthermore, some emissions (e.g. nitrogen) vary according to the conditions of application (fertilization with N) and attempting to reflect this in the tax system often results in complexity and high administrating costs.

In some cases, a public assistance and support to private organizations is the best mode for intervention. The public financial support for environmental actions is the most commonly used instrument for improving the environment performance of farmers. It is easy to find an economic justification for the public payments as a compensation for the provision of an "environmental service" by farmers. However, the share of farms participating in various agri-environmental support schemes (in EU, Japan, USA etc.) has not been significant. That is a result of voluntary (self-selection) character of this mode, which does not attract farmers with the highest environment enhancement costs (the most intensive and damaging environment producers). In some countries the low-rate of farmers' compliance with the environmental contracts is a serious problem¹⁴. The later cannot be solved by augmented administrative control (enormous enforcement costs) or introducing a bigger penalty (politically and juridical intolerable measure). Principally, it is estimated that the agri-environmental payments are efficient in maintaining the current level of environmental capital but less successful in enhancing the environmental quality. Another disadvantage of "payment system" is that once introduced it is practically difficult ("politically unacceptable") to be stopped when goals are achieved or there are funding difficulties. Moreover, withdraw of subsidies may lead to further environmental harm since it would induce the adverse actions (intensification, return to conventional farming strategies). Other critics of subsidies are associated with their "distortion effect", negative impact on "entry-exit decisions" from polluting industry. unfair advantages to certain sectors in the country or industries in other countries, not considering the total costs (such as transportation and environmental costs, "displacement effect" in other countries).

Often providing public *information, recommendations, training* and *education* to farmers, rural agents, and consumers are the most efficient form since they improve their capability and strategies. In some cases, a *pure public organization* (in-house production, public provision, etc.) will be the most effective one as it is in the case of important agro-ecosystems and national parks; agrarian research, education and extension; agro-meteorological forecasts; border sanitary and veterinary control, interventions by

¹⁴ 40% of French farmers experience problems implementing public eco-contracts [Dupraz *et al.*].

international organizations, etc.Usually, the effective implementation of a long-term environmental conservation strategy requites combined public intervention (a governance mix). The necessity of multiple public intervention is caused by the fact that: different natural resources and diverse challenges associated with them need different instruments and form of public intervention; individual modes are effective if they are applied alone with other modes; frequently the combined effect is higher that sum of individual effects; the complementarities (joint effect) of individual forms; restricted potential of some less expensive forms to achieve a certain (but not the entire) level of socially preferred outcome; possibility to get an extra benefits (e.g. "cross-compliance" requirement for participation in public programs); particularity of problems to be tackled; specific critical dimensions of managed activity; uncertainty (little knowledge, experience) associated with the likely impact of new forms; needs for "precaution"; practical capability of the State to organize (administrative potential to control, implement) and fund (direct budget resources and/or international assistance) different modes; and dominating (right, left) policy doctrine.

Besides, the level of an effective public intervention (management) depends on the scale of ecosystem and the type of eco-problem. There are public involvements, which are to be executed at local (farm, agro-ecosystem, community, regional) level, while others require nationwide management. There are also activities, which are to be initiated and coordinated at international (regional, European, worldwide) level due to the strong necessity for trans-border actions (needs for a cooperation in natural resources and environment management, for exploration of economies of scale/scale, for prevention of ecosystem disturbances, for governing of spill-overs, etc.) or consistent (national, local) government failures. Often the effective governance of many challenges and risks of agroecosystems requite multilevel management with combined actions of different levels, and involving various agents, and different geographical and temporal scale. The public (regulatory, inspecting, provision etc.) modes must have built special mechanisms for increasing competency (decrease bounded rationality and powerlessness) of the bureaucrats, beneficiaries, interests groups and public at large as well as restricting the possible opportunism (opportunity for cheating, interlinking, abuse of power, corruption) of public officers and other stakeholders. That could be made by training, introducing new monitoring, assessment and communication technologies, increasing transparency (e.g. independent assessment and audit), and involving experts, beneficiaries, and interests groups in management of public modes at all levels. Furthermore, applying "market like" mechanisms (competition, auctions) in public projects design, selection and implementation would significantly increase the incentives and decrease the overall costs. Principally, a "pure" public organization should be used as a last resort when all other modes do not work effectively [Williamson]. "In-house" public organization has higher (direct and indirect) costs for setting up, running, controlling, reorganization, and liquidation. What is more, unlike market and private forms there is not automatic mechanism (competition) for sorting out the less effective modes¹⁵. Here a public "decision making" is required which is associated with high costs and time, and it is often influenced by strong private interests (power of lobbying groups, policy makers and their associates, employed bureaucrats) rather than the efficiency. What is

¹⁵ It is not rare to see highly inefficient but still "sustainable" public organizations around the world.

more, widespread *"inefficiency by design"* of public modes is practiced to secure (rent-taking) positions of certain interest groups, stakeholders, bureaucrats, etc. Along with the development of general *institutional environment* ("The Rule of Law", transparency) and the monitoring, measurement, communication, etc. *technologies*, the efficiency of pro-market modes (regulation, information, recommendation, etc.) and contract forms would get bigger advantages over the internal less flexible public arrangements.

Usually hybrid modes (public-private partnership) are much more efficient than the pure public forms given coordination, incentives, and control advantages. In majority of cases, involvement of farmers, farmers organizations and other beneficiaries increases efficiency - decreases asymmetry of information, restricts opportunisms, increases incentives for private costs-sharing, and reduces management costs [Bachev, 2004]. For instance, a hybrid mode would be appropriate for carrying out the supply of preservation of environment, biodiversity, landscape, historical and cultural heritages, etc. That is determined by the farmers information superiority, the strong interlinks of activity with the traditional food production (economy of scope), the high assets specificity to the farm (farmers competence, high cite-specificity of investments to the farm and land), and the spatial interdependency (needs for cooperation of farmers at a regional or wider scale), and not less important – the farm's origin of negative externalities. Furthermore, enforcement of most labor, animal welfare, biodiversity, etc. standards is often very difficult or impossible at all. In all these cases, stimulating and supporting (assisting, training, funding) private voluntary actions are much more effective then the mandatory public modes in terms of incentive, coordination, enforcement, and disputing costs.

If there is a strong need for a third-party public involvement but an effective (government, local authority, international assistance) intervention is not introduced in a due time, then the agrarian "development" is substantially deformed. Consequently, all class of socially needed ecoactivities and investment are blocked, natural resources are degradated or pollutes in large scales, sustainability of farms structures in reduces, etc.

6. Assessing efficiency of eco-management

The "efficiency of agro-eco-management" represents the specific effectiveness of the analyzed form of management and/or the system as a whole in relations to the extent of realization of practically (technologically, socially, economically, etc.) possible eco-effects and the minimization of overall costs for eco-management. When the effects, costs and efficiency of individual components of ecomanagement is evaluated it is to be taken into account their different temporal scale, joitness, complementarity, special and temporal apartness, and the potential for development in the conditions of constantly changing socioeconomic and natural environment. In some cases, it is possible to determine the relation between the eco-action (costs) and the eco-effect in the space and time through measurement, statistical (factors) analysis or simulation models. For example, it is possible to determine with a high precision the correlation between the optimization of nitrogen fertilization in farms of a particular region and the decreasing the ground waters nitrogen pollution in the region; the relationship between farms involvement in the public agro-ecological measures and the restoration of biodiversity in participating farms; or the link between improved eco-behavior of farms and the preservation of the natural landscape in rural areas.

However, often it is extremely difficult (too expensive) or practically impossible to monitor, measure, and separate

the specific effect (costs) of the individual elements of the management or the entire system. For instance, it is impossible to determine (quantitatively) precisely the positive or the negative impact of the (Bulgarian, Thai, etc.) agriculture on the climate preservation and/or change. In these instances it is to be used a system of qualitative and quantitative indicators for characterization of:

• the state and the dynamics of eco-behavior and/or eco-intention of agents. For example, the following indicators could be used: extent of application of effective croprotation; introduction of good practices for chemical storing, fertilization, crop protection, irrigation and agro-technics; application of good agricultural and ecological practices; introduction of professional eco-codes and standards; transition to eco- or organic production; introduced and registered eco-products and services; amount of costs for environmental protection and restoration; amount and character of eco-investment (e.g. building of modern manure storage site, drop irrigation system, etc.); number and scope of signed private and/or public eco-contracts; membership in eco-cooperatives or associations; number of participants and the scope of public eco-contracts and agro-ecological payments; plans for sustainable land and water exploitation, landscape and biodiversity conservation, system for waste management, etc.

 the extent and the dynamics of the eco-pressure of agriculture. Following indicators are appropriate: type of farmland utilization, number and kind of livestock per ha, intensity of water use, quantity and balance of chemical fertilization and crop protection, total and per ha yields for agricultural products, nitrogen and pesticides emissions in waters, emissions of dust, harmful particles, odors, noise and greenhouses gasses, the system of utilization of farmland and farming (intensive, extensive, ecological), intensity of application of heavy machineries, type of utilization of livestock manure and biomass, amount and type of agricultural waste, number and scope of protected zones, etc.

• the impact on and/or state of the natural environment and its individual components. The following indicators can be employed: scale and scope of farmlands erosion, scale and scope of degradation (acidification, saltification, pollution, desertification, stuffing) of soils, extent of conservation of the natural landscape, scale and scope of air and waters pollution, number of endangered species, diversity of populations of wild animals and plants, number and size of zones with environmental problems, frequency and type of extreme climate phenomena (storms, rainfalls, flooding, droughts, hails, frosts, extreme hot and cold days, etc.).

According to the type and the goals of analysis some of (or similar) indicators could be used simultaneously for characterization of the eco-behavior, eco-pressure, ecostate and eco-impact of agriculture. For instance, the increased number of livestock on underutilized pasture or fertilization of exhausted farmlands could express decreased eco-pressure. Similarly, the implementation of good agricultural practices, transition to organic farming, or protected zones, all they could indicate both improved ecobehavior as well as diminished pressure on natural environment. The amount of emissions of chemicals, greenhouse gasses, bad odors and noise in agriculture could be used as indicators for pressure, state, emissions, etc.

In many cases, there is not enough information for some (or all) elements of the effects and/or costs, or it is impossible to determine the effective potential of certain forms and mechanisms. Then it is appropriate to apply quantitative analysis as well, which would reveal the specific incentives, costs, effects, obstacles, and capability for improvement of eco-behavior of the diverse participants in the process.

The specific indicators selected will depend on the level of analysis (farm, national, etc.), the type of analysis (particular form or instrument for eco-management, individual component of the natural environment, specific ecochallenges, integral, etc.), and the available (statistical, monitoring, experts, etc.) information in agricultural farms, in other agents of agro-eco-management (farmers and business organizations, Ministry of Agriculture, Ministry of Environment, etc.), and independent sources (Environment monitoring agency, research institutes, etc.). As a rule, for the current and short-term analysis (a year, planed period), at the lower levels of management (farm), and for a smaller number of participating agents (individual farm or group of farms) mostly indicators for the eco-behavior and ecopressure would be appropriate. For longer periods of analysis (programs, life-cycle of investment or products), at upper levels of management (sector, eco-system, national), and for a larger number of agents who are necessary for achieving a positive eco-effect, the indicators for eco-state and eco-impacts would be more suitable. Uncompleted list of commonly used indicators for assessing eco-behavior, pressure, state and impact is presented in Table 2.

The assessment of the *comparative* and the *absolute efficiency* of agro-eco-management is to be made. The first one assess the efficiency of a particular mode or the system as a whole in comparison to another feasible alternative form (system) or with the state before the introduction of the specific form/system of agro-eco-management. For instance, the assessment is made on the comparative efficiency (additional costs, additional farm and ecological effect) of organic farming in relation to the farms with the traditional technology or the state of farming before introduction of that eco-innovation; on private eco-contract in comparison with the participation in eco-cooperative; on public agro-eco-subsidies comparative to the introduction eco-taxes, etc.

Table 2. Indicators for Assessing Eco-behavior, Eco-pressure, Eco-state, Eco-impact

Eco-behavior	Eco-pressure	Eco-state	Eco-impact
Implementation of effective crop rotation;	Size and share of arable land;	Scale and size of water erosion	Agricultural impacts
Good practices for chemical storage;	Size and share of permanent crops;	of farmlands;	on:
Good practices for fertilization;	Size and share of grasslands and	Scale and size of wind erosion	 soil quality;
Good practices for crop protection;	pastures;	of farmlands;	 water quality;
Good practices for irrigation;	Size and share of abandoned land;	Scale and size of farmland	 air quality;
Good agri-technic practices;	Number and kind of livestock per	acidification ;	 – conservation of land-
Good agricultural and ecological practices;	farmland;	Scale and size of salinized	scape;
Professional eco-codes and standards;	Intensity of water use;	farmland;	 conservation and
Transition to eco or organic production;	Total and per farmland amount of	Scale and size of farmlands	recovery of biodiver-
Introduction of eco-products and ser-	N, K, and P fertilizers;	polluted with heavy metals etc.;	sity;
vices;	Balance of chemical fertilization;	Scale and size of farmland	 – climate changes;
Registered eco-products and services;	Total and per farmland amount of	desertification;	 quality of ecosystem
Expenditures for eco-protection;	chemical crop protection;	Scale and size of pressed	services
Expenditure for eco-restoration;	Crop output and yields;	farmlands;	
Eco-investment;	Water emission of N and poeticized;	Scale of conservation of natu-	
Modern manure storage;	Emissions of dust and pollutants;	ral landscape;	
Drop irrigation;	Emissions of odor;	Kind, size and scale of air	
Number and scale of private	Noise emissions;	pollution;	
eco-contracts;	Green-house gas emissions;	Kind, size and scale of ground	
Number and scale of public	Share of intensive land use and	water pollution;	
eco-contracts;	farming;	Kind, size and scale of sur-	
Eco-cooperation;	Share of extensive land use and	face water pollution;	
Number of participants and scale of	farming;	Kind, size and scale of drink-	
public eco-contracts;	Share of ecological land use and	ing water pollution;	
Number of participants and scale of agri-	farming;	Number of endangered wild	
environmental payments;	Intensity of heavy machineries;	habitats;	
Plans for sustainable land management;	Amount and share of manure use;	Diversity of wild habitat popu-	
Plans for sustainable water management;	Amount and share of biomass use;	lations;	
Plans for sustainable landscape	Amount and kind of agricultural	Number and scale of zones	
management;	wastes;	with eco-problems;	
Plans for biodiversity protection;	Number and scale of protected	Frequency and type of ex-	
Systems for waste management	zones	treme climate (storms, floods,	
		droughts, hails, freezes etc.)	

At the management decision stage, the analysis of comparative efficiency is a mean for selecting the mostefficient option of eco-management (behavior, investment, cooperation, benefits) between institutionally, financially, and technologically possible alternative forms. Therefore, they are tools for increasing the absolute efficiency of the agro-eco-management. At the project implementation stage, these estimates express the comparative advantages (or disadvantages) of the chosen form for agro-ecomanagement in relation to the feasible alternatives.

The absolute efficiency assesses the overall effectiveness of a particular form or the entire system in relation to the achievements of standards for environmentally friendly and sustainable agriculture. Here as criterion for assessing the effect is used: the contemporary scientifically recommended ecological norms and standards for behavior, pressure, emission, acceptable pollution, balance of fertilization, state of soils, waters, biodiversity, landscape, etc. For instance, achieving the norms for ecologically efficient fertilization and restoration of soil fertility, efficient number of livestock per ha pasture land, limits for minimum pollution of waters for drinking and irrigation; standards for balance of wild species in agro-eco-systems, for storage of manure and other agrarian waste, etc.

 or the planned socio-economic (farm, ecological, etc.) objectives or standards in the program for agro-ecomanagement. For instance, transition and certification for the organic and eco-production, number of farms and amount of farmland included in the public measures for agro-ecology; extent of realization of the plan for restoration of polluted waters and soils, for recycling of wastes, etc.

The criterion for assessment of the costs is weather it is possible to achieve the same goals with less overall costs or it is possible to achieve a higher (ecological, other positive) effect with the same costs.

The evaluation of the sustainability of eco-management for a farm is also made though analysis of the absolute efficiency. For example, the absolute efficiency of public, private or market eco-contract for a particular farm is to be estimated through the additional income from the agroecological subsidy, contract cash flow, and/or increased prices of eco-product/service, in relation with the costs for management and implementation of eco-contract terms (including missed benefits from the decreased yields and productivity as a result of transition to the eco-production). The existence of a net benefit (profit) means that the ecoactivity is economically efficient for the farm¹⁶. The benefits for a particular farm are to be searched in other directions as well. For instance, the improved system of ecomanagement leads to conservation of natural resources employed in the farm, preserved or improved farm productivity in a longer-term, avoided future costs for compensation of decreased productivity and/or for the restoration of quality of natural resources, preserved or increase value of natural assets of the farm, etc.

At lower levels of analysis (farm, industry) the direct (internal farm, program) and indirect (external and social) eco-costs and effects are to be distinguished. At higher levels of analysis (most) costs and effects are "internal". In any case, all (positive, negative, interlinked) effects and the overall social costs associated with individual forms of ecomanagement are to be taken into account.

The assessment of costs for eco-management is to include:

• *purely "production" costs and investment* for ecofriendly agriculture, which are associated with the technology of conservation, improvement and restoration of natural environment; and

• the transaction costs, which are associated with the management of relations with other agents – costs of labor, and payments for acquiring information, negotiation, organizational development, registration and protection of ecorights and products, controlling opportunism, conflicts resolution, adaptation to market and institutional environment, etc.

For instance, in assessment of the public form the overall costs is to be included which usually comprise: direct (tax payer, assistance agency) expenses, and transacting costs of bureaucracy (for coordination, stimulation, control of opportunisms and mismanagement), and costs for individuals' participation and usage of public modes (adaptation, information, paper works, payments of fees, bribes), and costs for community control over and for reorganization of bureaucracy (modernization, liquidation), and (opportunity) costs of public inaction. A part of the transaction costs could be determined directly, since they are object of a separate (including accountancy) reporting or could be easily specified from the traditional (production, program) costs. Examples for these type are costs for licensing, certifications, tests, purchase of information, registration, hiring consultants, payments for guards and lawyers, lawsuits, bribes, etc. However, another (significant) part of the transaction costs is impossible or very expensive to be separated or determined. Here already pre-

¹⁶ Often complicate calculations (comparing current and long-term effects, "discounting") similar to long-term investment are needed.

sented *Comparative structural (qualitative) analysis* is to be employed which will determine whether the eco-activities and transactions with specific dimensions (frequency, uncertainty, assets specificity, and appropriability) are governed/organized with the most effective mode(s). The effective are structures, which minimize the transaction costs and maximize the transaction costs of the participants in the specific socio-economic, institutional, technological and natural environment [Bache, 2004].

When the aggregation and/or the comparison of data for effects and costs are made it is necessary to correct differences, which are associated with the application of unequal methods of calculation and/or dissimilar precisions in different farms, public agencies and periods of time. The adequate assessment of efficiency often requires collection of first hand microeconomic, ecological, etc. data from different levels and participants in agro-eco-management as well. For this purpose, it is to be organized interviews with managers and stakeholders, laboratory tests, scientific experiments, etc. Very often, it is also necessary to use experts' assessments of leading specialists in the area. The selection of the type and the importance of the criterion and indicators for the analysis and assessment of efficiency of the agro-eco-management at different levels are to be done by the experts in the field.

7. Stages in analysis of environmental management and strategies

The analysis and the improvement of agro-ecomanagement and strategies is to include following stages: First, assessment of the specific management needs of conservation of natural environment utilized and/or affected by agriculture. The later depends on the particular characteristics of diverse natural resources and ecosystems they are part of, and the number, interests and strategies of related agents. For instance, persistence of serious ecoproblems and risks is an indicator that an effective system of eco-management is not put in place. Therefore, trends, factors, problems, and risks associated with the natural environment and its individual elements (land, water, air, biodiversity, eco-systems, climate, etc.) are to be identified. Modern science offers guite precise methods to assess the state of environment, and detect existing, emerging and likely challenges - environmental changes, degradations, destructions and depletion of natural resources, eco-risks, etc. [MEA; Bachev, 2013c]. What is more, science offers reliable instruments to estimate agricultural contribution to and impact on the state ("health") of environment and its different components, including in different spatial and temporal scales. For instance, there are widespread applications of numerous eco-indicators for pressure, state, respond, and impact as well as for integral assessment of agrarian environmental sustainability [FAO, 2010a]. The lack of serious eco-problems, conflicts and risks is an indicator that there is an effective system for ecomanagement, and therefore there is no need for changing public strategy for environmental conservation. However, usually there are significant or growing environmental problems and risks associated with the agriculture in developed and developing countries alike.

Second, assessment is to be made on the efficiency and the potential of *available* and *other feasible* modes and mechanisms of management for environmental conservation, and for overcoming the existing, emerging and likely eco-problems and risks associated with agriculture. The analysis is to embrace the system of agro-ecomanagement and its individual components – *institutional environment* and *various* (formal, informal, market, private, contract, internal, individual, collective, public, specialized, multifunctional, simple, complex, etc.) *forms* for governing eco-activities of agrarian agents (farms of different type). In fact, most analyses are restricted to a certain form (formal, farm, cooperative, public program) ignoring other important, dependent, or complementary modes.

The efficiency of individual modes are to be evaluated in terms of their strategies and (comparative) potential to safeguard and develop agents eco-rights and investments, stimulate socially desirable level of environment protection behavior and activity, rapid detection of eco-problems and risks, cooperation and reconciliation of eco-conflicts, and to save and recover total environmental (conservation, recovery, enhancement, transaction, direct, indirect, private, public etc.) costs. Furthermore, the efficiency of individual forms cannot be fully understood without analyzing the complementarities and/or contradictions between different forms and strategies - e.g. the high complementarities between (some) private, market and public forms for ecomanagement; conflicts between the "gray" and "light" sector of agriculture and natural resources exploitation, etc. Most assessments include only direct, production (ecorecovery, eco-maintenance, eco-enhancement), or program (international assistance, taxpayer) costs. The analysis is to include all (social) costs associated with different forms of eco-management - private, third party, public, current, long-term, production, transaction, etc. In addition to the proper individual and third-party production (technological, agronomic, ecological etc.) costs, the ecomanagement is usually associated with significant transaction (governance) costs.

The efficiency checks are to be performed periodically even when the system of agro-eco-management seems "works well". That is because the good conservation of natural resources could be done at excessive social costs or further improvement of the environment may be done at the same social costs. In both cases there is an alternative more efficient organization of agro-eco-management, which is to be introduced. For instance, often the too expensive for the taxpayer "state eco-management" (in terms of incentives, total costs, adaptation and investment potential) could be replaces with more effective private, market or hybrid mode (public-private partnership). Besides, the assessments are usually limited to the absolute efficiency of individual forms of eco-management (related costs, environmental effects) ignoring their comparative efficiencies. The analysis is to incorporate both absolute and comparative (in relation to other feasible modes) efficiency of the diverse management modes. The comprehensive analysis let determine the deficiencies ("failures") in dominating market, private, and public modes to manage effectively existing, emerging and likely eco-problems and risks, and specify the needs for (new) public intervention in agrarian eco-management. They could be associated with the impossibility for achieving socially desirable and practically possible environmental goals, significant transaction difficulties (costs) of participating agents, inefficient utilization of public money and resources, etc.

Third, the alternative and practically possible modes for new public intervention able to correct (market, private and public) failures are to be identified, their comparative efficiency and complementarities assessed, and the most efficient one(s) selected. Only technically, economically, and politically feasible modes of new public intervention in the environmental management are to be specified. Their comparative (goal achieving, coordinating, stimulating, costs-minimizing, etc.) efficiency to and complementarities with other practically possible modes of public involvement (assistance, public-private partnership, property rights modernization, etc.) is to be assessed, and the best one(s) introduced. The public modes not only support (market *and* private) transaction, but are also associated with significant (public *and* private) costs. Therefore, the assessment is to comprise *all* costs for implementation *and* transaction – direct (tax payer, assistance agency) expenses, *and* transacting costs of bureaucracy (for coordination, stimulation, control of opportunisms and mismanagement), *and* costs for individuals' participation and usage of public modes (adaptation, information, paper works, payments of fees, bribes), *and* costs for community control over and for reorganization of bureaucracy (modernization, liquidation), *and* (opportunity) costs of public inaction¹⁷.

Suggested analysis is to be made at different levels (farm, eco-system, regional, sectors, national, international) according to the type of eco-challenge and the scale of collective actions necessary to mitigate specific ecoproblems and risks for each component of the natural environment (soils waters, air, etc.) and integrally for the natural environment as a whole. It is not one time exercise completing in the last stage with a perfect system of ecomanagement. It is rather a permanent process, which is to improve eco-management along with the evolution of natural environment, individual and communities (social) awareness and preferences, and the modernization of technologies and institutional environment. Besides, the public (local, national, international) failure is also possible (and often prevail) which brings us into the next cycle in the improvement of eco-management in agriculture.

The comparative institutional analysis let define the efficiency and the potential of divers mechanisms and modes of management to deal with diverse problems and risks associated with the natural environment. Moreover, it let improve the *design* of the new forms of public intervention according to the specific market, institutional and natural environment of a particular farms, eco-system, region, subsector, country, and in terms of the perfection of coordination, adaptation, information, stimulation, restriction of opportunism, controlling (in short - minimizing transaction costs) of participating actors (decision-makers, implementers, beneficiaries, other stakeholders). What is more, that analysis unable us to predict likely cases of a new public (local, national, international) failures due to impossibility to mobilize sufficient political support and necessary resources and/or ineffective implementation of otherwise "good" policies in the specific socio-economic environment of a particular country, region, sub-sector etc. Since public failure is a *feasible option* its timely detection permits foreseeing the persistence or rising of certain environmental problems, and informing (local, international) community about associated risks.

Conclusion. Suggested new interdisciplinary framework would let better understand, assess and improve the eco-management and strategies in the specific market, institutional and natural environment of the individual agents, ecosystems, regions, sub-sectors and countries. However it would require a significant chance in the "traditional" economics logic and widespread practices as well as collection of a new kind of (microeconomics) data.

Giving more public support to multidisciplinary and interdisciplinary research on all aspects and impacts of the

¹⁷ Some of the *environmental losses* are expressed in economic terms (decline in income, replacement and recovery costs, effects on human welfare). Significant part of social value cannot – impact in biodiversity, ecosystems, human health, future generations etc.

eco-management, including factors and forms of ecomanagement, and their impact on individual and collective eco-behavior and environmental preservation would significantly contribute to the resolution of that problem.

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ПРО ФОРМИ, ЕФЕКТИВНІСТЬ ТА ОЦІНКУ ЕКОЛОГІЧНОГО МЕНЕДЖМЕНТУ

Ми пропонуємо цілісну систему для аналізу, оцінки і поліпшення екологічного менеджменту, використовуючи "аграрний сектор" як приклад. Вона включає в себе міждисциплінарний підхід (економіка, організація, право, соціологія, екологія, технологія, поведінкові та політичні науки) і включає в себе: уточнення управлінських суб'єктів, потреб і спектра регулюючих режимів (інституційного середовища, приватних, колективних, ринкових, громадських режимів) на різних рівнях прийняття рішень (індивідуальних, ферми, екосистеми, на місцевому, регіональному, національному, транснаціональному, глобальному); Специфікація критичних соціальноекономічних, природних, технологічних, поведінкових і т.д. факторів управлінського вибору, і можливий спектр управлінських форм; визначення та оцінки порівняльної й абсолютної ефективності форм екологічного менеджменту та системи; вдосконалення форм державного втручання в еко-менеджмент.

Ключові слова. екологічний менеджмент; сільське господарство; механізми і форми управління; показники еко-домоуправління.

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О ФОРМАХ, ЭФФЕКТИВНОСТИ И ОЦЕНКЕ ЭКОЛОГИЧЕСКОГО МЕНЕДЖМЕНТА

Мы предлагаем целостную систему для анализа, оценки и улучшения экологического менеджмента, используя "аграрный сектор" в качестве примера. Она включает в себя междисциплинарный подход (экономика, организация, право, социология, экология, технология, поведенческие и политические науки) и включает в себя: уточнение управленческих субъектов, потребностей и спектра регулирующих режимов (институциональной среды, частных, коллективных, рыночных, общественных режимов) на различных уровнях принятия решений (индивидуальных, фермы, эко-системы, на местном, региональном, национальном, транснациональном, глобальном); Спецификация критических социально-экономических, природных, технологических, поведенческих и т.д. факторов управленческого выбора, и возможный спектр управленческих форм; определения и оценки сравнительной и абсолютной эффективности форм экологического менеджмента и системы; совершенствование форм государственного вмешательства в эко-менеджмент.

Ключевые слова. экологический менеджмент; сельское хозяйство; механизмы и формы управления; показатели экодомоуправления. Bulletin of Taras Shevchenko National University of Kyiv. Economics, 2015; 1(166): 31-39 UDC 336.748.4 JEL E42; E52; E58 DOI: dx.doi.org/ 10.17721/1728-2667.2015/166-1/3

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TRANSITION TO INFLATION TARGETING IN UKRAINE: NEW TOOLS FOR MONETARY POLICY

Positive experience of inflation targeting in many countries influenced the decision to implement this framework in Ukraine. Authors consider the appropriateness of retaining inflation target under conditions of deteriorating currency market. Uncertainty of forecasts is aggravated by fragile impact of monetary policy on Ukrainian economy in conditions of growing nonlinearity of macroeconomic processes. The authors suggest the possibility of using two channels of transmission mechanism, namely, exchange rate and interest rate, and recommend additional tools to specify targets of monetary policy for the National Bank of Ukraine.

Keywords: central banks; inflation targeting; monetary policy, monetary conditions index, monetary instruments.

INTRODUCTION. Inflation targeting regime traditionally is regarded as the most effective in transition and emerging economies. It is well-known that a common feature in the inflation targeting regime is the target inflation rates which are managed on the basis of the usage of changes in interest rates and other monetary instruments.

It is envisaged that Ukraine should transit to inflation targeting in the second half of 2015. Given this, the question is whether there are necessary preconditions for the implementation of this framework in Ukraine, where national financial system is weak in terms of powerful geopolitical challenges, devaluation effects, industrial output decline and worsening structural imbalances. How in these conditions to ensure the orderly and systematic use of monetary instruments for the maintenance of inflation target, taking into account the imbalance of Ukrainian money market and possible external and internal shocks?

In the study of characteristics of transition to inflation targeting in Ukraine, we have taken into account the effect of several adverse factors, which include the following:

• increase in external debt of Ukraine against the background of decline in international reserves, due to the monetary policy of the National Bank, aimed at keeping fixed exchange rate of national currency recent years;

 increase in refinancing commercial banks to maintain liquidity of banking system;

• rapid increase in private debt of Ukraine in foreign currency due to difference in borrowing rates on domestic and foreign markets;

• lack of complementarity in the set of tools and methods in managing inflation, budget deficit and public debt sustainability. The National Bank of Ukraine (NBU) purchases significant amounts of government debt securities in the secondary market (such as debt securities placed by the Government in the share capital of recapitalized banks, and 'Naftogaz Ukraine' Corporation). NBU officials called this phenomenon "quasi-monetization", while Government officials – "quasi-fiscal" operations;

 insufficient level of NBU operational independence on the choice of instruments to achieve policy targets; inability to fully abandon the principle of fiscal dominance subject to government borrowing and due to underdeveloped domestic financial market in terms of capability to absorb additional volumes of government securities issuances;

• opacity of the financial market in Ukraine which is not effectively perform the functions to redistribute financial resources in the national economy. Thus, in terms of access to finance, Ukraine during 2009-2012 dropped from 45 to 56 position among 62 countries, according to estimates by Davos Economic Forum (World Economic Forum: The Financial Development Report, 2009, 2010, 2011, 2012).

To date, Ukraine has no adequate model that would describe the mechanism of influence of interest rate channel on inflation expectations of market. The complexity of situation is explained by the nonlinearity of macroeconomic processes, when on one and the same regulatory measure the system may demonstrate totally disproportional and unexpected reaction depending on time and date and imbalances. This reinforces urgency of search for new appropriate tools of monetary policy operational structure and improving efficiency of transmission mechanism main channels.

Main attention of this article is paid, firstly, to evaluating impact of monetary and non-monetary factors on inflation; secondly, clarification of approaches to formation of central bank targets of monetary policy in terms of money market imbalances; and thirdly, definition of monetary instruments for the National Bank of Ukraine, which in deployment would more fully meets the transition period conditions.

Chapter 2 provides an overview of literature on inflation targeting in developing countries, and devoted to overcome problems of transition period. We developed a hypothesis about the necessity to identify "currency comfort" zone for countries with open economies. In Chapter 3 we describe an empirical analysis and proposed a formula for calculating the index of Ukrainian monetary conditions index for tools of inflation targeting in Ukraine I in view of money market imbalance. Chapter 4 includes conclusions.

An overview of literature. Experience of emerging economies shows positive effect of inflation targeting on macroeconomic indicators, while in advanced economies, the differences between countries with and without inflation targets are smaller according to economists Berg, Hallsten, Queijo von Heideken and Söderström (2013). Growing number of central banks use this framework, however, there are some differences in mechanisms of inflation targeting, which highlighted by Hammond (2012), Lyziak (2012), Mehrotra and Yetman (2014), Svensson (2013). This prompted us to consider peculiarities of inflation targeting mechanism for Ukraine.

Known that main elements of inflation targeting are strictly defined target for inflation, central bank independence, transparency and availability of appropriate accountability mechanisms, as described by Mishkin (2000), Truman (2003), Hammond (2012).

The introduction of inflation targeting in developing countries promotes decrease inflation, strengthening central bank real independence, transparency and credibility of monetary policy. It is interesting in this regard to mention Roger (2009), which shows results of inverse influence of inflation on the real rate of GDP. We performed comparative analysis of banking systems development in Ukraine with Poland and Hungary during the transition to full inflation targeting (Table 1). In particular, the development of Ukraine's banking system is comparable with banking system in Poland during transitional period, which was started in the country in 1998. However, it is advisable to pay attention to high level of financial dollarization of Ukrainian economy: total amount of loans and deposits in foreign currency explicitly exceeds analog indicator in banking systems of Hungary and Poland's during transition to targeting inflation.

 Table 1. Some indicators of banking systems development in Poland, Hungary and Ukraine before the introduction of inflation targeting, %

Indicator		The three-year period before the						Ukraine		
		introduction of inflation targeting								
		Poland			Hungary					
	1996	1997	1998	1999	2000	2001	2011	2012	2013	
Banking sector assets to GDP	80.6	77.49	92.98	67.09	67.0	66.35	94.39	88.62	99.92	
Gross loans to GDP	53.78	54.62	66.13	43.06	45.81	42.81	65.82	58.83	65.11	
Volume of central bank lending to the Government / Budget deficit	16.69	19.6	11.63	71.7	68.6	34.08	13.47	5.69	4.58	
Share of foreign currency loans in total loans	38.08	40.34	37.06	28.54	32.29	29.27	38.24	35.65	33.47	
Share of foreign currency deposits in total deposits	20.92	20.72	17.48	21.87	23.29	22.09	42.97	44.04	38.37	
Volume of international reserves to external debt	21.76	20.69	27.63	37.32	43.38	38.84	58.1	35.1	26.4	
Central bank discount rate	22.0	24.5	18.25	16.0	13.25	11.0	7.75	7.5	7.5	
Growth rate of Central Bank refinancing to commercial banks	5.38	13.74	-7.75	-29.02	-25.9	-50.05	458.5	238.4	-26.7	
Growth rate of Monetary aggregate M2	29.29	30.85	25.16	15.75	12.09	16.78	14.23	13.10	13.74	
Growth rate of open market operations with short-term govern- ment obligations	11.22	27.25	13.85	-8.27	-0.13	-52.6	49.69	55.08	-12.11	

Source: Calculated by the authors according to National Bank of Ukraine, National Bank of Poland, and the Hungarian National Bank data

Inflation targeting regime is characterized by greater influence of monetary policy on the economy, even in a crisis. This is evidenced by changes in indices of monetary policy in Ukraine and neighboring countries that use inflation targeting¹⁸. After introduction of inflation targeting regime in Poland (1998), Hungary (2001), Romania (2005), monetary policy in these countries was characterized as stable, and the index approached 1 even during the global crisis of 2008 (Fig. 1).



Fig. 1. Monetary conditions index of Ukraine and neighboring countries, which deployed inflation targeting in 1991-2013

Source: own calculations of authors

Unlike these countries, the Monetary condition index for Ukraine indicates fragile impact of monetary policy on national economy, and the most significant decline of this index was observed in crisis year 2008.

Therefore, the effectiveness of monetary policy in countries with inflation targeting compared with other countries, is undeniable. Nevertheless, Svensson (2007) emphasizes the importance of ensuring financial stability in inflation targeting. Key measures to ensure the proper level of consistency of monetary and fiscal policies for Ukrainian conditions were considered by Naumenkova and Mishchenko (2012). This is especially important in view of the fact that under co-regulation and setting inflation targets both by the government and central bank provides the least number of deviation in target indicator.

With the deterioration of foreign exchange market, central banks of countries with emerging markets, often find themselves faced with a choice: whether to maintain a fixed exchange rate and give up inflation targets, or to maintain inflation target, neglecting fixed exchange rate.

Covas and Zhang (2008) consider that the accuracy of achieving inflation targets is determined by exogenous

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¹⁸ Monetary conditions index consists of weighted average of nominal short-term and long-term interest rates and the nominal effective exchange rate. The index reaches its maximum value of "1", and calculated using formula exp[-0.05*(Inflation – 2%)²].

factors that are influenced by world prices of basic resources and in view of demand and supply in domestic market. Considering this, Mason et al. (1997) are quite cautious about efficiency of inflation targeting regime in developing countries. Wagner (1998) concluded that direct inflation targeting strategy in developing countries was ineffective, at the present stage of their development. More optimistic estimations on implementation of inflation targeting regime in transition economies are provided in study by Czech National Bank (Czech National Bank, 2000).

Our view coincides with findings from studies of Ball (1998), Faia and Monacelli (2008) on necessity to use by central bank targeting two main channels of transmission mechanism on transition to inflation, namely, foreign exchange and interest rate. In our opinion, in developing countries, to prevent economic shocks, the central bank should monitor the dynamics of exchange rates for possible smoothing fluctuations that can destabilize the economic situation.

This is confirmed by the study of Parrado (2004), which emphasizes the need to central bank adherence of free exchange rate policy in real economic shocks or managed float – under nominal shocks. This position is certainly justified for countries with open economies where real interest rate should be established, based on inflation rate and real exchange rate, as evidenced by the results obtained by Bousrih (2012).

Ghosh (2013), Petreski (2012), Odrïa et al. (2013), Beckmann et al. (2011) stress the need to control exchange rate with introduction of inflation targeting regime in developing countries. Pourroy (2013) also emphasizes the need for the specification of monetary policy flexibility exchange rates in developing countries, and importance of its perception not only as a tool, but as an intermediate target. Levy-Yeyati et al. (2013) made similar findings with regards to recognizing importance of currency channel in implementing inflation targeting regime in developing countries.

A review of scientific literature indicates the absence of common position in treatment of possible deployment of such tool as exchange rate, in implementation of inflation targeting. The reason for this is complexity of developing adequate macroeconomic models that incorporate simultaneous usage of interest rate and exchange rate.

However, the relevance of composing equilibrium market exchange rate is growing, as evidenced by appearance of publications dedicated to these issues. For instance, Blanchard (2012) advocates the need for FX interventions under inflation targeting. Jaromir et al. (2013) note the importance of foreign exchange intervention in medium horizon of inflation targeting. Noteworthy are results obtained by Canzoneri and Cumby (2014) with regards to significance of FX intervention impact on inflation and usage of interest rates as a monetary policy tool.

Inflation targeting regime implies that central bank's actions should be based on quantitative estimates of impact level on interest rates on inflation, which are the main tool for maintenance of inflation target. We believe that the National Bank of Ukraine should specify targets of monetary policy in terms of money market imbalance. In such circumstances the approach deserves attention that focuses on providing low volatility of exchange rate and maintains established inflation rate target that allows us to formulate a hypothesis about the need to establish as operating objective of monetary policy the monetary conditions index, which takes into account changes in interest and currency course.

Principles of composing index of monetary conditions and its implementation for the purpose to regulate monetary market were thoroughly addressed in scientific studies of Ericsson et al. (1998), Guender (2005), Osborne-Kinch and Holton (2001). Monetary conditions – is the combined effect of interest rate and exchange rate. This index was developed by the Bank of Canada in the late 1980s.

Monetary conditions index, which characterizes the state of money market can be used by National Bank of Ukraine over period of transition to inflation targeting. This index is widely deployed in practice by central banks of Canada, New Zealand, Norway, Sweden and many others.

Practical usage of Monetary Conditions Index will be characterized by constraints that are in peculiarities of connection between monetary conditions and monetary instruments as well as in possible changes in discount interest rate and exchange rate over time. Introduction of Monetary Conditions Index in domestic practice shall convince financial market participants that activity of the National Bank of Ukraine is focused on inflation targeting.

3. Empirical analysis

In our view, monetary condition index for Ukraine should be determined taking into account exchange rate and key interest rate. The need for consideration of exchange rate is determined by its importance in implementing monetary policy in countries with emerging markets. Percent component of the index is a tool of influence on the volumes of money through the level of refinancing rate. On the other hand, the interest rate will be informative Indicator liquidity of banking system. Thus, both components of proposed index are important for assessing impact on inflationary pressure.

In general terms, the index is represented by the equation (1):

$$MCI_{t} = A_{r}(r_{t} - r_{b}) + A_{s}(q_{t} - q_{b}),$$
(1)

where MCl_t – Monetary condition index on time t; A_r and A_s – shares of index components impact; r_t – short-term interest rate at time t; q_t – logarithm of exchange rate at time t; r_b and q_b – variables of interest rate and exchange rate in base period.

In academic literature we can identify common approaches to formation of the index, which provide assessing proportional influence of changes in exchange rate and interest rate to inflation, which together equal to "1", as well as calculation on the basis of weighted average change in short-term interest rates and exchange rate.

We conducted our empirical analysis on an annual basis since 2008, when Ukrainian economy was under stress of crisis. The data in Table 2 shows the overwhelming contribution of monetary factors in overall inflation in Ukraine until 2011. Dynamics of monetary base and exchange rate represent monetary factors influencing inflation. In 2013 the contribution of these factors significantly decreased and reached only 20%.

National Bank of Ukraine used monetary instruments that contributed to prevent losses from deflation. Some experts believe that range of inflation level for developed countries should be 1-3%, and for developing countries to be higher (Hammond, 2012). Nevertheless, only such inflation does not bother people and has advantages over the probable gain from inflation below 2%.

Table 2. Inflation in Ukraine, monetary and non-monetary factors in 2008-2013, %

	2008	2009	2010	2011	2012	2013
Inflation, December of reporting year to December of previous year	22.3	12.3	9.1	4.6	-0.2	0.5
Monetary factors	95.5	85.1	86.8	75.0	44.4	20.0
Non-monetary factors	45	14 9	13.2	25.0	55.6	80.0

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Source: author's calculations based on NBU data

The main instrument of keeping optimal inflation rate is the interest rate. At present in Ukraine due to the lack of reliable quantitative estimates of interest rate policy impact on inflation there is no composed model that adequately describes this causality.

Scientific papers devoted to interest rate channel of transmission mechanism in Ukraine, always pay attention to its lack of effectiveness, as well as restricted capabilities of Ukrainian central bank to influence inflation through the use of interest rate policy instruments (Mishchenko, Petryk, 2008).

Under these conditions, liquidity of banking system may be intermediate reference point to achieve main goal – keeping inflation range. National Bank of Ukraine, depending on the situation, can apply refinancing operations, repurchase operations with its own debt obligations, and operations with Ukrainian Government bonds to regulate liquidity. Unpredictable increase of liquidity in the market without appropriate action by regulator could trigger inflationary pressures in economy. Therefore, it is advisable, that National Bank of Ukraine could apply measures to regulate the proportion of mandatory reserves, as well as ordering bank requests for refinancing loans. The introduction of these mechanisms will allow the National Bank of Ukraine to form an additional buffer of liquidity for banking system and stimulate economic growth while respecting the established target inflation.

It is predicted, that in 2015 the Ukraine shall increase monetary base by 20% (National Bank of Ukraine, 2014). According to theory and practice of monetary circulation, growth of monetary base leads with corresponding lag to accelerate increase in commodity prices, which will definitely affect the rate of inflation. Graphically, the gap in time between increase in money supply and prices are not clearly traced, that is not relevant to exchange rate and prices (Fig. 2).



Fig. 2. Dynamics of Monetary aggregate M2, UAH/USD Exchange rate, and inflation rate in Ukraine, 2008-2014, %

Source: author's calculations based on NBU data

According to results of correlation analysis, we obtained evidence that monetary aggregate M2 had greatest impact on inflation with lag of 5 months (Table 3). Changes in exchange rates during studied period had immediate direct impact on inflation, where greatest manifestation of this factor was observed with a delay by 2-3 months.

In our opinion, monetary condition index for Ukraine should be determined taking into account exchange rate and interest rates. Exchange rate, as evidenced by the analysis, should be included in this indicator because of its importance as main instrument of National Bank of Ukraine monetary policy in recent years. Percent component of the index will be a tool to influence the money supply through refinancing rate level. Thus, both components of proposed index for Ukrainian realities, as well as for introduced world indices, are important from the standpoint of assessing impact on inflationary pressures.

Time lag, months	Monetary aggregate M2	Exchange rate		
1	0.015193767	0.336453		
2	0.077551424	0.436694		
3	0.064414422	0.420032		
4	-0.112429356	0.215889		
5	0.218961537	0.133253		
6	0.029273144	0.092024		
7	-0.193447522	-0.0135		
8	-0.023248937	-0.15474		
9	-0.035093624	-0.15474		
10	0.029484856	-0.05932		
11	-0.182897496	0.110366		
12	-0.029801281	0 204736		

Table 3. Correlation of monetary aggregate M2 and exchange rate with consumer price index in Ukraine, 2008-2013

Source: author's calculations based on NBU data

Thus, using the index of monetary conditions, we must firstly figure out approaches to inclusion of currency and interest components in calculation of the index.

First, regarding exchange rate component, we propose to use nominal weighted index of exchange rate of national currency (NWERI). This Indicator takes into account the nominal rate of hryvnia against currencies of countries that are major trade partners of Ukraine.

For base period of measuring NWERI in Ukraine we selected May 2008 as date of accession to the World Trade

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Organization, which was the beginning of process to ensure stable functioning of international trade system, liberalization and transparency of trade procedures.

Proceeding from trade turnover of Ukraine with countries around the world, we consider that nominal weighted

index of hryvnia should incorporate the following currencies: USD, EUR, Polish Zloty, the Belarusian ruble, the Russian ruble, Turkish lira, Chinese yuan, Kazakhstan Tenge (Table 4).

Table 4, input data for calculating nominal weighted mack of they that (CALL) exchange rate in 2000 2010 year

		Russia	USA	China	Kazakhstan	Belarus	Poland	Turkey	Euro-zone
008	Foreign trade turnover, US\$ million	35149.4	4757.4	6149.1	4951.4	4915.2	6618.6	6583.4	27468.9
	Export, US\$ million	15735.6	1949.2	547.6	1832.6	2105.6	2338.3	4633.3	10151.9
	Import, US\$ million	19414.2	2808.3	5601.6	3118.9	2809.7	4280.3	1950.1	17317.1
2	Exchange rate*, UAH	20.5	485.2	69.9	4.0	0.20	222.9	396.3	754.5
	Share in total foreign trade turnover	0.3639	0.0493	0.0637	0.0513	0.0509	0.0685	0.0686	0.2844
6	Foreign trade turnover, US\$ million	21730.9	1536.9	4168.7	3452.4	2951.8	3383.4	3078.8	15132.1
	Export, US\$ million	8495.1	250.7	1434.4	1418.5	1258.9	1213.1	2126.5	5631.3
8	Import, US\$ million	13235.8	1286.3	2734.3	2033.9	1692.9	2170.3	952.3	9500.8
2	Exchange rate*, UAH	20.6	784.2	114.8	5.8	0.30	269.6	515.1	1115.2
	Share in total foreign trade turnover	0.2553	0.0181	0.0489	0.0406	0.0347	0.0397	0.03616	0.1777
	Foreign trade turnover, US\$ million	35629.9	2578.9	6016.9	2066.8	4466.8	4576.1	4324.9	18781.6
0	Export, US\$ million	13431.9	812.2	1316.6	1300.6	1899.2	1787.2	3026.7	7482.6
0	Import, US\$ million	22198.1	1766.8	4700.4	766.2	2567.6	2788.8	1298.3	11299.1
2	Exchange rate*, UAH	20.6	797.3	118.8	5.3	0.20	272.1	520.1	1101.1
	Share in total foreign trade turnover	0.3177	0.0229	0.0537	0.0184	0.0399	0.0408	0.0386	0.1674
	Foreign trade turnover, US\$ million	48951.9	3704.9	8448.4	3533.5	6134.1	5977.5	5229.9	25660.5
011	Export, US\$ million	19819.6	1113.8	2180.1	1857.6	1922.4	2794.1	3748.6	10071.4
	Import, US\$ million	29132.2	2591.2	6268.3	1675.9	4211.8	3183.4	1481.3	15589.1
2	Exchange rate*, UAH	22.7	797.5	123.5	5.4	0.10	249.2	465.0	1043.5
	Share in total foreign trade turnover	0.3242	0.0246	0.0556	0.0234	0.0406	0.0396	0.0347	0.1699
	Foreign trade turnover, US\$ million	45050.1	3919.9	9676.8	3954.1	7319.7	6143.3	5636.9	25964.9
2	Export, US\$ million	17631.8	1014.7	1777.2	2459.2	2251.2	2576.2	3685.1	9959.8
0	Import, US\$ million	27418.3	2905.2	7899.7	1494.9	5068.6	3567.1	1951.9	16005.8
2	Exchange rate*, UAH	25.6	799.1	127.3	5.3	0.10	245.0	432.2	1041.7
	Share in total foreign trade turnover	0.2936	0.0256	0.0631	0.0258	0.0477	0.0401	0.0367	0.1692
3	Foreign trade turneyer LISC million	38299.3	3647.7	10627.	2803.1	5588.9	6616.5	5658.2	25746.8
	Export LISS million	15065 1	888.3	4 2726 7	2120 1	1083 7	2547.0	3805.5	0376.5
01	Import US\$ million	23234.2	2750 /	7000 8	683.1	3605.2	4068.7	1852.7	16370.3
2	Evolution Filmon	25254.2	700.3	120.0	5.2	0.08	262.08	1052.7	10370.3
	Sharo in total foreign trade turneyor	23.4	0.0260	0.0759	0.0100	0.00	202.00	400.3	0 1936
	Share in total loreign trade turnover	0.2731	0.0200	0.0756	0.0199	0.0399	0.0472	0.0404	0.1030

Note.

*for 100 national currency units

Source: author's calculations based on NBU data and information from State service on statistics of Ukraine

To calculate NWERI we propose the formula of average weighted geometric value of abovementioned indices. The weight of each exchange rate as part of NWERI index should be determined by proportion of country in foreign trade structure of Ukraine. Change of NWERI during 2009-2013 is shown in Fig. 3.



Fig. 3. Nominal weighted index of hryvnia exchange rate in 2009-2013, %

Source: composed by authors' calculations

The five-year observation testifies, that change of nominal weighted index of hryvnia exchange rate by 1% results changing consumer prices 0.125% (Table 5).

Table 5. D	vnamics of nominal wei	ahted UAH exchange	e rate index change	and consumer p	orice index in 2	2009-2013. %
	,	g	• • • • • • • • • • • • • • • • • • • •			

Indicator	2009	2010	2011	2012	2013	
NWERI	25.4	21.5	21.8	22.6	25.5	
CPI	112.3	109.1	104.6	99.8	100.5	

Source: author's calculations based on State service on statistics of Ukraine data

Second, we identified approaches to take account of interest rate component in calculating index of monetary conditions.

It should be noted that in Ukraine in implementing inflation targeting the NBU can more actively use interest rate band, setting restrictions on minimum and maximum shortterm interest rates, through which the central bank would change volume of monetary base, and provide or absorb liquidity in relevant volumes.

In Ukraine, interest rate band only just occurs. Since 2010, interest rate on overnight loans performs the role of maximum price of resources, available on interbank market, while interest rate for quantitative tender of NBU deposit certificates placement restricts lower level of money market rates fluctuations (Fig. 4).





Source: author's calculations based on NBU data

Using symmetric changes in the boundaries of interest rate band, the NBU has opportunity to conduct hard or soft monetary policy. According to data obtained (Fig. 4), we concluded that difference between maximum and minimum boundaries of the band is about 5%, but beginning of 2014 showed actual gap 9%. Certainly, such difference between rates of band is rather large for proper management of money market. In financially-stable countries, as experience shows, this gap should not exceed 2%. Moreover, with rather wide corridor of interest rates observed in Ukraine, domestic banks accumulate excess liquidity.

Mistakes in framing interest rate band with active absorption of excess liquidity by central bank could lead to 'interest arbitration' in view of interest of external market, and with active refinancing – to increasing credit risk in interbank market.

For this purpose we analyzed possible usage of interest rates (Fig. 4). Thus, repurchase rate is the most representative, but cannot be used in the mechanism of liquidity support to banking sector. It is caused by refusal of the National Bank of Ukraine from repurchase transactions in March 2014 and transfer to weekly refinancing tenders. We consider that calculation of the index should include rate on loans granted through NBU tenders. Subject to the central bank tender, banks could form independently this rate at which they agree to obtain facility. We believe that this rate is the most representative for deployment in monetary policy in Ukraine. This pattern can be used in the transition to inflation targeting until authorized bodies elaborate more effective interest rate policy levers. Thus, volume of bank liquidity and 'comfort zone' of exchange rate, which we determines, can serve as main instruments for achieving target indicator of inflation. Global experience shows in countries with inflation targeting further weakening relationship between exchange rate and inflation, which requires appropriate upgrade of approaches.

Further, in practical usage of monetary conditions index, it is expedient to determinate weights of each instrument (interest rate and exchange rate) to achieve expected results of its operating objectives.

Values of A_r and A_s in Equation (2) reflect relative impact of real interest rates and exchange rate on aggregate demand. Both parameters (interest rate and exchange rate) are important components in composing monetary conditions index for Ukrainian economy:

$$ukrMCI_{t} = (r_{t} - r_{b}) + \frac{A_{s}}{A_{r}} (q_{t} - q_{b}),$$
 (2)

Specific weights of exchange rate and interest rate impact on proposed index can be calculated based on regression equations of impact for these two indicators on aggregate demand in Ukraine. Our observations of 2008-2013 found that aggregate demand in Ukraine had large impact on changes in interest rates (Fig. 5).


Fig. 5. Changes in aggregate demand, interest rates on loans granted through tender and nominal weighted index UAH exchange rate in Ukraine in 2009-2013, %

Source: author's calculations based on NBU data

Results of estimating influence of interest rate and exchange rate on aggregate demand are represented by the following regression equations:

$$y = 65.36 \ q - 126.06 \ r + 145.36, \tag{3}$$

 $R^2 = 0.96$, F-*statistic* = 24.04, p-*value* = 0.04, where y – aggregated demand, UAH Billion.

In this way, we found that increase in aggregate demand is negatively related with interest rate and positively – with exchange rate. Analysis of variables in formula (3) shows that total value of aggregate demand in Ukraine would be based on 65% of impact of interest rate and 35% – exchange rate. Thus, changes in interest rates by 1% will cause such effect as change of exchange rate to 1.93%. In view of this: $A_s/A_r = 65.36/126.06 = 1/1.93 = 0.518$.

Therefore, above mentioned equation of monetary conditions index in Ukrainian context will be as follows:

$$ukrMCl_t = (IRCT - 6.5) + 0,518 (log_n NWERI - log_n 25.5857) * 100,$$
 (5)

where: $ukrMCl_t$ – Ukrainian monetary condition index at time *t*; *IRCT* – short-term lending through tenders; 6.5 – interest rate on loans through NBU tenders arranged in December 2013; NWERI – nominal weighted UAH exchange rate index; 25.5857 – value of nominal weighted UAH exchange rate index in December 2013; 0.518 – coefficient, which offsets the impact of exchange rate in case of changing interest rate.

4. Conclusions

The article lists factors that characterize the transition to inflation targeting in Ukraine. We identified, that contribution of monetary factors in overall inflation in Ukraine until 2011 was superior and reached 75-95% over 2008-2011. It seems expedient, that the National Bank of Ukraine would be able to use two channels of transmission mechanism, namely, interest rate and currency rate frameworks – for the period of transition to inflation targeting. Changes in exchange rate regime in 2008-2013 had immediate direct impact on inflation, where the greatest manifestation of impact was observed with a delay of 2-3 months. It is necessary to take account of exchange rate due to its importance in the implementation of monetary policy in emerging economies.

We concluded that for the Ukraine would be most appropriate to deploy approach that focuses on insuring low volatility of exchange rate and maintaining established target level of inflation. We clarified some approaches to consideration of interest rate and exchange rate components, and presented the calculation of Ukrainian monetary conditions index.

The article describes methodological approach to calculating index of monetary conditions for Ukraine, which incorporates both interest rate and exchange rate. We calculated specific components of this index, composed band of interest rates fluctuation, received data on upper and lower levels of Ukrainian money market rates volatility in 2008–2013. Based on data analysis, our findings are that since 2010 interest rate on overnight loans determined maximum cost of resources on interbank market, while interest rate on tender placement of NBU deposit certificates restricted lower level of money market rates fluctuations.

We designed the formula for calculating Ukrainian monetary conditions index (*ukrMCl*_t), which describes the state of money market and may be used by the National Bank of Ukraine under the transition to inflation targeting. Using this formula, we calculated that in 2013 change in interest rates by 1% had same effect as change in exchange rate at 1.93%, where in this period change in total value of aggregate demand by 65% was caused by influence of interest rates movements, and 35% – by exchange rate.

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ПЕРЕХІД ДО ІНФЛЯЦІЙНОГО ТАРГЕТУВАННЯ В УКРАЇНІ: НОВІ ІНСТРУМЕНТИ ДЛЯ МОНЕТАРНОЇ ПРАКТИКИ

У статті досліджено особливості переходу до інфляційного таргетування в Україні. Основну увагу приділено впорядкованому та системному використанню інструментів монетарної політики в умовах розбалансованості грошового ринку в Україні. Отримано висновки щодо необхідності уточнення цільових орієнтирів грошово-кредитної політики. Визначено "зону комфорту" валютного курсу при переході до таргету інфляції. Запропоновано формулу для обчислення українського індексу грошово-кредитних (ukrMCl_i) для посилення ефективності грошово-кредитної політики на етапі переходу до інфляційного таргетування в Україні. Ключові слова: центральні банки, таргетування інфляції, монетарна політика, індекс грошово-кредитних умов, монетарні інструменти.

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ПЕРЕХОД К ИНФЛЯЦИОННОМУ ТАРГЕТИРОВАНИЮ В УКРАИНЕ:

НОВЫЕ ИНСТРУМЕНТЫ ДЛЯ МОНЕТАРНОЙ ПРАКТИКИ

В статье исследованы особенности перехода к инфляционному таргетированию в Украине. Основное внимание уделено упорядоченному и системному использованию инструментов монетарной политики в условиях разбалансированности денежного рынка в Украине. Сделан вывод о необходимости уточнения целевых ориентиров денежно-кредитной политики. Определена "зона комфорта"

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валютного курса при переходе к таргетированию инфляции. Предложена формула для вычисления украинского индекса денежнокредитных условий (ukrMClt) для усиления эффективности денежно-кредитной политики на этапе перехода к инфляционному таргетированию в Украине.

Ключевые слова: центральные банки, таргетирование инфляции, монетарная политика, индекс денежно-кредитных условий, монетарные инструменты.

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LIFE CYCLE ASSESSMENT IN HEALTHCARE SYSTEM OPTIMIZATION. INTRODUCTION

Article describes the life cycle assessment method and introduces opportunities for method performance in healthcare system settings. LSA draws attention to careful use of resources, environmental, human and social responsibility. Modelling of environmental and technological inputs allows optimizing performance of the system. Various factors and parameters that may influence effectiveness of different sectors in healthcare system are detected. Performance optimization of detected parameters could lead to better system functioning, higher patient safety, economic sustainability and reduce resources consumption.

Keywords: life cycle assessment, holistic approach, healthcare management, social responsibility, modelling.

Introduction. The fast industrial development, active population growth, the extremely high level of consumption of resources with the following air, water, soil pollution induced increasing interest to new eco - friendly tools and technologies. In modern science so far so often a rising awareness paid to the concept of social responsibility, which means the obligation to act benefiting society at large and a duty for every individual to perform maintaining a balance between the economy and environment [4]. Forming the basis patterns for a modern science, researchers solved many problems of humanity. Nevertheless, it is necessary to emphasize that since Democritus' reductionist approach was ideologically preferred in the western science, much effort has been directed to the excessive value of details and analysing of processes from the point of view of their decomposition into constituent elements, parts, or small particles. It caused the underestimation of the interrelations and interdependence of system components and respectively led to the loss of understanding of the systems "holistically". Holism was an idea firstly introduced by Plato, later developed by anthropologists stated that all the properties of a given system could not be determined and explained by its component parts alone [5]. The different aspects of humanity were taken into account. There were the physical (biology) and cultural (archeology, linguistics), the cross-cultural, looking at what it meant to be human. Therefore, the system as a whole determined how the parts behaved. Thus, the holistic approach was the examination of all the aspects of humanity. According to Merriam-Webster dictionary – "Holistic means relating to or concerned with wholes or with complete systems rather than with the analysis of, treatment of, or dissection into parts. Hereby, holistic ecology views humans and the environment as a single system" [34]. In course of time the concept migrated to medicine and in 40's was actively popularized by the prominent public health leader Andrija Stampar. He wrote the introductory declaration of the Statute for just established World Health Organization and defined the health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" [6. p.697-708]. Inasmuch our fast developing society requires quick responses to problems and challenges, the modern managerial systems have to be not just well structured, that exactly facilitate the studying of main subjects, but also integral, fast performing, adaptable,

sustainable and with ability to be holistically analyzed. The reference frame should be structurally expanded with preservation of objectivity and scientifically reliable conclusions. Thus, through the application of new outstanding tools and technologies inside the boundaries of proposed enhanced framework appropriate new effective methods should been introduced. Among such numerous approaches of a complex analysis this article draws attention to the Life Cycle Assessment (LCA). While been scientifically proven it allows quantifying environmental damages caused by the lifecycle activity of a product. The method developed with purpose to achieve maximum guantification of entire life cycle of a product [7]. A comparatively short history of its emergence began with Harold Smith's report of a calculation of cumulative energy requirements for the production of chemical intermediates and products in 1960's [8]. In 70's the process of quantifying the use of resources and environmental releases of products became known as a Resource and Environmental Profile Analysis, as practiced mainly in the United States. In Europe, it was called an Eco balance. From 1975 through the early 1980's, as interest in these topics waned because of the fading influence of the oil crisis, environmental concerns shifted to issues of hazardous and household waste management. Through this period, sincere efforts to create a protocol or standard research methodology for conducting such works have been made. The multi - step methodology involves a number of assumptions. During these years, the assumptions and techniques used underwent considerable review by US Environmental Protection Agency and major industry representatives, with the result of evolving of the most reasonable methodologies. After years of development in connection with these events, first databases have been created. A broad range of practitioners and researchers across the globe have been further refining and expanding the methodology. The need to move beyond the inventory to impact assessment has brought LCA methodology to another point of evolution and from 1997 to 2002 led to the development of the LCA standards formalized by the International Standards Organization 14000 series [3]. In 2002, the United Nations Environment Programme joined forces with the Society of Environmental Toxicology and Chemistry to launch the Life Cycle Initiative, which now is a welknown international partnership on a subject [9]. The topics like raw materials extraction, energy demand, emission and waste disposal are still important and always in the focus of the integral balancing. New programs and databases aim at putting life cycle thinking into practice and at enhancing the supporting tools through better-acquired data and indicators. One of them is the U.S. Life Cycle Inventory Database that improves global access to transparent, high quality life cycle data by hosting and facilitating expert groups whose work results in web-based information systems [10]. Another one is the Life Cycle Impact Assessment program that increases the quality and global reach of life cycle indicators by promoting the exchange of views among experts, whose work results in a set of widely accepted recommendations [11]. The "Life cycle assessment – Principles and framework" standard was later reviewed and confirmed in 2010 [12]. **Methodology.** For purposes of the following issue and for further understanding of the proposed interpolation of the method to a healthcare system here presented the basic methodological concepts of the LCA. Thus, every product in its life cycle passes through different stages such as raw materials extraction, refinement, processing, manufacturing, distribution, use, recycling, waste disposal etc., and should be analyzed in a frame of reference known as "from cradle to grave" (Fig. 1). It means that certain product should be completely analyzed from the moment of its emergence in various systems ("cradle") to the end of a life cycle ("grave"), when the product is disposed [1, p.1-14; 2, p.15-34].



Fig. 1. Stages of a product life cycle

Source: "Éco Entreprises Québec"

Conceptualized goals of LCA conducting are: the quantification of the overall environmental impacts (e.g. releases to air, water, and land in relation to each life cycle stages) of a product; selection of the best product with the least harmful effect on human health and the environment; systematic evaluation of the environmental consequences associated with a given product; estimation of the environmental trade-offs associated with one or more specific products; categorization for a planned action; assistance in identifying significant shifts in environmental impacts between life cycle stages and environmental media; assessment of the human and ecological effects of material consumption and environmental releases to the local community; comparison of the health and ecological impacts between two or more rival products; identification of the impacts of a specific product, etc [3, 12, 13]. Due to the fact

at the initial stage of emergence LCA was to a greater extent used for products in industry, today it would be necessary to expand the understanding of the term "product". Such broader understanding gives the Business Dictionary that defines "product" as "a good, idea, method, information, object or service created as a result of a process and serves a need or satisfies a want. It has a combination of tangible and intangible attributes (benefits, features, functions, uses) that a seller offers a buyer for purchase" [35]. This definition allows applying LCA also to processes as well as for guidance for optimization of activities towards a reduction of resource requirements and emissions. The method offers 4 stages, step - by step assessment process. It includes: goal definition and scoping, inventory analysis, impact assessment, and interpretation (Fig. 2).



In the 1st stage the main goal definition and scoping have to be determined. A proper description of a product or activity has to be worked out. Therefore, to obtain adequate results it's necessary to establish the frame in which the assessment is to be made with identification of the environmental effects inside system boundaries. In the 2nd stage which is mainly the collection stage, according to standard methodology, the accurate tracking of all product "in - out" flows are identified. The identification and quantification of energy, water, materials usage and environmental releases (e.g., air emissions, solid waste disposal, waste water discharges, pollution with chemical reagents) have to be properly collected. Furthermore, in the 3rd stage the assessment of potential human and ecological effects of energy, water, and material usage and the environmental releases identified in the inventory analysis (2nd stage) has to be fulfilled. The adherence to clear procedure during this stage has to be made to avoid confusion. For example, if manufacturing a product consumes an estimated volume of diesel, in the LCIA phase the CO2 emission effects and global warming impact from combustion of that fuel would be calculated [3, 10, 14]. There are various methods proposed for categorizing the life cycle impact of the flows "to" and "from" the environment [3. p.1-18]. The reason is that the complexity of ecosystems leads to the permanent development of alternative impact modules. Table 1 shortly exhibits some of them. As it can be seen from the table, there is an assessment of a life cycle of product with use of different indicators such as releases, recourse use, damages on human health, etc. A large quantity of proposed methodologies indicates that some of them can be efficiently applied to a particular case and miss the aims of researches in another. Thus, after a qualitative analysis we should admit that every methodology prefers some specific indicators but less attention pays to others. From this perspective it is obvious, that such methodologies as LIME, Eco-indicator 99, IMPACT 2002(+) accounted such factors as climate change, human toxicity, pollution agents inside and outside of analysed space, acidification, eutrophication, and energy extraction [15. p.87-88, 20]. Whereas for such tools as EPS 2000d, TRACI, ECOSCARCITY smaller quantity of factors have been taken into account [16, 17, 18, 20]. These are for example the climate change and a human toxicity. In any case it doesn't point at imperfection of some of these approaches. Rather, the major issue is that they indicate the main points for certain systems relatively when the most important characteristics for assessment are chosen. In this way, from our point of view, the complicity and inefficiency of attempts in creating the universal methodology is evident. However, such factors as human toxicity, including

workplace and indoor pollutants, eco toxicity and climate change supposedly should be considered as universal. Further analysis of LCA methodologies reveals possibilities to conduct LCA without spending too much time and costs. Such tool as BEES 4.0 is free of charge, combines a life cycle cost for building and construction materials with a life cycle assessment and should be very adaptable and cost saving, even more indispensable when applied to institutions of a social sphere [28]. For the purpose of understanding the internal analytic mechanisms, it would be useful to compare two methodologies, for example EDIP97 and Eco-indicator 99 in context of modelling types they use. Thus, the EDIP97 is a midpoint methodology where modelling midpoints considered as links in the cause-effect chain (environmental mechanism) of an impact category. From the other side the Eco-indicator 99 is an endpoint tool where characterization factors (indicators) can be derived to reflect the relative importance of emissions or extractions. Common examples of midpoint characterization factors include ozone depletion potentials, global warming potentials, and photochemical ozone (smog) creation potentials. However, in the endpoint modelling, characterization factors are adopted at the endpoint level in the causeeffect chain for all categories of impact (e.g., human health impacts in terms of disability adjusted life years for carcinogenicity; impacts in terms of changes in biodiversity, etc.). On the Figure 3 is given graphical representation of basic differences between the midpoint (lower row of swinging arrows) and the endpoint approach (upper row of swinging arrows). The small arrows represent models that add information in a cause - effect framework. The question marks indicate information that is available but could not be further modelled. Such cases include unmeasured emissions, unconsidered types of releases (occupational, accidental), and substances where endpoint models have still to be established (e.g. neurotoxic effects on human health) [19]. Both midpoint and endpoint methodologies provide useful information to the decision maker with respect to uncertainty (parameter, model and scenario), transparency, and the ability to subsequently resolve compromises across impact categories using weighting techniques. Following the LCA methodology, the last 4th stage is the Interpretation, which is designed for identification of key parameters and evaluation of results of inventory stage and impact assessment with purpose to select the preferred product or process. Certainly, the clear understanding of the assumptions, used to generate the results of the conducted research has been made. Consequently to support the importance of a holistic approach, we need to insist on the integrating of various aspects of the analysed system into cohesive whole i.e. the general sustainability.



Fig. 3. Graphical representation of basic differences between the midpoint and the endpoint approach Source: Life Cycle Impact Assessment Workshop Summary Midpoints versus Endpoints: The Sacrifices and Benefits

LCIA methodology	Eco-indicator 99	EDIP 97	EDIP 2003	EPS 2000d	IMPACT 2002(+)	LIME	ECOSCARCITY	TRACI	BEES 4.0
Method description	EP damage ap- proach, including N and default W sets	MP method with N	MP method with N	Category indica- tors at damage level + W	MP+EP damage including N	EP+damage assessment+W	W method, based on environmental policy goals, to be used for MP categories and selected emissions/ interventions	MP method without N and W	W + N
Reference	Goedkoop at al.(1999),	Wenzel et al. (1997), Hauschild and Wenzel (1998)	Hauschild and Potting (2004), Potting and Hauschild (2004)	Steen (1999) and Steen (1999)	Jolliet et al.(2003)	METI, NEDO, AIST (2003)	Brand G., Braunschwei A.,Scheidegger A., Schwank O.:W , 1998	Bare J.C. et al.(2003)	National Institute of Standards and Technology (U.S. Department of Commerce), 2009
Climate change									
Human toxicity, including work-									
place and indoor pollutants									
Ionising radiation									
Noise									
Acidification									
Eutrophication									
Ecotoxicity (fate, exposure and									
effect should at least be consid-									
Energy extractions									
Mineral extractions									
Water resource use									
Human health									
Abiotic man-made environment									
Biotic man-made environment									

Table 1. LCIA methodology

Legend:

Endpoint – EP, Midpoint – MP, Normalization – N, Weighting – W,

Considered

Less attention paid or unconsidered

Source: Life Cycle Initiative (a joint organization of UNEP and SETAC).

Notification! The table is modified by the author adjusted to the purposes of this article

of the legal framework for environmental safety and in-

crease of a social responsibility of subjects would be

added. In the 2nd stage, except usual and accepted pa-

rameters, which have been discussed earlier, the level of

training of medical staff and their accuracy in fulfillment of medical tasks would be useful to introduce. In the 3rd

stage, the main factors that significantly affect the results of

a conducted research would be considered. The exclusion

of secondary factors, which have not a significant influ-

ence, would be done based on the list of inputs and out-

puts. Therefore, the factors influencing the system with varving intensity would be clearly identified. As well as the

possibility of establishing a system of scoring points or

complex pattern - matching system for ranging of the influ-

ence of different factors would be considered. Furthermore,

the correlation analysis (a statistical technique used to examine causal relationships between variables) would de-

termine the weight of each variable in relation to the overall

system performance. Among the most important, key fac-

tors, which adjust the whole system or process to the opti-

mized level, would be determined. It would be convenient

to fulfill using the multifactorial analysis (variation of multi-

ple factors in analysis of multiple factor models). In addi-

tion, while leaving free space for discovery of new factors

that have not been previously taken into account, such

data as the qualification of specialists, social level of pa-

tients, etc. would be obligatory analyzed. During the inter-

pretation (LCA's 4th stage) it would be necessary for re-

EKOHOMIKA. 1(166)/2015 Results. Since the invention of the method, LCA has been generally used for products in industries with highpollution outputs [21, 22, 23, 24, 25]. Many review articles have been written on the topic, but much less attention was paid to consideration of the method application to a healthcare. Even less has been said about pros and cons of this opportunity, and strong and weak points in this relation. Although, industries are of a high - priority because of generating profits and as a wide field for research of impacts, yet a healthcare system still important because of its social significance and influence on public health. In this context an additional key concept - the Life Cycle Management (LCM) should be introduced. LCM is the application of life cycle thinking to modern practice with aim to manage the total life cycle of organizations, products and services toward more sustainable consumption and production. It is the integrated framework of concepts to address environmental, economic, technological, and social aspects of products, services, and organizations. LCM as any other management pattern is applied on a voluntary basis and can be adapted to the specific needs and characteristics of individual organizations [26]. An illustrative example of the LCM application is surgeon and nurse initiated so - called Green Operating Room Committee. It is internal medical staff initiative on the premises of one hospital in the United States. After exchanging of routinely used consumables (single use devices, reusable gel pads instead of disposable operating room foam pads etc.), into recycled and more energy saving, the decreasing amount of wasted water, solid waste reduction, electricity, and great per year spending level was reached. As a result, the ecological initiative provided significant opportunity to improve healthcare unit's impact on the environment and save money [27]. In fact, the clear understanding of the LCM concept would enrich the practical use of LCA and experimentally proves the efficacy of its application to processes, units, and departments of a healthcare system. Such parameters as labour, time, costs would be additionally taking into account. Thus, in the 1st stage of LCA method extrapolation onto processes in a healthcare such goals as design of recommendations for the improvement

searcher to summarize results of analysis; obtain answers to questions stated in the first stage; and give recommendations concerning the development and improvement of the quality of products or services in their close connection to the environment, etc. At the end of assessment the nec-

essary policy improvements would be formulated. In some cases the possibility of changing the whole life cycle of a product would be considered. All described innovations would be the drivers for creating of more advanced guidelines for the development of normative - legal framework; guidelines for setting limits for certain hazardous emissions, effects and impacts on the human health [29, 30, 31, 32].

Conclusion & Discussion. Introduction of LCA refers to one of the building blocks of the Europe 2020 Strategy -"Roadmap to a Resource Efficient Europe" and proposes ways to increase resource productivity and to decouple economic growth from both resource use by units and environmental impacts, taking a life cycle perspective (i.e. considering Input of materials, production, use, final waste management and all necessary transport in an integrated approach). LCA is a relatively new approach with constantly developing methodology. It would be a confident backwater for holistic description of a life cycle of products and services, specifically in healthcare, where the use of sustainable technologies, materials and processes are extremely important. Taking into account permanent scarcity of resources, materials and emphasis on a cost - saving procedures in a social sphere, the method would be an efficient way for the optimization of economic and environmental performance of a healthcare. Inside proposed framework new factors should be identified and lead to creation of new models and techniques for the impact assessment. LCA should be successfully applied to analysis of healthcare system units (e.g. department, laboratory, hospital, ambulance, operating room), study of a life cycle of a single process, efficiency of medical staff as well as for analysis of performance of healthcare system of particular country etc. In addition, the rising social responsibility, corporate social responsibility and Life Cycle Management would be drivers for development and widespread application of such methods as LCA to processes and activities of healthcare institutions [31, 33]. As a result it would be of great importance for developing and implementation of effective public healthcare system model based on relevant, meaningful, robust, results and principles of careful use of resources, improvement of convalescence of patients and economic efficiency of units.

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ОЦІНКА ЖИТТЄВОГО ЦИКЛУ В ОХОРОНІ ЗДОРОВ'Я. ОПТИМІЗАЦІЯ СИСТЕМИ. ВСТУП ДО ПРОБЛЕМАТИКИ

У статті описаний метод оцінки життєвого циклу (ОЖЦ) та можливості його використання в системі охорони здоров'я. ОЖЦ звертає увагу на дбайливе використання ресурсів, охорону навколишнього середовища і соціальну відповідальність індивіда. Моделювання вхідних екологічних та технологічних ресурсо-потоків дозволяє оптимізувати продуктивність системи. Позначаються чинники та параметри, які можуть поліпшити ефективність функціонування різних секторів системи охорони здоров'я. Оптимізація продуктивності виявлених параметрів дозволяє поліпшити функціонування системи, забезпечити більшу безпеку пацієнтів, економічну стійкість і знизити споживання ресурсів.

Ключові слова: оцінка життєвого циклу, цілісний підхід, управління охорони здоров'я, соціальної відповідальності, моделювання.

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ОЦЕНКА ЖИЗНЕННОГО ЦИКЛА В ЗДРАВООХРАНЕНИИ. ОПТИМИЗАЦИЯ СИСТЕМЫ. ВВЕДЕНИЕ В ПРОБЛЕМУ

В статье описан метод оценки жизненного цикла (ОЖЦ) и возможности его использования в системе здравоохранения. ОЖЦ обращает внимание на бережное использование ресурсов, охрану окружающей среды и социальную ответственность индивида. Моделирование входящих экологических и технологических ресурсо-потоков позволяет оптимизировать производительность системы. Обозначаются факторы и параметры, которые могут улучшить эффективность функционирования различных секторов системы здравоохранения. Оптимизация производительности обнаруженных параметров разрешает улучшить функционирование системы, зоравоохранения. Отпиниизация произвооплетьности оснаруженных параметров разрешает улучанть функционирование системы, обеспечить большую безопасность пациентов, экономическую устойчивость и снизить потребление ресурсов. Ключевые слова: оценка жизненного цикла, целостный подход, управления здравоохранения, социальной ответственности,

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UKRAINIAN FISCAL EQUALIZATION: DOES IT NEED AN IMPROVEMENT?

The article states that existing economic and social differences between territories in Ukraine call for use of fiscal equalization instruments. The study shows that implementation of formula-based fiscal equalization has led to a virtually full equalization of differentials in subnational total public revenues and expenditures on the regional level. Findings presented give reasons for reviewing a current fiscal equalization procedure with regard to incorporating into equalization grant allocation formula fiscal incentives for subnational governments.

Keywords: fiscal equalization, intergovernmental transfers, public finance.

1. INTRODUCTION

Fiscal equalization plays an important role in granting adequate levels of public services at the subnational level. In this capacity it serves as an instrument for endowing local democracy institutes (bodies of self-government) with fiscal resources which cannot be obtained under the current allocation of other revenue sources (taxes and user charges). That is why horizontal fiscal equalization has not only a theoretical, but also a huge practical meaning, which is reflected in political documents and is practiced on the grounds of both efficiency and fairness.

The scale and intensity of fiscal equalization is preconditioned by peculiarities of the country's intergovernmental fiscal relations, assignment of governmental functions and revenues within its system. Thus, it also depends on a variety of institutional, political, and economic factors which shape the specific public administration sector. Ukraine as a transition country which gained independence after the disin-tegration of the Soviet Union in 1991 has inherited some issues from the soviet past that have an impact on its public finance in general, and the equalization system in particular, until implementation of the Budget Code in 2001. But even after that the remnants of a socialist past, when there was no place for subnational fiscal autonomy and sound fiscal management, were still at play. As a result, fiscal discipline on all governmental levels has not been fully implemented. Despite several reforming attempts, the "soft budget constraint" still remains a feature of public finance here.

One of the milestones in reforming intergovernmental finance in Ukraine has been the introduction of a brandnew fiscal equalization procedure. Since 2001, when the Budget Code was adopted, a formula-based approach to allocation of equalization transfers was introduced. It came to replace the obsolete approach based on a mixture of individually set tax-sharing rates for each subnational government (further referred to here as SNG) and discretional general grants. Nevertheless, practical implementation of the new approach has shown problem issues which have been aggravated with time.

Fiscal equalization is a theoretically controversial and politically vulnerable issue and is one of the most important components of the fiscal federalism theory. The roots of the fiscal equalization theory began evolving in the 19th century within the German public finance school. No wonder that an American economist of German origin, Richard Musgrave, authored one of the most comprehensive writings on fiscal equalization to date [13]. In his publication he analyzed basic approaches to fiscal equalization, where territorial units are considered as subjects of equalization (we could refer to this type of equalization as "territorial"). Despite the fact that he limited himself by considering relations within a federal nation and by pure redistribution, his theoretical findings concerning fiscal outcomes of different equalization schemes are still very important from both a theoretical and a practical point of view.

An alternative approach to fiscal equalization was put forward by another American economist, James Buchanan [1950]. This approach shifts subjects of fiscal equalization from territorial units to individuals; that seems to be wellmotivated from the theoretical point of view: namely, separate individuals, not groups, are the real economic actors as they bear preferences for both private and public goods. This approach could be called "individualistic" (according to P. Mieszkowski and R. Musgrave [11] the two approaches mentioned here are referred to as "fiscal capacity equalization" and "horizontal equity equalization").

Of these two approaches it was the first one (the "territorial") that prevailed, because the other one has significant problems of practical implementation. Despite some pessimism stemming from theoretical inconsistencies [14, 207], territorial fiscal equalization is widely accepted as an instrument for granting equality and efficiency across territorial units.

A special case for fiscal equalization is created by the transitional context. Former socialist countries did perform fiscal equalization before transition, but it was built on opposite grounds in comparison to the market-economy nations. i.e. on ignoring efficiency issues. One of the first studies of intergovernmental finance in transition countries [2] pointed out at extensive use of deviation-based tax sharing, national government (further referred to here as NG) discretion concerning formation of an equalization fund, a prevalent nonconditionality of transfers, and significant differences in respective policies between countries of Central and Eastern Europe and those of the former Soviet Union. The latter ones (and this should be stressed) still remain backward in public finance reforming in general, and in fiscal equalization in particular. So, in Ukraine, a modern formula-based equalization approach was introduced only in 2001, after ten years of national independence.

Since that time, a number of both international and domestic scholars have analyzed the Ukrainian fiscal equalization policy, although it should be recognized that it was done within a broad context of fiscal decentralization and public fiscal management, without paying close attention to details of the equalization procedure and its outcomes. One of the most comprehensive studies was undertaken by J. Martinez-Vasquez and W. Thirsk [10]. The authors concluded positive developments in intergovernmental finance in Ukraine since the adoption of the Budget Code, but also pointed out some issues related to fiscal equalization that still require special treatment. To them belong lack of incentives in revenue collection and inefficient expenditure management, suboptimal size of territorial units at subdistrict level, lack of autonomous local revenues. In order to remedy some deficiencies in fiscal equalization, they suggest rejecting the derivation principle in shared revenue allocation, introducing an additional local personal income tax (further referred to as PIT) rate for enhancing local fiscal autonomy. As concerns the equalization approach itself, a sound solution they offer would be two-stage equalization transfer calculation (stage one - definition of need determinants, stage two - relative fiscal need index calculation) and involvement of independent statistical bodies (not those of MoF) for collecting and submitting statistical data.

A deep insight into Ukrainian equalization issues is found in studies produced by I. Lunina [7; 8] who tried to analyze the evolution of the country's public finance and respective changes in the transfer system. She highlighted the presence of certain systematic problems in Ukraine's intergovernmental finance which make fiscal equalization less effective. Specially worth mentioning is her emphasis on lacking local fiscal autonomy and absence of legally fixed explicit vertical assignment of public functions.

The most comprehensive endeavors in analyzing the equalization system, its problems and prospects are found in publications by O. Shyshko [18] and S. Slukhai [19]. Shyshko stressed several issues in the current Ukrainian equalization formula, i.e. flaws in the fiscal capacity coefficient definition, inclusion into the equalization coefficient formula of (i) non-adjusted historical revenue collections and (ii) measures of revenue-generation plan execution. He suggests setting values of equalization coefficients for separate groups of territorial units (which looks appropriate), but doesn't take it to the point of refusing to use actual revenues in the equalization formula. Basing on fiscal panel data, S. Slukhai concluded that fiscal equalization in Ukraine had stressed equality rather than efficiency issues, and that basically there had been no observable correlation between regional revenues and regional revenue collection efforts. Also, the incentive component in the formula represented in the equalization coefficient had not functioned because of asymmetry in its application (applied only to donors)

The most recent studies of Ukrainian fiscal equalization issues published to date belong to Moldovan [12] and Volokhova [21].

Despite of the efforts described above, there are still some issues in Ukrainian fiscal equalization policy that needs to be addressed. To them belong justification of the prevailing fiscal equalization approach from the efficiency point of view; assessment of the soaring practice of *ad hoc* grant application in order to fill in gaps in equalization outcomes.

This study intends to critically assess the current Ukrainian approach to fiscal equalization basing on use of official statistical data on aggregate regional budgets (published annually by the Ukrainian Ministry of Finance, further referred to here as MoF) and outline some recommendations in this field aiming to make fiscal equalization more sustainable.

2. UKRAINIAN INTERGOVERNMENTAL FINANCE AND FISCAL EQUALIZATION

After gaining independence in 1991, Ukraine, being a unitary state, naturally tended to practice a centralistic model of fiscal federalism [20] or "administrative fiscal federalism" [16]; this fact does have an impact on the shape of its intergovernmental system in general, and the transfer system in particular. When analyzing the current legal base and actual practice of intergovernmental finance in Ukraine, one will find a kind of duality: on the one hand, some state functions are handed down through the Law on Local Self-Government to bodies of local self-governance of different levels, which corresponds to predictions of fiscal federalism literature. However, on the other hand, actual implementation of these functions is mostly vested onto the NG's bodies – district and region state administrations, which are appointed and accountable to the President of Ukraine (a minor exclusion is cities of national and regional importance). This means that actually bodies of self-government in Ukraine enjoy a very limited scale of own competence combined with low autonomy for its realization.

Actually, even after the enactment of the Budget Code in 2001, to date subnational governments (further referred to here as SNGs) remain deprived of the ability to manage their finance and assets. In many cases they formally bear responsibility for certain public functions (such as general secondary education or primary health care), but have no possibility to manage the basic factors affecting their expenditures, such as salaries and wages; they also have no right to hire and fire managers of subordinated public institutions, or to set standards of service delivery etc. They even cannot hold accounts in the financial institutions of their choice – only in the State Treasury.

Under such extensive delegation of expenditures from the top to the bottom, theory would foresee a problem of principalagent. Financial theory and practice suggest that it will result in artificially inflating expenditures and engaging into bargain games with authorities of the upper level. This means low incentives for effective expenditure management.

Within this context, it is worth discussing trends in public expenditure assignment in Ukraine, which is conventionally understood as an index of decentralization [1; 3]. Figure 1 demonstrates that a trend to increasing the relative size of public administration sector in GDP generally dominates, being supported by a very slight increase in the relative role of the subnational sector within it. The problem with this index is that GDP expenditure share does not really reflect the real extent of fiscal decentralization: in Ukraine, most public expenditures at the subnational level are administered by the state authorities, not by SNGs.



Fig. 1. Total government share in Ukrainian GDP and subnational share in total government expenditures, %% (own calculations based on MoF data)

As concerns public revenues, the trends here are just the opposite. The data demonstrates that SNGs' role in redistribution of GDP has constantly diminished through the years. Starting with about 46% at the moment of gaining independence (1991), the total subnational share in public revenues (transfers excluded) has actually halved – it had dropped to about 23% by 2012. The NG has gained a much bigger role in subsidizing SNGs and making them more dependent on its decisions concerning the fiscal support granted.

While observing two opposing trends (a growing subnational share in expenditures and a diminishing one in revenues) one could draw the conclusion that this will result in a soaring vertical imbalance, which has to be covered by use of vertical intergovernmental transfers. Respectively, the composition of subnational revenues has also changed. Since 2000, PIT has become the biggest by its share in revenues ceded tax; in 2001 its share (transfers excluded) was 45%, in 2012 about 61%.

An important component of intergovernmental finance in Ukraine is direct fiscal transfers. As the data in Table 1 demonstrates, the intergovernmental transfer system in Ukraine displays the following trends: (*a*) growing dependence of SNGs on fiscal transfers, (*b*) gradual substitution of NG's discretionary transfers (mutual settlements and budgetary loans) for formula transfers (grants) and (*c*) substitution of general transfers ("grants") for earmarked ones ("subventions").

Voar	Transfer share in SNG total revenues	Out of total transfer mass:						
Tear		Mutual settlements	Grants	Intergovernmental loans	Subventions			
1991	14,4	34,8	55,9	9,2	-			
1995	4,9	51,7	40,3	8,0	-			
2000	22,9	0,2	96,5	1,9	2,4			
2005	43,5	-	61,8	-	38,2			
2010	48,8	-	56,8	-	43,1			
2011	52,3	-	50,7	-	49,3			
2012	55,2	-	48,7	-	51,3			

Table 1. Relative value and composition of fiscal transfer fund, %%

Source: Own calculations based on MoF data

The growing SNG dependence on transfers signalizes a soaring vertical imbalance and diminishing local fiscal autonomy. An elimination of discretionary transfers could be judged as a positive development, since it has made transfer allocation more objective and predictable. Increasing relative importance of earmarked transfers could be hardly judged positively, because earmarking puts additional restrictions on SNGs' fiscal policy and may distort their spending priorities.

The growing extent of NG intervention into subnational finance is objectively motivated by the substantial economic differentiation among the regions, and could be measured by *per capita* GRP, calculated in Ukraine since 1995. GRP is the most suitable tool for measuring interre-

gional differentials, as it is more strongly related to regional economic capacity than *per capita* revenues, which include net transfers [17]. Table 2 shows the growing economic inequality among the regions. In 1995, the GRP maximum/minimum ratio was 2.7 to 1, but in the middle of the first decade of the 2000s it exceeded 6 to 1, and has remained this high. As a result, differences in social development across the regions became more visible, too, triggering inter-regional and international migration of production factors. In addition, it generated significant differences in fiscal endowment of SNGs which required mre intensive equalization measures from the NG side.

Year	Average value	Variation coefficient	Minimum	Maximum	Maximum to minimum
1995	970	0,232	507	1368	2,7 / 1
2000	2788	0,340	1411	5965	4,2 / 1
2005	9373	0,486	4603	28780	6,25 / 1
2010	23600	0.486	10939	70424	6.44 / 1

Table 2. Regional differentiation of per capita GRP in Ukraine (in market prices, UAH)

Source: own calculations based on MoF data

It is a challenge to assess fiscal equalization intensity in the country. One approach could be to deliberate about total transfer share in total SNG revenues (see Table 2 above). But this share tells us nothing about reaching the goal of equalization, only hinting that "we likely observe a high scale of equalization". In order to assess how intensive fiscal equalization is, we need to have some additional measures applied. Here, we offer a specific measure, a relative change in per capita revenue variation coefficients (CV) calculated at two stages of equalization: the first one, performed with indirect transfers (passive equalization) and called "intermediate", and the second one, performed with direct transfers (active equalization) after the intermediate stage, and called "final". An advantage of such a measure is that it could allow us to catch dynamics in fiscal equalization policy. So we have two coefficients:

$$C_{1} = \frac{CV(TL) - CV(TL + TS)}{CV(TL)} \text{ and}$$

$$C_{2} = \frac{CV(TL + TS) - CV(TL + TS + TD)}{CV(TL)}$$

where *TL* stands for regional proceeds from local taxes, *TS* – shared taxes, *TD* – total direct transfers, all in *per capita* terms. C_1 presents a relative change in regional revenue variation with regard to shared (ceded) revenues; C_2 presents a relative change in revenue variation occurring after application of active equalization measures (direct transfers).

Having as a base of comparison a variation of *per capita* local taxes, we could proceed to final equalization results by sequentially evaluating intermediate and final outcomes and, thus, observing whether policy measures at each stage make a contribution to revenue equalization, and in what manner. A positive value of measures C_1 and C_2 means that a decrease in revenue distribution inequality occurs; a negative value of both signalizes an opposite development, i. e. growing inequality. Table 3 presents the results of respective calculations. It shows that before adoption of the Budget Code, measures of passive equalization (ceded taxes and shared revenues) dominated, but the scale of interregional differentials at passive and active equalization stages measured by *CV* remained quite sizeable. It should be mentioned that *CV*s for the time period before the Budget Code adoption at the intermediate equalization stage were higher, than at the final stage. This

result could be interpreted as followed: absence of formulabased grant allocation contributed to subjectivity in grant allocation that resulted in diminishing final equalization effect. After the enactment of the Budget Code and the shift to a system of ceded revenues (instead of shared revenues with varying sharing rates), interregional inequality at the first stage exploded (the value of C_1 became negative), but with time it began to diminish, reaching the value of -0,19 in 2011.

Year	Local taxes and duties, CV(TL)	Revenues including indirect transfers, CV(TL+TS)	Intermediate equalization, C ₁	Revenues including direct transfers, CV(TL+TS+TD)	Final equalization, C ₂
1993 ^a	0,93	0,32	0,66	0,37	-0,16
1995	1,22	0,28	0,77	0,22	0,21
2000	0,42	0,80	0,90	0,53	0,34
2001	0,44	0,84	-0,91	0,56	0,33
2006	0,49	0,66	-0,35	0,25	0,62
2011	0,31	0,37	-0,19	0,09	0,76

Table 3. Intensity of horizontal revenue equalization through use of indirect and direct transfers

^a 1993 was a first year for which a whole set of data was available. Source: Own calculations based of MoF data.

This counter-equalization effect at the intermediate stage could be attributed to using an origin principle for tax proceeds allocation. So locations which have bigger revenue base (like national capital Kyiv City or regional administrative centers), end up being better-off in comparison to those that have a lower one (or even absent like in many Ukrainian rural locations where PIT is being collected from incomes of those working for the local authorities). Increase in revenue inequality as a result of passive equalization called for much more extensive amounts of grants than before. The data presented in Table 3 demonstrates that effective intensity of equalization at the final stage before 2001 was much lower than in the period after Budget Code enactment. After 2001, the intensity of final equalization increased significantly: C_2 reached a value of 0,76 in 2011, however, CV for the final stage became almost zero in the same year.

So, after more than 10 years since the new equalization procedure has been introduced, it ended up with *de facto* full alignment of fiscal differences among the regions. And this fact could be important with respect to efficiency, because such an intensive equalization would lead to disincentives in using local fiscal capacity, as R. Musgrave [1961] predicted, and as is recognized by Ukrainian students [6]. This disincentive effect could be traced by lowering engagement into raising revenues and its respective negative influence on budget expenditures. We assume that diminishing differentiation in regional *per capita* revenues (transfers excluded) and expenditures would signal a similar effect of the equalization policy. Applying the Herfindahl-Hirshman Index (HHI), usually used for measuring concentration in the industry, to evaluation of interregional inequalities in the public sector [9] demonstrates that such an effect is really present in Ukrainian intergovernmental finance. According to our calculations, HHI value for combined regional total revenues (fiscal transfers excluded) was 1028 in 2001 and 623 in 2011; respective values for total expenditures were 548 and 475. So we may conclude that the current equalization approach has induced some negative allocative effects, which are more significant as concerns revenue collection.

This conclusion could be backed up by the fact of actual full equalization of regional *per capita* total expenditures measured with CVs (Table 4). This could not be a surprise, as according to legislation, subnational budgets must be executed without deficit, and SNGs are strictly limited in their ability to borrow money in financial markets. But, as the data above shows, subnational expenditures on functions delegated by the state (on social needs, education and healthcare) are equalized much more heavily than those dedicated to own ones (housing and amenities, economy). The total result – almost full expenditure equalization – could be attributed to the fact that own expenditures comprise rather a small fraction of total SNG expenditures, about 15% in 2012.

Year	Total	On social needs	On education	On healthcare	On housing and amenities	On economy
1992	0,20	0,12	0,13	0,15	••••	2,13
1996	0,16	0,17	0,15	0,16	0,68	0,52
2001	0,30	0,17	0,14	0,19	0,86	0,81
2006	0,25	0,10	0,10	0,13	0,82	0,86
2011	0,09	0,07	0,09	0,14	0,59	0,65

Table 4. Variation coefficients for subnational per capita expenditures

Source: Own calculations based on MoF data

The growing intensity of fiscal equalization became possible thanks to massive state involvement into formation of subnational revenues. There occurred a sharp decrease in the number of donating territorial units of all subnational levels (e.g. in 2012, only one region out of 27, Kyiv City, made contributions to the state budget), and in the amount of contributions to the equalization fund: it was UAH 7584 mil in 2009 and only UAH 1114 mil in 2012. Actually, Ukraine has moved to a model of equalization performed exclusively through NG appropriations with no horizontal redistribution.

3. NEWEST DEVELOPMENTS IN HORIZONTAL FISCAL EQUALIZATION

Since 2001, the main instrument of the equalization policy in Ukraine has been the equalization grant (further referred to here as EG). The Budget Code stipulates that EGs are allocated in order to financially support fulfillment of delegated functions in case proceeds from ceded taxes are not sufficient to fund respective expenditures. By nature, the EG is a general transfer allocated according to a formula. Beneficiaries of the EG fund are regional and district authorities, along with governments of the cities of national and regional significance. District state administrations are responsible for performing equalization for subdistrict units (cities of district significance, settlements and villages); it is being done in line with guidance provided by the Budget Code according to specific law. In general, EGs are allocated among respective territorial units through the formula $T_i = \alpha_i (V_i - D_i)$ where D_i is the forecasted amount of revenues assigned for funding delegated functions, calculated with regard to tax capacity coefficient; V_i stands for calculated amount of expenditures for fulfillment of delegated functions; α_i stands for equalization coefficient. Expenditures are calculated as a sum of corrected (by a bundle of coefficients for each delegated function) standards of budgetary coverage. The formula was modified several times (2002, 2003); however, it has remained quite stable in its major components since 2005.

In general, introduction of the formula-based fiscal equalization procedure was a progressive step forward [10], although it did not remove all the issues diminishing the efficacy of the transfer policy in its redistribution aspect. The most important issue to be mentioned is defining the to-be-allocated transfer fund basing on aggregation of differentials between calculated expenditure needs and revenues for funding the delegated functions. The problem is that expenditure needs are calculated with regard to specific "standards of budgetary endowment" set by MoF and adjusted by additional coefficients. This means that subnational expenditure needs are based on fiscal capacity of the state, but not objective criteria.

As we found out before [19], formula-based equalization in Ukraine has not neutralized all the issues preventing the fair and unbiased distribution of fiscal funds within the public sector. To these belong among others: the unconditional nature of grant funds, which is prone to bargaining and political corruption at subnational level; very moderate changes in the net of local public facilities; space for unfair and subjective treatment at the district level, where authorities have some discretion in allocating transfer funds to subdistrict units.

Since the current equalization approach was introduced, it has demonstrated both weaknesses and strengths. One of these weaknesses was that is could not reach sufficient levels of expenditure equalization (rapid changes in regional fiscal needs were not being sufficiently matched by EGs). This situation called for additional instruments, which were provided by the Budget Code as socalled "additional grants". This additional fiscal equalization instrument was activated in the mid-2000s and began to play an important role in the recent years. The state began to allocate additional "grants for securing fiscal solvency of SNGs" at the basic level (districts, cities and villages), "grants for cancellation of salary arrears in budgetary institutions", "grants for compensation of energy tariff in-crease", etc. The amount of these additional grants began rapidly booming since 2011, as shown in Table 5. The basic reason behind this is lack of local fiscal autonomy, whereby SNGs do not have sufficiently elastic revenue sources at their disposal in order to accommodate their finances to the conditions of the changing fiscal situation.

Table 5. Equalization	grants and additional	grants in Ukraine	2008-2013, UAH million
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Year	FGs	Additional grants	Act add	ual amount of itional grants	Actual additional	Ratio of actual total
		approved ^a	Total allocated ^b	Paid out in the last month of the budget year ^b	%%	EGs, %%
2008	28810	756	1629	196	215	5,7
2009	33356	703	2702	1047	384	8,1
2010	43740	711	582	412	82	1,3
2011	43630	956	4483	2239	469	10,3
2012	51650	1289	8976	4305	696	17,4
2013	55695	1312	5525	2702	421	9,9

^a As stated in the respective annual Budget Law (firstly approved, without further amendments). ^b According to data of the State Treasury.

The data in Table 5 also draws attention to a drastic difference between approved and actually paid out additional grant amounts. It could be explained by the right of the Cabinet of Ministers to reallocate money within a specific budget program without changes in the budget law (it means without approval of the Parliament) granted by item 23.6 of the Budget Code; the Cabinet also has a right to change transfer allocations among separate territorial units within a budget year. The problem with these grants is that there are no explicit objective criteria according to which they could be allocated. That is why they have turned into a perfect instrument for manipulation from the NG side, embracing both fiscal and political reasons. The data above shows that additional grants, firstly, fluctuate greatly in amount from year to year; secondly, they generally demonstrate a trend to absolute and relative increase; thirdly, their actual amount usually greatly (by several times) deviates from the approved one in the annual Budget Law; fourthly, they are mostly paid out in the last month of the budget year. It should be added that in addition to their discretional nature, these transfers also include a huge disincentive component: those SNGs which get into bigger current fiscal problems could receive more, since these grants compensate for mandated increase of salaries in budgetary institutions and other expenses. So, the more arrears a territorial unit has, the more non-conditional fiscal assistance it could receive. As there is no explicit formula for allocation of additional grants either on the national or subnational level, regional state administrations decide how to allocate money and how much each of the subregional units will receive, thus giving a floor for bargaining and political corruption.

Another instrument that could have a counter-equalizing effect and be a source of additional distortions in subnational fiscal policy is state investments. These investments are allocated in two ways: (a) through direct appropriations of NG bodies (ministries and agencies) and (b) through investment money allocated to regional authorities, which then decide how to use it. In the latter case, we actually have *quasi*-transfers, because these investments are allocated by regional authorities without any NG's influence.

Despite the lacking systematic data on these two additional fiscal instruments, indirect evidence makes us suggest that their implications may fully distort outcomes of the official equalization policy, thus making the overall results of horizontal fiscal fund allocation fully inadequate and unfair. Independent experts reported a complete reversal of fiscal flows among regions observed since 2010, when a political turn in Ukraine occurred. Before 2010, the less-developed regions generally benefited, but, since 2011, the transfers have been redirected in favor of the economically highly-developed ones (especially the East). In the first half of 2013, top beneficiaries of all kinds of NG net payments (all types of transfers, targeted state support plus direct state investments) included those regions which conventionally were considered as the most important donors, such as Kyiv City, Donetsk and Luhansk regions.

4. CONCLUSION AND POLICY PROPOSALS

Our analysis has shown that Ukraine has shaped its equalization policy by implementing basic provisions of the Budget Code postulating improved assignment of revenues and expenditures among governmental levels, and introducing a formula allocation of equalization grants. Thanks to these reforming attempts, quite a significant intensity of revenue and expenditure equalization has been achieved. However, this study has shown that there is a space for further policy improvements, since equality currently prevails over efficiency, and need factors are not incorporated adequately enough into the equalization procedure. The opportunity cost of intensive revenue equalization includes significantly increased transfer dependence of SNGs and, as theory predicts, diminishing incentives for regional and local authorities in making efforts towards generating sufficient revenue flows and better expenditure management. Despite the increased objectivity in fiscal equalization, there are still components of the transfer mechanism that somehow undermine equalization goals - ad hoc additional grants and state investment entitlements for the regions; even though the study did not provide strong evidence to support a hypothesis of interference of political factors with the equalization process.

As concerns the grant allocation formula, it should be significantly simplified in both revenue capacity and fiscal need measurement, which will make it impossible to support ineffective budget management at the subnational level. This step, along with application of the equalization coefficient to beneficiaries, will contribute to incorporating incentive elements into the grant allocation formula. There is no question that the role of *ad hoc* additional grants should be minimized, if not fully eliminated.

Among other issues worthy of consideration is the equalization grant fund formation principle. The current approach, where the state bears the full equalization burden, looks unconvincing; our vision is that this fund could consist of two parts: a fixed one (NG budget appropriations that might be set e.g. in proportion to total governmental proceeds) and a variable one representing redistribution among the governments of subnational levels. Such an approach would make the equalization process more elastic to economic development and, on the other hand, would place harder subnational budget constraints, thus simultaneously diminishing space for political bargaining among authorities and politicians of different territorial levels. Another issue that could make the Ukrainian transfer system more incentive-oriented could be developing conditional matching grants, which are today underrepresented as policy instruments.

It looks as if the Ukrainian equalization approach will soon be modified in order to satisfy the demands of territories for self-reliant fiscal management. There are many challenging options to be considered, which, when realized, would contribute to a more fair and efficient resource allocation within the sector of public administration.

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ФІНАНСОВЕ ВИРІВНЮВАННЯ В УКРАЇНІ: ЧИ ПОТРІБНЕ УДОСКОНАЛЕННЯ?

У статті показано, що існуючі є Україні економічна та соціальні відмінності між територіями вимагають застосування інструментів фінансового вирівнювання. Дослідження показує, що застосування формульного підходу до фінансового вирівнювання призвело до практично повного вирівнювання відмінностей у сукупних доходах та видатках на субнаціональному рівні. Представлені у статті результати надають підстави для перегляду поточної процедури фінансового вирівнювання у напрямі включення до формули розподілу трансфертів вирівнювання фінансових стимулів для місцевих урядів.

Ключові слова: фінансове вирівнювання, міжбюджетні трансферти, державні фінанси.

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ФИНАНСОВОЕ ВЫРАВНИВАНИЕ В УКРАИНЕ: НЕОБХОДИМО ЛИ УСОВЕРШЕНСТВОВАНИЕ?

В стать показано, что существующие в Украине экономические и социальные отличия между территориями требу ют использования инструментов финансового выравнивания. Исследование показывает, что использование формульного похода к финансовому выравниванию привело к практически полному выравниванию отличий в совокупных доходах и рас ходах на субнациональном уровне. Представленные в статье результаты дают основания для пересмотра текущей процедуры финансового выравнивания в направлении включения в формулу распределения трансфертов выравнивания финансовых стимулов для местных правительств. Ключевые слова: финансовое выравнивание, межбюджетные трансферты, государственные финансы.

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GLOBAL WARMING BETWEEN SCIENCE AND POLITICS

During the last three decades, the scientific theory of global warming has become a political ideology. Significant political components are found both in the premises and (especially) in the consequences. But witnessed also at least a decade of negationism: global warming research programs are questionable regarding methodology and the ethics of research. Face to all contestations, "Global warming theory" has already become "Global climate change theory". It is true that global warming ideology preparing a global governing over a strictly limited number of people?

Keywords. Global warming, Global Climate Change, Theory, Ideology, Politics, Policies.

Introduction

In the past three decades, the "global warming" scientific theory, amassing socio-political significations of the most diverse, appears to us as a solid political ideology, which proposes the thesis of a defensibly created company in order to prevent/combat the worst threat to the global society: Earth global warming in all its physical components, up to serious life impairment. Of course, skeptics contribute massively to the political structure of the global warming (under their siege, already renamed widely in "the theory of global climate change").

In this context, our research tries to answer several key questions: does the scientific theory of "global warming" contain errors of measurement and interpretation?; If so, are these intentional?; who uses the possible falsification of scientific data?; which are the global projects that favor this theory, and who are the beneficiaries of the social/political patterns that it proposes?

"Global climate change" in scientific research. Scientific book and research program

The number of scientific books that promote global warming thesis (in recent years, under the label of "global climate change") is impressive and huge in relation to those expressing reservations or flatly denies global warming. The phenomenon seems growing exponentially, being impossible to quantify. We can the most to infer an order of magnitude and a vague numerical ratio between supporters of global warming and the work of sceptics. Assuming this imperfect proceeding by analyzing a website among the most used [2], we can count 162 "popular books" on the subject of global warming – among which not more than ten express their reservation and denial. All are books in English that appeared after the year 2000 – but more than three-fourths were offered to the market after 2005.¹⁹

But the book – even scientific – is not intended primarily for researchers and other categories of experts on the issue of global climate. Of course, most beneficiaries are of the informed public or information-hungry – teachers, students, journalists, non-governmental activists, officials of all levels, with the passion of various readings. Maybe a few tens of individuals to read a book with the wizard's eye, able to formulate specialized appraisals and to use further the scientific results in their own research.

Experts systematically exceed the scientific book, their mandatory reading being scientific research programs and projects of their own or of others. These projects are worked, appreciated and capitalized, running in a world far narrower numerically, and incomparably more valuable from the scientific point of view. Through research programmes and projects, science is advancing more than by book.

Here, however, a fracture occurs that is extremely dangerous both for science, for implementers of policies and for the general public. The last two categories do not have sufficient instruments to deal with error and falsehood sold in the project-based research. Then politicians formulate and implement policies incorrectly, and the public unfoundedly supports or opposes to these policies. Perhaps no other contemporary field of science is more exposed to (and used!) to this risk than that of "global climate change".

Speaking of research programmes, the relevance of the number is minimal. The "market" is dominated by a few intense publicity programmes, generously financed, which engages in multidisciplinary teams some of the most prestigious and most active researchers in climatology, biology, geology, economics etc. The results of these researches are automatically transferred to the mandatory reference for global policies, for opening new directions of research – but also the favorite target for sceptics.

The most important organizations of climate research are, invariably, advocated by the theory of global warming. They receive huge funding, as demonstrated by a balance sheet of the year 2010, corroborating revenues with media impact during 2012-2013 [24]:

¹⁹ Of course, this exercise is burdened by the lack of books in languages other than English, and does not consider quantitative factors such as number of pages, format, number of copies, number of copies sold – all combined could provide a clearer and more nuanced in our problem

501C3 Name	2010 Income	Net Assets	Mentions in Major World News Publications[6]
Sierra Club	\$97.757.678	\$52.209.573	726
World Wildlife Fund	\$267,993,426	\$182,067,246	993
Friends of the Earth	\$5,495,897	\$3,407,984	1,831
United Nations Intergovernmental Panel on	· · · ·		
Climate Change	NA	NA	697
United Nations Environmental Program	NA	NA	115
United Nations Foundation	\$197,737,803	\$231,213,165	101
Nature Conservancy Inc.	\$997,037,663	\$5,180,558,726	242
Greenpeace Inc.	\$27,465,948	\$824,056	2,879
Climate Works Foundation	\$83,026,313	\$215,248,816	1
World Resources Institute	\$50,079,176	\$59,901,847	125
Center for Biological Diversity	\$7,181,472	\$10,734,072	115
Defenders of Wildlife	\$30,229,512	\$23,839,354	35
International Institute for Environment and			
Development	\$30,335,978	\$5,121,919	1
Natural Resources Defense Council	\$97,957,964	\$197,413,060	484
National Council for Science and the			
Environment	\$3,526,925	\$562,386	8
Global Green USA	\$4,633,587	\$4,372,965	8
Pew Center on Global Climate Change	\$6,424,365	\$4,666,874	2
Institute for Sustainable Communities	\$15,007,337	\$6,207,761	0
Sustainable Markets Foundation	\$4,347,579	\$1,660,940	0
US Climate Action Network	\$2,414,999	\$1,067,116	1
350 Org	\$3,013,995	\$2,250,300	109
Association for the Advancement of Sustainabil-			
ity in Higher Education	\$2,362,495	\$736,159	0
The Alliance for Climate Protection	\$19,150,215	\$12,052,979	5
Climate Solutions	\$2,642,682	\$907,901	29
Alliance for Climate Education	\$2,749,291	\$369,251	2
Climate Central Inc.	\$3,273,478	-\$808,414	49
Climate Group Inc.	\$2,746,784	\$465,685	0

 Table 1. The most important organizations of climate research – a balance sheet of the year 2010 corroborating revenues with media impact during 2012-2013

Source: Tracy James F., CO2 and the Ideology of Climate Change: The Forces Behind "Carbon-Centric Environmentalism", [Online], Global Research", 2013, November 12, http://www.globalresearch.ca/co2-and-the-ideology-of-climate-change-the-forces-behind-carbon-centric-environmentalism/5342471

The supreme authority in synthesizing and disseminating research on global climate change is informally but definitely, the programme entitled "Intergovernmental Panel of Experts on Climate Change" (IPCC), set up in 1988 by the World Meteorological Organization and the United Nations Environment Programme[31]. The IPCC publishes reports on the implementation of the United Nations Framework Convention on Climate Change [34].

From scientific research to policies²⁰

So far, in an invariable way, only the scientific conclusions that converge to the affirmation of the imminence of global warming have led to policy proposals. Those skeptical or sceptic were ignored or dealt with by politicians with a well-coordinated segment of non-governmental organizations, taken by a press with authority in the scientific world or on the public at large.

It is interesting and debatable that those policies were undertaken directly by the global political bodies. It is a process organized from the top down, through debates in the United Nations and its specialized agencies, in which the contribution of member countries is extremely uneven and limited.

In fact, both before and after the adoption of the United Nations Framework Convention on Climate Change and the Kyoto Protocol [27], the process of policy-making in the field of climate change – simplifying to the maximum – means taking the conclusions of scientific programmes agreed by the IPCC and their transformation into global, regional, or even national policies for the limitation of the

effects of global warming. National expertise does not exist in this discussion – just that sometimes the examples (relevant or not) are extracted by the organizations approved by the IPCC in the national field.

In these circumstances, it was just a matter of time until the national interests had to deal. Disputes have been intense on the occasion of the fifteenth Conference of the parties to the United Nations Framework Convention on Climate Change, held in Copenhagen in December 2009 [35]. The failure of global policies is evident from the fact that the Copenhagen Agreement against global warming (intended to replace the Kyoto Protocol) was negotiated and signed by only 30 States of the 193 participants (European Union countries, plus China, the US, India, South Africa, and Brazil).

The agreement provides for a 2% global limit and the creation of a fund for the most vulnerable countries to global warming worth 30 billion dollars (available in the period during 2010-2012), which will grow to 100 billion dollars (2020). The sources are not specified, so the target is up to the some donor countries.

Main conflicts were carried out between developed and poor countries (the latter assuming that the developed states should impose additional pollution limits and pay more), but also between the Eastern and Western European Union (the de-industrialized East after the fall of communism pollute less, and considers it appropriate to pay less). The representatives of the emerging economies (China, India and Brazil) have declared themselves dissatisfied with the tendency of sates that have reached the limits of development to make pay those who now have the overriding need to use fossil fuels [19].

²⁰ In our research, policy = administrative measures adopted by international organizations and states; politics = policy formulation and implementation in the interest of group

Therefore, once established the international standards, national states have ratified the Kyoto Protocol and switched to the specific application of policies. In the case of Romania, the former Ministry of Environment became the Ministry of Environment and Climate Change [25], and the main area of activity (of the 17!) is "Climate Change" – the other 16 being invariably determined or influenced by global warming assumption [26]. The basic document of the policy orientation of the work of the Ministry is the National Strategy on Climate Change, a document promoted by the Government Decision No. 529/2013 and published in the Official Gazette of July 2013 [27]. The entire fabric of policies established by the Strategy is justified by "subsequent scientific reports" of the United Nations Framework Convention on Climate Change [27, 3].

But what if "further scientific reports" favorable for the global warming thesis are inaccurate or falsified? And what do we do with those scientific reports that prove the opposite? [22]

What value does thus bulky document retain (73 pages), with regulatory force, setting out concrete measures for reducing emissions of greenhouse gases in all sectors of socio-economic activity? What value do emergency measures, institutional cooperation, public awareness campaigns have?

From policies to politics. A few essential questions

The policies proposed (some would say forced) by the United Nations Organizations and implemented by specific rules by the national states seem encumbered by group interests, which are inserted in the premises of scientific research, during the research approach, as well as in the implementation of policies arising (appropriately or not?) from research results. Some questions are essential:

1. Research projects concluding global warming, present deficiencies of methodology which would put into question the results?

The answer to this question is not simple. In order to have certainties, it takes the reconstitution of the project, in the charge of a team of independent researchers to work with the same databases and then with alternate databases, with funding from sources other than in the initial project (who can guarantee that new contributors are disinterested of a certain result?). The full resumption of a research has not been done so far.

The question marks remain to be launched by independent researchers (exceptionally research teams) who are interested in one or the other of the aspects of the original project methodology. Typically, alarm signals start from the enormity and monstrosity of premises or conclusions. Here are some examples.

The report published in September 2013 by the United Nations Organizations warns on the continuous climate warming trend, and believes that human activity is responsible for 95% of it. But, working on the databases of the World Meteorological Organization, Professor Rowan Sutton from Reading University shows that in the last 10-15 years, the warming trend has stalled. The same conclusion is formulated by Stephen Belcher, manager at the Met Office Hadley Centre, stating that such pauses in the process of global warming occur once or twice in a century.

In a desperate attempt to rescue the theory of global warming, a number of researchers claim that a large amount of heat produced in the meantime is absorbed by the oceans [11]. But oceans do not heat – on the contrary. Were it is that El Niño has warmed the Pacific Ocean waters twice after 1998, while the opposite phenomenon – La Niña has cooled the Pacific four times during the same period [12].

On these data have the experts been working in numeric predictions, such as J. Scott Amstrong – expert in long-term forecasts, professor at the University of Pennsylvania of Wharton, co-founder of the "Journal of Forecasting" and "International Journal of Forecasting" [30]. His conclusion, after forecasting methodologies applied to the United Nations Report, in order to outline the trend of global warming: "Nobody knows". It is impossible to predict. In some regions it cools down, in others it heats up. That's all" [20].

This kind of debates shall be maintained within the limits of honest scientific dialogue, meant to correct unintentional errors caused by the choice of input data, the logic of the process of investigation, the partial or poor interpretation of results.

2. But what if some errors in drafting the global warming thesis and human errors as main cause are intentional? What if the data is mystified, to serve the predetermined conclusion that man is causing global warming?

Unfortunately, information to this extent gathers into a vertiginous rhythm. Here are some examples.

The U.N.O. report of 2007 has been ridiculed on the subject of forecasting the disappearance of the glaciers of the Himalayas until the year 2035. The thesis was done by taking a single the conclusions of one article (no scientific study!) published in 1999 in the magazine "New Scientist" by Robert Muir-Wood (head of the London-based consultancy firm "Risk Management Solutions"). Starting from this thesis, the Chairman of the IPCC Rajendra Pachauri has obtained grants of over 3 million euro for the Energy and Resources Institute in New Delhi. Following the protests of independent experts, the forecast has been withdrawn. Including "New Scientist" has urgently demanded the departure of the head of the IPCC Rajendra Pachauri [23]²¹.

The draft report of the United Nations in 2013, under the signature of more than one hundred climate experts, announce that the planet's temperature did not increase in the last 15 years. Presented to the political decisionmakers before publication, the draft has caused "concern" in political circles in Belgium, Germany, Hungary and the United States of America. Expert delegations of those States have been working to maintain the sentence intact. The Germans demanded the deletion of the previous paragraph relating to the attenuation of the increase in global temperature and centering the analysis on decades and centuries - in order to mask the recent development. Hungarians have attracted the attention that the report will offer arguments to skeptics the theory of global warming. Belgians have suggested to be abandoned in 1998 as the peak of the temperature curve, and to adopt the reference of the year 1999 or even 2000; all of a sudden warming can be justified. And the Americans have suggested that the heating pause should be explained by the fact that the oceans have absorbed the excess heat, themselves raising thir temperature. These concerned interventions of national delegations have been revealed by the "Associated Press", making the report findings honesty delusional [10].

There are examples of distortion of the results of a gentile scientific research in addition to tracking rugged and systematic counterfeit, as shown to us by the "Climategate" [1; 14; 9] business. The scandal began in November 2009, when a hacker accessed the databases (emails and documents) of the Climate Change Research Centre of the University of East England – one of the most influential institutions that formulate and promote the theory of global warm-

²¹ "New Scietist": "Pachauri has spent much effort defending what can not be defended, particularly when developed last IPCC report containing serious errors"

ing, in which Phil Jones (important member of the IPCC) and Michael Mann. Stolen information were posted on a Russian website, revealing among other things:

• Data shows that the global temperature has not increased in the last decade, and explanations cannot be formulated. In these circumstances, the data must be omitted or manipulated.

• Phil Jones and Michael Mann have operated maneuvers in order to block articles arguing the contrary to global warming, so as not to appear in peer-reviewed journals. On the other hand, they accuse these authors that they are not accepted in recognized magazines.

• Supporters of the opposing thesis were obstructed in the evolution of academic career. Lists were drafted of those experts who were not "predictable", with a view to their decredibilization on blogs and social networking.

• Unsuitable databases were destroyed or hidden; Phil Jones refused systematically to provide these data bases, which "got lost". The answer is not only unacceptable in terms of professional ethics, but also bearing in mind that the projects were financed from public sources.

• The computer program used by the CRU is inadequate and produces countless errors. But leading to agreeable results, that has not been claimed and corrected.

Damage brought to the reliability of scientific approach, to research organizations and to the theory of global warming through "Climategate" are huge.

3. If not human activity, what is causing global warming?

Partial responses were a compelling alternative image to the Earth's warming.

Data collected by NASA since 2005, studying the "frozen zone" near the South Pole (which has decreased for three consecutive summers) proves that Mars is undergoing a process of heating. The comparative processing of such data at the Pulkovo Astronomical Observatory in St. Petersburg show that both Earth and Mars are affected by solar cycles, and we are in a period of increased radiation sent by the Sun to the planets of its system [21].

Significant events happen also on Jupiter, as recorded by the Hubble Space Telescope. The storm areas known for over a hundred years agglomerate starting with 1998-2000, creating huge areas damaged by storm. In this context, the maximum heat area migrates from the equator to the South Pole. The equatorial area becomes warmer, and the South Pole begins to heat up [13].

In the same time, we have evidence about warming of the far-away Pluto. This is how it shows the systematic increase of atmospheric pressure for 14 years, according to the measurements made by a consortium composed of Massachusetts Institute of Technology, Williams College, the University of Hawaii, Lowell Observatory, and Cornell University [16].

The trend of warming of the planets in the system under the action of the Sun is demonstrated also regarding the Earth. The reference is the article published by Robert Calahan from Godard Space Center of NASA in "Daily Tech", under the title of NASA Study Acknowledges Solar Cycle, Not Man, Responsible for Past Warming [7]. It challenges the designation of the year 1998 as the hottest in the history of the planet, demonstrating that the year 1934 owns the record of positive temperature. The average temperature of the Earth increases and decreases in the context of solar cycles – and the growth trend is not linear.

The fact that the solar cycles seem off-balance compared to the conclusions of the previous measurements, brings another explanatory power regarding the tendency to stop global warming. If 1998 appears to have been the peak of a solar cycle (calculated at an average of 11 years) that brought a maximum of radiation over the planets in the solar system, in 2013 the scientists found a non-forecasted weakening of solar activity. Instead of a massive solar flare, you can barely see a few solar eruptions. In these circumstances, Richard Harison – the dead of the Department of Space Physics at the Rutherford Appleton Laboratory in the United Kingdom, as well as Lucie Green, of the Mullard Space Science Laboratory of University College London or Mike Lockwood, professor of space physics at the University of Reading, draw the attention to the danger of a cooling down up to a new ice age [8].

In front of the results of these investigations, the thesis of human activity as the main cause of global warming (in the ratio of 95% according to the most recent report of the United Nations Organization) cannot resist. There are cosmic causes that are related to solar activity (measured enough) or superior to solar activity (yet impossible to measure).

4. What is the actual ratio between the number of scientists who believe that the global warming theory is invalid, and those who deny it? Is it relevant to the scientific debate?

A partial response comes on the initiative of the Professor of chemistry at the Oregon Institute of Science and Medicine, Arthur B. Robinson, who has launched a joint petitioning project for American scientists who oppose the fundamentals of scientific articles which consider man as a cause of global warming published in per-review journals. The number of signatures exceed 31.000 [29]!

Beyond the expression of the opinion in an informal framework, the researchers disputing the theory of global warming begin to constitute in organizations with offices, staff, programs and own projects. We have the example of the International Climate Science Coalition, which launched in 2008 *The Manhattan Declaration on Climate Change.* "Global warming" is not a global crisis [3]. In august 2014, the number of supporters was 114 (present at the founding conference in New York in March 2008 [4]) to which other 671 experts were later added [5].

By comparison, the number of experts consulted by the United Nations for the publication of the report of the IPCC in 2013 is 250 [22]. It seems like a clear numeric disproportion in favor of skeptics, who do not have access and visibility through major publishers, through databases of prestigious magazines, or even in large-circulation daily newspapers. They cannot show the same force to the public by their results compared with the supporters of global warming theory.

Which are the groups that promote the project "Global Climate Change" and what are they after?

The central figure of the campaign in favor of the idea of global warming is former Vice President of America Al Gore, who founds his public presence on the non-profit organization "The Climate Reality Project" [32]. It was established in 2006 in Nashville – Tennessee. The main activity at the beginning of the organization was preparing as many hosts for the documentary film "An Inconvenient Truth". In 2007, subsidiaries of "The Climate Reality Project" have been set up abroad (United Kingdom, Australia, Spain, India, China, Canada, Indonesia, and Mexico). The entire system was unified in 2010 with the "Alliance for Climate Protection". Since then, the current name of the organization dates back.

The central site of the Organization has minimal scientific relevance. The texts, very few, promote undemonstrated sentences – as well as the introductory sentences relating to the Mission: "Today, we know that climate disruption is the greatest challenge that humanity has ever faced. And we know that carbon pollution is to blame." [33]

As regards the scientific value of the documentary "An Inconvenient Truth", critics are numerous, and they were not answered. Here's the summary of the errors identified by Christopher Monckton, published on the website Science & Public Policy Institute [15] (each one being demonstrated with scientific data, illustrated by tables, graphs and photographs):

Fusice 2. do Erroro in the Boodinentary An moonvertient fram							
ERROR 1	Sea level "rising 6 m"						
ERROR 2	Pacific islands "drowning"						
ERROR 3	Thermohaline circulation "stopping"						
ERROR 4	CO ₂ "driving temperature"						
ERROR 5	Snows of Kilimanjaro "melting"						
ERROR 6	Lake Chad "drying up"						
ERROR 7	Hurricane Katrina "man made"						
ERROR 8	Polar bear "dying"						
ERROR 9	Coral reefs "bleaching"						
ERROR 10	100 ppmv of CO ₂ "melting mile-thick ice"						
ERROR 11	Hurricane Caterina "manmade"						
ERROR 12	Japanese typhoons "a new record"						
ERROR 13	Hurricanes "getting stronger"						
ERROR 14	Big storm insurances losses "increasing"						
ERROR 15	Mumbai "flooding"						
ERROR 16	Severe tornadoes "more frequent"						
ERROR 17	The sun "heats the Arctic ocean"						
ERROR 18	Arctic "warming fastest"						
ERROR 19	Greenland ice sheet "unstable"						
ERROR 20	Himalayan glacial melt waters "failing"						
ERROR 21	Peruvian glaciers "disappearing"						
ERROR 22	Mountain glaciers worldwide "disappearing"						
ERROR 23	Sahara desert "drying"						
ERROR 24	West Antarctic ice sheet "unstable"						
ERROR 25	Antarctic Peninsula ice shelves "breaking up"						
ERROR 26	Larsen B Ice Shelf "broke up because of 'global warming'"						
ERROR 27	Mosquitoes "climbing to higher altitudes"						
ERROR 28	Many tropical diseases spread through 'global warming'"						
ERROR 29	West Nile virus in the US spread through 'global warming'"						
ERROR 30	Carbon dioxide is "pollution"						
ERROR 31	The European heat wave of 2003 "killed 35,000"						
ERROR 32	Pied flycatchers "cannot feed their young"						
ERROR 33	Gore's bogus pictures and film footage						
ERROR 34	The Thames Barrier "closing more frequently"						
ERROR 35	"No factin dispute by anybody."						

Table 2. 35 Errors in the Documentary "An Inconvenient Truth"

Source: Monckton Christopher, 35 Inconvenient Truths. The errors in Al Gore's movie, [Online], "Science & Public Policy Institute", http://scienceandpublicpolicy.org/images/stories/press_releases/monckton-response-to-gore-errors.pdf

On the other hand, the documentary "An Inconvenient Truth" has received the reply in the same register, through the documentary "The Great Global Warming Swindle" [17].

Al Gore's Organization functioned as an engine for thousands of other non-governmental organizations, political parties, universities and institutes of the national academies, international organizations and states. Its paradigm was taken, justified, fathomed, supplemented with case studies of regional and local level. At present, it predominates the public consciousness, and has a considerable advantage over skeptics in the scientific circles (less in terms of the number of experts positioned in the two camps!).

What motivates the proponents of the theory of global warming?

First, we cannot deny a sincere eco-concern. Cohorts of organizations, media editorial offices, and parties are afraid for the future of the planet and of human generations to come. The truth of the arguments on which it is based remains in question.

Secondly, various international or private structures that would manage the carbon certificate market – which represent the context of colossal and facile economic advantages.

Last (but not least?) the followers of global governance have found in the issue of global warming the perfect tool for their implementation. Very simple logic, in fact, is missed by the overwhelming majority of the public. Global warming cannot be solved with national legislation; it takes a global law. Those who violate the law must be identified and researched by a global police force, to be then judged by a global justice. Here it is then, the core of the future global government.

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ГЛОБАЛЬНЕ ПОТЕПЛІННЯ МІЖ НАУКОЮ І ПОЛІТИКОЮ

Протягом останніх трьох десятиліть, наукова теорія глобального потепління стала політичною ідеологією. Значні політичні компоненти можна побачити як в передумовах, і (особливо) в наслідках. Але спостерігається вже принаймні десятиліття і негативізм: науково-дослідні програми глобального потепління сумнівні щодо методології та етики досліджень. Як виклик до всіх тенденцій "теорія глобального потепління" вже стала "теорією глобальної зміни клімату". Чи правда, що глобальне потепління це ідеологія підготовки глобального керівництва над суворо лімітованою кількістю людей?

Ключові слова. Глобальне потепління, глобальна зміна клімату, теорія, ідеологія, політика.

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ГЛОБАЛЬНОЕ ПОТЕПЛЕНИЕ МЕЖДУ НАУКОЙ И ПОЛИТИКОЙ

В течение последних трех десятилетий, научная теория глобального потепления стала политической идеологией. Значительные политические компоненты можно увидеть как в предпосылках, и (особенно) в последствиях. Но наблюдается уже по крайней мере десятилетие и негативизм: научно-исследовательские программы глобального потепления сомнительные по методологии и этике исследований. Как вызов всем тенденциям "теория глобального потепления" уже стала "теорией глобального изменения климата". Правда ли, что глобальное потепление это идеология подготовки глобального руководства над строго лимитированным количеством людей?

Ключевые слова. Глобальное потепление, глобальное изменение климата, теория, идеология, политика.

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ESTIMATION OF THE INFORMATION SYSTEM DATA COLLECTION EFFICIENCY **IN ENERGY COMPLEX**

The paper highlights shortcomings of current information system of energy statistics in Ukraine. The study describes the mechanism of automated statistical data collection in energy complex and estimates introduction efficiency of such system. Developed information system of energy statistics makes it possible to form the statistical report by different profiles in energy.

Keywords: State Committee of Statistics of Ukraine; energy complex.

Introduction. Information system of the State Committee of Statistics of Ukraine, particularly energy statistics can be characterized as not fully automated. That is

why it is important to create and implement the mechanism for statistical data which come from respondents and as a result to avoid a lot of intermediate stages of information processing.

According to the law of Ukraine "On State Statistics" information system of the state statistics is a complex of technical, soft, communicational and other tools which ensure the process of collecting, accumulation, processing, distribution, saving, protection and usage of statistical information [6].

The state statistics of Ukraine consists of the following elements:

 Central body of executive authority which implements the state politics in statistics sphere;

- Functional bodies of the state statistics are enterprises, institutions and organizations which are governed by the central body, which implements the state politics in statistic sphere.

For understanding that many stages of statistical information processing are performed manually, there is a list of work stages of the State Committee of Statistics of Ukraine:

1. The State Committee of Statistics develops and distributes blank accountability forms (monthly, quarterly, annually and operational).

2. The Regional Committee of Statistics distributes the forms to enterprises and to the district units of Statistics. District (city) unit of statistics is small organizational subdivisions, responsible for data collection. City administration of statistics gathers information only from industrial, construction and other companies.

3. Gathered data is aggregated on computer using spreadsheets.

4. Aggregated and consolidated into the spreadsheets, data is sent to the regional department of statistics as well as to the local governing body. Only 30% of gathered information is sent to the regional level [1].

Problems. So the aim of the State Committee of Statistics of Ukraine should be automation of the state statistical activity in energy complex, to be more precise, creation of automated process of data collecting and processing which come directly from statistical unit. Such information system will allow to decrease the complexity of the process of statistical data collecting by eliminating many stages of data processing and to shorten the duration of this process.

Literature review. During the last few years there are a lot of normative documents at the international and state level which regulate the order of collection and processing of statistical information due to the need of information system improvement of the state statistics.

Particularly there was a review of the System of Environmental Economic Accounting (SEEA) which was initiated by the United Nations Statistics Division (UNSD) with the purpose to raise SEEA up to the level of the international statistical standard. Reviewed SEEA is based on its predecessors – SEEA-2003, SEEA–1993 [3].

Energy is defined is a priority branch for SEEA usage. There were also developed the "International Recommendations for Energy Statistics" (IRES). IRES were developed by Statistical Division of the United Nations Organization (UNO) by the cooperation with Oslo Group on statistics and energy and Intersecretarial working group on statistics and energy. A draft of IRES was created in New York on February 22-25, 2011 [3].

The international recommendations for statistics in energy sphere provide data with a full set of recommendations starting from the basic idea, definitions and classifications for data sources, strategy of data collection, energy balances, and quality of data and statistics distribution.

SEEA – Energy enlarges and defines concretely instructions included in IRES. As a result of studies in Ukraine which are purely theoretical in the field of collecting and processing of statistical information, the amount and quality of bills and normative legal acts are increasing steadily. A lot of normative acts appeared in Ukraine during 2011-2013 years. Particularly Methodological Regulations on organization of the state statistical surveys in the field of energy and forms of the state statistical observations were approved.

Results. State information system of statistics in energy complex is information system which includes statistics data in energy complex.

In Russian Federation the decision about creation of the similar system was adopted in 2009 and Minenergo was responsible for the development. But in Russian Federation there is more functional system – information system of energy complex. The difference is that it will include information about the state and forecast of energy complex development.

The main law that regulates relations as a result of creation, usage, improvement of the state information system of energy statistics in Russian Federation is the law "On the state information system of energy complex" which was adopted in November 2011. And putting into operation is planned for 2015 year [2].

The idea of collecting data from the first hand source was discussed in Russian Federation but after the analysis of necessary expenses there was decided to integrate data from the already exist at the enterprises information system [2].

Data collecting in Russian Federation was planned with a help of special program and technical tools – complex of information technologies, including program tools of information system of energy complex (software for PC and data base) and technical tools of information system of energy complex [4].

In the information system of statistics of energy complex of Ukraine collecting of statistical data is planned to perform via web-application and doesn't need the installation of extra software. Therefore, expenses for putting into operation this system are minimum.

Information system of statistics of energy complex is assigned for automation of the process of collecting, saving of statistical data of energy complex and for the access to this data.

The main principles of functioning of future information system of statistics of energy complex are the following:

1. Fullness, validity and providing information on time to include into the information system.

2. One-time of collecting information.

3. Interaction of information system of statistics of energy complex with the other state information system, particularly with the State Register of Enterprises and Individual Entrepreneurs.

4. Information security.

5. Accessibility and no fees for use of the information system by the subject of this system.

The basis for information system functioning should be the law of Ukraine which regulates relations between the subjects of this information system, particularly collecting of information, processing, access, storage, providing and distribution of information. This law should be concentrated on support and improvement of the system of interagency information cooperation in the field of energy complex.

The main points that should be regulated by the law are the following:

legal basis of the establishment, functioning, improvement of the information system;

- subjects of the information system;

- main requirements for the information system;

- government authority in the development, operation and improvement of the information system;

- rules for collecting, storage, processing, distribution of the information.

to the energy sector.

Experience of Russian Federation can be used during the creation of such a law, a model can be the law "On the State Information System of Energy Complex".

The subjects of the information system of energy sector are:

 Public authorities (The State Committee of Statistics) of Ukraine and the Ministry of Energy and Coal Industry of Ukraine).



Fig. 1. Mechanism of Functioning of the Information System of Energy Sector

Source: composed by authors' calculations

Some of functions of the State Statistic Service of Ukraine:

- Ensuring of development and implementation of consistent technological approaches to collecting, processing and distribution of statistical information on the basis of consistent methodology and modern information technologies;

- Ensuring of functioning and development of integrated information and analytical system of the state statistics.

So, development and implementation of an automated system of energy sector is a function of the State Statistics Committee of Ukraine. But such development is possible only with the involvement of experts.

The process of using the information system by the respondents is performed via several stages:

1. Registration of the legal entity / individual entrepreneur and each separate unit.

1.1. Receiving of the login and password to log into the information system in the State Statistics Committee of Ukraine. There is a need to obtain a login and password by the authorized person only, to limit the possibility of registration of the unauthorized persons. 1.2. Edit of details of the subjects. Initial data entry will be unnecessary since the moment data is imported from the state register of enterprises and individual entrepreneurs.

2. Filling of forms of the state statistical surveys.

Each entity in its personal account will have a number of forms need to be filled.

Each form is opened for filling on a certain day. For example, if a report should be filled on the results of the year, a form is open since January 1st and active for filling by the deadline. So the form can be "open" or "closed".

Each "open" form can have a status "Report is in the process of filling" or "Report is sent". That is each report can be filled by parts. Partially filled report can be saved and can have a status "Report is in the process of filling". And after the report is done, click "Send" and it will change its status to "Report is sent". It is not allowed to make any changes after the report is sent.

During the form filling there is the process of the preliminary checking of data on appropriateness. In case of conflicts a user will be sent a notification. So mechanism of filling the form is identical to the paper form filling but significantly reduces time for filling and processing data.

When you log into the system it is advisable to implement a dynamic password, so after the main password is entered, there will be sent a message that include a dynamic password.

According to the Article 14 of the law of Ukraine "On the State Statistics" main rights and duties of the respondents are:

- The respondents have a right to know what initial data about them is collected during the process of statistical surveys, for what purpose, how, by whom, and for what purpose will be used.

- Respondents are required without any fee (the exception is selective surveys of individuals or a group of individuals, for which, individuals receive monetary compensation for time spent) sufficiently, according to a form, provided for statistical reporting within a set deadlines send accurate information as well as with limited access and accounting.

- Structure, volume and methodology of calculation, addresses and terms of providing statistical information are mentioned in statistical documentation and are mandatory for all respondents and can't be changed without an appropriate permission of the state statistics [5].

There will be 3 types of users in the information system: 1. Respondents,

2. Users of the public authorities:

2.1. The State Statistics Committee of Ukraine,

2.2. The Ministry of Energy and Coal Industry of Ukraine.

End users.

Administrators of the information system will be moved to a separate group.

So each login is assigned to a particular group. Depending on a group membership, a user has a defined function of information system. There is no necessity for registration for the end users.

Respondents of Information system of statistics of energy complex are:

 transactors who have at least one kind of activity refer to section "B" of Classification of Economic Activities;

- transactors who have at least one kind of activity refer to section "D" of Classification of Economic Activities (without group 35.3 "delivery of steam, hot water and conditioned air")

Let's define functions for each group. Features of the information system for the respondents are:

- filling of forms of the state statistical surveys;

generation of the reports for your own company based on forms of the state statistical surveys (comparative statements per years, reports based on calculated rate).

Features of information system for users of the State Statistics Committee:

- generation of summarized reports based on data received from respondents:

 generation of report on the level of filling of reports by the respondents by deferent criteria;

- adjustment of the level of the reports specification that can be generated by the end users.

- Legal entities, separate units of legal entity, individual

Mechanism of functioning of the information system of

entrepreneurs who have at least one kind of activity related

energy sector is represented at picture 1.

Features of information system for users of the Ministry of Energy and Coal Industry of Ukraine:

 generation of summarized reports by different criteria based on data from respondents;

 generation of report on the level of filling of reports by the respondents by different criteria.

Features of information system for the end users:

- familiarization with summarized reports (with fixed criteria);

- generation of summarized reports on different criteria based on data received from respondents.

Capability of administration:

- support of productivity of information system;

- technical task performance, given by users of the Ministry of Energy and Coal Industry of Ukraine and by users of the State Statistics Committee of Ukraine.

Information system of statistics of energy sector will be available on a web site. Each representative of the government (The State Statistics Committee of Ukraine and the Ministry of Energy and Coal Industry of Ukraine) and a respondent needs to log into the system. After logging, each group will have its own system interface.

Table 1 gives the list of sections for each group of users.

Table 1	. Sections	of the	portal fo	r each grou	p of users
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Group of Users	Section	Features
	Porsonal account	Personal data edit
		Password change
	Management of forms of the state	Form status change: active, not active
Users of the State Sta- tistics Service	statistics surveys	Determination of the start and end day for reporting (filling of form)
	Pospondonts	Generation of reports per respondents (according to database Regis-
	Respondents	ter of statistical units)
		Generation of summarized reports by deferent criteria based on data
	Reporting of respondents	received from respondents
	reporting of respondents	Generation of report on the level of filling of reports by the respondents
		by deferent criteria
	Personal account	Personal data edit
		Password change
Lisers of the Ministry of	Respondents	Generation of reports per respondents (according to database Regis-
Energy and Coal Indus-		ter of statistical units)
try of Ukraine		Generation of summarized reports by deferent criteria based on data
ay or ordanio	Reporting of respondents	received from respondents
	reporting of respondents	Generation of report on the level of filling of reports by the respondents
		by deferent criteria
	Personal account	Password change
	Information regarding the company	Data review imported from Register of statistical units
Respondents	Forms of the state statistics surveys	Filling of forms of the state statistics surveys
	Poports of fuel and onergy complex	Generation of report on the level of filling of reports by the respondents
	Reports of rule and energy complex	by deferent criteria
Enducore	Poports of fuel and operate complex	Generation of report on the level of filling of reports by the respondents
	Reports of rule and energy complex	by deferent criteria

Conclusion. Creation of the information system of energy statistics will allow to improve the quality, efficiency and effectiveness of public administration in the field of energy. Summary of data coming from the respondents will be available to end-users on the Internet in the public domain (without registration).

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ОЦІНКА ЕФЕКТИВНОСТІ ЗБОРУ СТАТИСТИЧНИХ ДАНИХ В ЕНЕРГЕТИЧНІЙ ГАЛУЗІ

В статті сформульовані недоліки існуючої інформаційної системи енергетичної статистики в Україні. Описаний механізм автоматизованого збору статистичних даних в енергетиці та оцінена ефективність системи, що впроваджується. Розроблена система дозволяє автоматично формувати статистичні звіти в енергетичній галузі в різних розрізах. Ключові слова: Державна служба статистики України, енергетичний комплекс.

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ОЦЕНКА ЭФФЕКТИВНОСТИ СБОРА СТАТИСТИЧЕСКИХ ДАННЫХ В ЭНЕРГЕТИЧЕСКОЙ ОТРАСЛИ

В статье приведены недостатки существующей информационной системы энергетической статистики в Украине. Описан механизм автоматизированного сбора статистических данных в энергетике и оценена эффективность внедрения такой системы. Разработанная система позволяет автоматически формировать статистические отчёты по энергетической отрасли в разных разрезах. Ключевые слова: Государственная служба статистики Украины; энергетический комплекс. Bulletin of Taras Shevchenko National University of Kyiv. Economics, 2015; 1(166): 60-64 JEL D83; G21; G28 UDC 336.77 DOI: dx.doi.org/ 10.17721/1728-2667.2015/166-1/8

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CREDIT BUREAU BENCHMARKING AS A TOOL FOR ESTIMATION OF BANK'S POSITION AT THE MARKET

The article presents the conception of benchmarking on the market of consumer loans. The essence of such benchmarking is comparative analysis of bank's activity parameters with market average values from bureau of credit histories. Such benchmarking using is considering as a tool for estimation of bank's market position.

Keywords: benchmarking; bureau of credit histories; competitiveness; banks crediting; market of consumer loans.

The problem statement.

Consumer lending, originating from the time of ancient Greece, gained significant development in the second half of the XX century. This is due, primarily, to the end of the Second World War, after which the gap between production and consumption demanded the creation of a mechanism to stimulate demand by the population and the rapid development of computer and information technologies. Banks have played the important role in this segment through high resource potential and opportunities in technology development lending. This segment differs from others by mass character of loan granting, standardized credit products, scoring tool for estimation of creditworthiness and risk of the borrowers. As addition, this segment is characterized by relatively high profitability and dynamic changing of the market opportunities.

Today the product range of consumer crediting includes mortgage, car loans, unsecured loans, express loans in stores, credit cards and more. During the global financial crisis of 2007-2008, the most dynamic segment of lending was mortgage. It was due to the presence of "long" money and their relatively cheap price. After the financial crisis lending segment shifted to unsecured consumer loans. The development of information technology is also constantly stimulates the development of the credit card segment.

Dynamic development of bank consumer crediting can be observed in Eastern and Central Europe. With the transition from a command to market system began to develop the banking sector. At the beginning of XXI century these countries experienced a boom in consumer lending. For example, quarterly growth in lending to households in Poland, Russia and Hungary for the period 2007-2008 years was 20-80% [1], [2], [3].

The consumer crediting had dynamically developing in Ukraine over the past 10 years. Dynamics included several stages. At the first stage, which began in 2004-2005 and continued until the 2008 financial crisis, banks are actively issued mortgages, car loans and loans for the purchase of home appliances. Moreover, a significant portion of mortgages and car loans issued in foreign currency (dominantly in USA dollars). The share of consumer loans in the structure of the total bank's loan portfolio amounted to about one-third. At the stage of the financial crisis, consumer credit stood still, and the post-crisis stage began to emerge with significant changes in the structure of banks supply. Specifically, since 2010, banks began to actively promote the market in unsecured no-purpose loans and credit cards. In mid-2013 formed sufficiently rich offerings of consumer loans proposition. Approximatively 50 banks are offering different proposition. The average monthly amount of lending to households from July 2012 to July 2013 was 8.5 billion [4]. At the same time, the share of loans to individuals in the structure of the total bank's loan portfolio has fallen to one-fifth and not growing, which is a consequence of focusing on the issuance of short-term loans.

Political turbulence impacted to the consumer lending in Ukraine at the first half of 2014. The focus was concentrated to revision the strategies of consumer lending development and reallocation capital for credit granting between regions.

So, we can see that credit market opportunities, resource support lending, profitability of different credit products dynamically changing in the last 10 year. These changes we observe as at the world market as in Ukrainian market of the consumer crediting.

Based on abovementioned, the banks in the consumer lending market face the challenge of qualitative competitive analysis for the development and implementation of optimal development strategy. That would allow them to take and hold (or expand) their own niche in this segment. For the development of optimal strategies in such competitive environment, banks have used a variety of methods and approaches. One such method is method of benchmarking, which originated in the 1970s in the United States, constantly improved, and today is a powerful tool of competitive advantage [5]. The problem which is analyzed in this article is to use potential of bureau of credit histories for creation benchmarking methodologies. These methodologies provide banks by good instrument for improving their market position and construct adequate strategies for competitiveness.

Analysis of recent researches and publications.

Benchmarking is recognised as an effective tool for permannt improvement of quality of different objects or processes. Since its origin in the middle of 1970-th there were published a lot of papers which covered different questions of its essence and applications in different spheres. Reviews of literature on benchmarking have been done in some special articles such [6] and [7].

From the current point of view all publications devoted to benchmarking can be divided for convenience into three groups. First group includes papers devoted to general aspects of concept of benchmarking and fundamentals of benchmarking using. May be paper [8] is a good overview for this. Second group is devoted to specific applications of benchmarking and case studies in different fields. It is reasonable to point out article [9]. Finally, the third group describes innovation techniques of benchmarking using [6].

There are a lot of literature devoted to different questions of bureau of credit histories functioning and applications of bureau information. Original paper [10] by David Birch presents approach of using the information from the private credit bureau Dun's Market Identifiers (DMI) to identify the impact of moving companies from one state to another for employment in the U.S. The article [11] presents overview of credit bureau in European countries. In [12] authors analyze the bureau development in Ukraine. The ideas about using benchmarking concept based on information from bureau are presented in [13].

Methodology.

Benchmarking is the term formed from word "Benchmark" which means "basis for comparison". In management and marketing benchmarking is the process (procedure) comparison of the company with the best analogs on the market or industry. The aim of benchmarking is to initiate changes for improving competitiveness and performance. First benchmarking as a method of analysis was generate in 1972. The U.S. research and consulting company PIMS proposed approach to finding effective solutions in a competitive environment, based on the knowledge and use of best practices of similar companies in similar circumstances. American company "Xerox" successfully used benchmarking to analyze the costs and quality of their products in comparison with Japanese counterparts. After that benchmarking had guickly become one of the most effective methods of competitive analysis. Today benchmarking as a method of analysis of competitiveness improves business performance, gain early warning signals about the lag, the level of performance compared with the best models in the industry, reduce the cost of developing a competitive advantage.

We offer to use the potential of bureau of credit histories for developing and implementing benchmarking on consumer lending market. There are a lot advantages in this approach which are presented below.

Bureau of credit histories are the credit market infrastructure institutions that accumulate information about credit histories and provide their exchanges. The bureaus are multifunctional institutions. The main functions of the bureau in modern credit markets are:

• Reduce the cost of collecting and analyzing information. If the institution of bureau of credit histories is absent on the market the creditors should spend a lot of effort to search for information about borrowers from different sources. When the market has a system of credit bureaus, the creditor immediately receive the necessary information.

• Reduce the risk of information asymmetry. This risk is present because the lender and borrower are in different information situations. Bureaus of credit histories reduce the risk of the lender by means of providing information about borrower. Borrowers with negative history rejected and borrowers with positive history can obtain better conditions for borrowing.

• Reducing the moral hazard of the borrower. Availability of credit bureau encourages the borrower to fulfill credit obligations more responsibly. Otherwise, the borrower will be limited access to credit granting through the display of negative information in credit bureau.

In general, banks in conjunction with the credit bureau can significantly improve risk management and improve the process of making credit decisions.

Bureau of credit histories collect and store the information about credit transactions in the market. The presence of huge volume of data can serve as a basis for benchmarking. In various countries functioning of credit bureau organized differently. It may be one bureau on the market. It may be many bureaus which are competitors. State may be directly involved in organizing the bureau, and can act only as regulator of office, which are private institutions. The collection of information may be required, or may be voluntary.

For example, in Ukraine the credit bureau system is developed as a set of private institutions. The state acts only as market regulator. Transmission of credit information from banks to bureau is not mandatory, but the National Bank of Ukraine encourages banks to pass information to the bureau through regulations of reserves. In Ukraine, the credit bureaus operating through 2005 after the adoption of the Law of Ukraine "On organization of formation and circulation of credit histories". There are 9 bureaus include in State register in Ukraine (as of April 2014). The largest in terms of data among which are the following three:

- Ukrainian bureau of credit histories (UBCH);
- First credit bureau of Ukraine (FCBU);
- International bureau of credit histories (IBCH).

Information taken from the official websites of these bureaus as of the first quarter of 2014, indicating that UBKI has amount of 35 million credit histories. IBCH and FCBU have above 16 million each. Almost all large banks engaged in consumer lending transmit information into bureau's databases. According to the author investigation, 96% of the borrowers inflow in early 2014 had a credit history of at least one of these three bureaus.

The amount of data accumulated in the credit bureaus usually are representative samples of market data. For example, the amount of data in any of these three Ukrainian bureau of credit histories, is sufficient for the evaluation of various market indicators. Therefore, they can realize the concept of benchmarking model developed in this article and is presented below.

The author believes that the benefits of using bureaus data for benchmarking are that the data consist of real statistical market information which updated regularly. It is important also that the performance can be calculated delay in payments and credit risk across the market. Such information is usually not disclosed by individual banks. Also benchmarking can explore the figures for individual products, market segments and regions.

The goal of the article.

The purpose of this article is to present the design of benchmarking on the market of consumer bank lending. A distinctive feature of the proposed benchmarking is to use information from bureau of credit histories. The advantages of this type of benchmarking and its implementation on the Ukrainian market of consumer lending are considered.

Results.

Model of bureau's benchmarking based on the data presented in the bureau. The proposed model based on the structure of the information that is reflected in the bureau under the Ukrainian legislation. Given that the Ukrainian legislation bureau was developed taking into account the international experience, the conceptual model does not significally vary from other markets.

The information contained in the bureau may be structured in the following content blocks:

information about identification of borrower;

 information about liabilities of borrower (loan products, their types, number of open and closed loans, parameters of loans, etc.);

 information about the borrowers from public registers and other public use databases;

 information about operations with credit histories (number of requests for stories during different intervals).

On the basis of these data and information it is possible to form the set of indicators for benchmarking model. Indicators can be grouped into 4 blocks as presented at the pictured on Picture 1. Each block contains a lot of indicators. That gives the possibility to compare average market values with values of these indicators for individual creditors.



Fig. 1. The benchmarking model based on bureau of credit histories information

Source: composed by authors' calculations

The description of block's constituents is following. Block "Indicators of credit activity".

Following indicators may be included:

1) monthly or quarterly growth/declining rate of queries to the bureau for all credit products;

2) approval rate (the ratio of number of granted loans to number of queries).

This block may include sub blocks devoted to: 1) queries for different type of loans (installment loans, credit cards etc.); 2) region differences in applicant's activity; 3) segments differences (such microcredits, large credits and so on).

Block "Characteristics of borrowers".

There are different social-demographic indicators and indicators of regional specificity can be proposed to including into this block. The most important are:

- 1) average age of applicants;
- 2) marital status;
- 3) average number of dependents;
- 4) region of living (geographically or cities/villages);

As addition it is possible to calculate indicators of borrower's activity:

1) Average total number of credits in applicant's credit history;

 Average number of open installment credits in applicant's credit history;

Average number of active credit cards which applicant has in applicant's credit history;

4) Average number of closed loans in credit history.

Block "Characteristics of granted loans".

This block includes basic parameters of granted loans. The basic indicators which can be received from bureau of credit histories are:

- 1) average granted loans amount;
- 2) average duration of granted loans;
- 3) average credit rate;

4) average monthly payments for granted loans.

Block "Indicators of delinquency and risk".

These are extremely important indicators for competitive analysis, which includes level of delay for varying degrees of arrears severity (Bad Rate) – 1 month, 3 months, 12 months and more. Especially important the indicator of the percentage of loans on which no payment was made (so called FPD – First payments default). Also is important indicator is the average amount of overdue.

The principal difference between benchmarking of bureau of credit histories is used the average market performance. Classical benchmarking is used best examples on the market. When we use benchmarking of bureau of credit histories we can consider following logic. Variations in the positive direction show some competitive advantages in comparison with the market and variations in the negative direction show weaknesses of the lender. Considered average market indicators and indicators of individual banks enable an objective assessment of the market position of the bank.

It is necessary to take into account some aspects when proposed model in use. First, you must decide to which type of average value is used for comparison. There are arithmetic average and weighted average. It is important by fact that market has small and large retail lenders. When considering the average-weighted value it may be some shift to the side of large lenders. Secondly, the comparison may be between the absolute values and between relative values. The comparison of absolute values can effectively illustrate deviations for individual indicators, but not always correct to consider the cumulative integral comparison. To review and assess the position of the bank in total should take 1 (100%) for average performance. The values from the bank deduct a percentage of the market average. Thirdly, it is advisable to compare all the criteria arranged in one direction (maximize or minimize). Of course, this does not always have a direct economic sense. For example, the parameter "average loan amount" cannot be determined as indicator for maximization or minimization. However, the criteria related to the delay in payments are clear.

An important aspect is to compare the results of comparing the integral index, which describes the cumulative deviation parameters of an individual bank from benchmarking. As an integral performance comparison can enter the following:

TUW (Time under the water). It shows the percentage of indicators on which bank deviates from the average in the market in an unfavorable direction.

Semivariation. Let benchmarking process includes *n* indicators. The value of the indicators *i* to denote as x_i for particular bank and the value of benchmarking bm_i (taking into account the above proposed approach bm_i taken as 1). Then the semi-standard deviation defined as follows:

(

$$\sigma_{+} = \sqrt{semi \, var_{+}} , \text{ where } semi \, var_{+} = \begin{cases} \frac{\sum_{i=2}^{n} \alpha_{i} (x_{i} - bm_{i})^{2}}{\sum_{i=2}^{n} \alpha_{1}} \\ \frac{\sum_{i=2}^{n} \alpha_{1}}{\alpha_{i} = 1, \text{ if } x_{i} > bm_{i},} \\ \alpha_{i} = 0, \text{ if } x_{i} \leq bm_{i}. \end{cases}$$
$$\left(\frac{\sum_{i=2}^{n} \beta_{i} (x_{i} - bm_{i})^{2}}{\sum_{i=2}^{n} \beta_{i} (x_{i} - bm_{i})^{2}} \right)$$

$$\sigma_{-} = \sqrt{semi \, var_{-}} \text{ , where } semi \, var_{-} = \begin{cases} \frac{\sum_{i=2}^{n} \beta_{1}}{\beta_{i} = 1, \text{ if } \mathbf{x}_{i} > bm_{i},} \\ \beta_{i} = 0, \text{ if } \mathbf{x}_{i} \le bm_{i}. \end{cases}$$

In fact, these values show the mean square deviation up and down from benchmarking. If $\sigma_+ > \sigma_-$, then the integral

index variations in the direction of positive integral index higher deviations in the negative direction. This is an indication that the bank's market position in the consumer credit market as a whole is better than the average market values.

In order to reflect the importance of variations on various indicators to calculate formulas *semi var*₊ and *semi var*₊ need to enter weights ω_i . They should satisfy conditions: $\omega_i \ge 0$ and $\sum_{i=1}^{n} \omega_i = 1$.

For example, formula to calculate $semi var_+$ will be following:

$$semi \, var_{+}(\omega) = \begin{cases} \frac{\sum_{i=1}^{n} \alpha_{i} \cdot \omega_{i} \cdot (x_{i} - bm_{i})^{2}}{\sum_{i=1}^{n} \alpha_{1} \cdot \omega_{1}} \\ \frac{\alpha_{i}}{\alpha_{i}} = 1, \text{ if } x_{i} > bm_{i}, \\ \alpha_{i} = 0, \text{ if } x_{i} \le bm_{i}. \end{cases}$$

Example. Let us supposed that someone choose 10 indicators for comparison by benchmarking model. All indicators correspond to maximization criteria. Average market value (calculated on the basis of the credit bureau) for these criteria selected as 1. The problem is to compare two banks A and B with average market values. The values of selected indicators (P1, ..., P10) are shown in the table.

	P1	P2	P3	P 4	P5	P6	Ρ7	P8	P 9	P10
Bank A	0,7	1,4	1,1	1,6	1,2	0,5	0,8	0,95	1,05	1,5
Bank B	1,3	0,6	1,4	1,4	0,7	1,5	0,6	0,4	0,67	1,05
Market Benchmarking	1	1	1	1	1	1	1	1	1	1
Weights ω _i	0,05	0,1	0,05	0,05	0,2	0,15	0,1	0,05	0,1	0,15

The calculation of TUW values provide us by following results: TUW for bank A is 40%. TUW for bank B is 50%. The calculation of σ_+ and σ_- shows following results: $\sigma_+(A) = 0,37$ and $\sigma_-(A) = 0,30$. This means that "positive" deviations are more significant than negative deviations. The situations with bank B is reverse: $\sigma_+(B) = 0,36$ and $\sigma_-(B) = 0,42$.

If we use weights presented in the last row in table then results will following: $\sigma_+(A) = 0,12$ and $\sigma_-(A) = 0,31$. The relation between deviations became reverse. The situations with bank B is following: $\sigma_+(B) = 0,13$ and $\sigma_-(B) = 0,14$.

Visual representation of benchmarking is present at Picture 2.



Fig. 2. Visual presentation of comparison with benchmarking

Source: composed by authors' calculations

Conclusions and discussion.

Let us form the conclusions. Modern market of consumer lending is a highly competitive and dynamically changing environment. To make profit at this market banks need to build effective strategies for the development of crediting business, which in turn means the market analysis and formation of their own niche products. An important tool for this can be benchmarking provided by bureau of credit histories. Its essence lies in the possibility to compare parameters and credit risk of a separate bank with the parameters of the total market and its separate segments. The advantage of bureau benchmarking is that it accumulates a large amount of significant credit information that representatively reflects market parameters. In presentation В I С Н И К Київського національного університету імені Тараса Шевченка ISSN 1728-3817

materials is represented a model of such benchmarking, which makes possible to perform complex (in the context of the four blocks of parameters) comparative assessment of a separate bank with the market. Based on the proposed model it can be developed an advanced business development strategies and created unique credit offers.

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БЕНЧМАРКИНГ БЮРО КРЕДИТНИХ ІСТОРІЙ ЯК ІНСТРУМЕНТ ОЦІНКИ РИНКОВОЇ ПОЗИЦІЇ БАНКА НА РИНКУ

Стаття презентує концепцію бенчмаркингу на ринку споживчих кредитів. Сутність такого бенчмаркингу у порівняльному аналізі параметрів банку та середньо ринкових значень, розрахованих на основі інформації з бюро кредитних історій. Використання бенчмаркингу розглядається як інструмент для оцінки ринкової позиції банку.

Ключові слова: бенчмаркингу; бюро кредитних історій; конкурентоспроможність; банківське кредитування; ринок споживчих кредитів.

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БЕНЧМАРКИНГ БЮРО КРЕДИТНЫХ ИСТОРИЙ КАК ИНСТРУМЕНТ ОЦЕНКИ РЫНОЧНОЙ ПОЗИЦИИ БАНКА НА РЫНКЕ

Статья презентует концепцию бенчмаркинга на рынке потребительских кредитов. Сущность такого бенчмаркинга в сравнительном анализе параметров банка и среднерыночных значений, рассчитанных на основе информации из бюро кредитных историй. Использование бенчмаркинга рассматривается как инструмент для оценки рыночной позиции банка.

Ключевые слова: бенчмаркинг; бюро кредитных историй; конкурентноспособность; банковское кредитование; рынок потребительских кредитов.

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DEVELOPMENT OF SELF-EMPLOYMENT IN GLOBAL ECONOMIC CONDITIONS

The article analyses factors effecting the development of self-employment activities in global economic conditions and, namely, liberal professions. The aim of this article is to identify the factors affecting the development of liberal professions. The methods used in this investigation are followers: scientific literature analysis, collection of information, comparison, generalization and logical analysis. The authors of this article concludes that the emergence of knowledge sector, increasing differentiation and flexibility of production and the growing role of creativity in value creation process determine the rising importance of liberal professions as one of the self-employment forms.

Keywords: liberal professions, self-employment, creativity, professional career.

Introduction

Economic activities carried out by individuals, through which they seek to earn their income or receive other economic benefits, can be classified based on various criteria: sphere of activity, legal organization and ownership, scope and aim of activity, the number of involved individuals, etc. It is common practice in foreign countries to provide employment qualification statistics in terms of job creation criteria, in other words, to separate self-employed and employed individuals. Generally, individuals creating jobs (for themselves and others) are perceived as self-employed. Individuals who are hired for jobs created by others are perceived as employed. Selfemployment can be collective (businesses with multiple owners) or individual (business license, liberal professions, independent creators and performers, freelance artists, individual craft companies). Due to perpetually rising scope of self-employment a need to define separate segments of this activity and regulate the participation of self-employed individuals in the society has emerged.

European Commission stresses the importance of economic analysis in respect to self-employment and dedicates much attention to liberal professions, which are labeled as one of the important sectors of European economy, providing considerable public services. European Economic and Social Committee in Information memo "The role and future of the liberal professions in European civil society 2020", notes that these professions assist in creating production structure, jobs and ensure considerable public services; they are a driving force of innovations, development and production, as well as an important measure in overcoming economic and social crisis (1). The number of self -employed is rapidly increasing in the liberal professions sector. Each sixth of self-employed in the EU-27 in 2012 was working in the liberal professions sector. Fig. 1 shows that from 2008 to 2012 the share of these workers in the total number of self-employed increased from 14.9% to 16.9%.



Fig.1. Self-employed in the liberal professions sector as the share from the self-employed in the EU-27, %

Source: authors calculations based on The role and future of the liberal professions in European civil society 2020.

The development of the self-employed indicates the decrease of recruitment volume in the liberal professions sector. The share of self-employed, who recruits labour

force, from all self-employed in the sector of liberal professions fell from 32,3% in 2008 to 28,1% 2012. (Fig. 2).



Fig. 2. The share of self-employed, who recruits labour force, in the sector of liberal professions

Source: authors based on The role and future of the liberal professions in European civil society 2020

Liberal professions, as a form of self-employment, in Lithuania were legalized by law from 1 January 2011. Currently the following spheres are distinguished: law, economics, medicine and social security, education and training, journalism, art, architecture, etc. The self-employed in this sector in 2008 – 2012 m. as a share of total self-employed increased from 8, 2% to 13,4% in Lithuania. (2).

The social significance of the liberal professions is indicated by the share of gross domestic product, created by workers engaged in this activity.

EU-wide liberal professions create about 11% of GDP. By the above-mentioned study (1), liberal professions sectors of the Lithuania, Latvia and Estonia created, respectively, 6.8%, 7.2% and 8.1% of GDP. The contribution of liberal professions sector to the economy vary according to level of a country development: from FIG. 3 is obvious that the largest contribution of the activities of the liberal professions is in Belgium (13.5% of GDP), while the lowest – in Romania (6.5% of GDP). The crisis highlighted the stabilisation effect of liberal profession on the economy. In 2009 compared to 2008, the contribution of the liberal professions at EU level slightly decreased from €1.220 billion to €1.180 billion (0.2%), in Lithuania – 0.7%, Estonia – 0.5%, in Latvia – 0.3%. This demonstrates that the liberal professions sector is more resistant to any fluctuations in economic activity than other sectors of the economy.



Fig.3. The liberal professions in GDP dynamics (% GDP)

Source: authors calculations based on The role and future of the liberal professions in European civil society 2020, on the database of Lithuanian Statistics.

The expanding scopes of self-employment rise the need to theoretically justify the reasons for this phenomenon, analyze the perspectives, development possibilities and challenges of self-employment.

Research object of this article is the liberal professions as a form of self-employment.

Research methods used are scientific literature analysis, collection of information, comparison, generalization and logical analysis.

Research aim is to identify the factors affecting the development of liberal professions.

Research goals are:

• to discuss the uniqueness of the economic activities carried out by the representatives of liberal professions;

• to identify the factors affecting the development of liberal professions.

Theoretical justification of the research

Scientists concentrating on the evolution of employment (3, 4, 5) also study liberal professions as a form of self-employment. Employment has been a research object in academic society since the times of industrial revolution. The analysis of meaning of work during the 60's turned the attention of scientists towards the following psycho-sociological functions of work: development of personality, self-regulation and responsibility for tasks, which are important to the society. Given these functions, work was regarded not only as a source of income, but also as an indicator of individual's social status.

Such conception of work enabled scientists to associate work with other dimensions, such as: activity, leisure, profession, family, etc. (6). A new idea of active society emerged, since communications, training, selfregulation and leisure elements were integrated into the concept of work (7). Through the discussions in respect to the future of work and its relation to profession, new scientific analysis appeared (4, 8), which concentrated on the phenomenon of liberal professions. Separate segments of liberal professions (such as art market, leisure market, tourism service market, etc.) became the object of scientific discussions. The idea raised in the 60's by Volrad Deneke (9), to analyze liberal professions through legal, social, ethical, sociological and economic views was revived.

Economic view of liberal professions is based on modern economic theories and stresses the economic role, development factors, social regulation questions, effectiveness problems of these professions and selfemployment in global economic conditions (10).

New competition theories, institutionalism, contract theory, cooperation research have each played an important role in explaining the place of self-employment and tasks raised for it in the future. Special importance is given to imperfect market competition theory, which according to scientists (11), differently from general equilibrium theory, postulates that imperfect information in the markets creates niches, which can be occupied by selfemployed individuals.

The issues arising from industry and self-employment work relations are reflected in the new transaction cost conceptions (for instance outsourcing, offshoring, etc.) (12).

The structure of the article is: first part of the article discusses the features of liberal professions and their distinctive economic activities. Whereas, the second part of the article is dedicated to the analysis of factors affecting development of liberal professions, institutionalistic explanation of liberal professions' development.

1. The features of liberal professions

The roots of classical liberal professions (doctors, lawyers, artists) in the scientific literature reach far into the history (13). Free citizens studied seven liberal arts²² (artes liberales). These studies required a free soul and material independence. Individuals pursuing liberal arts were free, but did not have a possibility to gain financially from their studies. This is how description of "free" and later "liberal" came about. The purpose of pursuing these studies was honor and use for society. During the middle ages seven liberal arts were treated as preparatory courses for technology, law and medicine studies at the university. During that time the concept of liberal professions was related to science and academic education. The currently used meaning of liberal profession was attributed only in the 19th century. Since then "liberal profession" meant freedom from the State's regulations of labor relations, in the form of freedoms for separate groups of individuals from the State (13).

Before industrialization, work was dependent and several dependency forms existed: dependency on feudal lords, household, cooperative, corporative (craft guilds),

²² The following seven subjects belonged to "Artes liberales": arithmetic, geometrics, astronomy, music, grammar, rhetoric and dialectics.

etc. Liberal and at the same time paid work was rare (6). Liberal and paid work in industrial society was based on contracts. Nevertheless, employee had to belong to an organization. Currently, organizations hire independent employees and this way reducing their costs. Nevertheless, employees benefit more if they do not belong to an organization. Thus, the distinction of liberal professions from one side was determined by the aspiration of organizations to reduce costs and from the other side by employees' refusal to belong to an organization. Bonding to a single work place became detrimental to reputation (6).

What are distinctive features of liberal professions? What activity can be attributed to liberal professions?

Heinrich Stieglitz (1960), who presented sociological definition of liberal professions in the 70's, notes that the main features of liberal professions are: creativity, awareness, spirit of innovation, efficiency, targeting a specific aim (14:276). The status of liberal professions in the society is determined by these features. Scientists (13, 5, 3) researching liberal professions propose the following features of this activity: personal input and result, freedom and personal responsibility, economic and business related independence, high qualification, creativity, trust based relations between the representative of liberal profession and employer, mostly altruistic rather than egoistic motives. Characteristics of liberal professions offered by scientists can be grouped according to three criteria: individuals pursuing liberal professions, who provide intellectual services to clients and society; pursuing individual activity, which is independent; individuals characterized by economic independence.

The result of liberal professions' activity is an intellectual service, which possesses a high social value (15). It can be scientific or artistic, but also providing personal services (intellectual communication with patients, clients, listeners), which require high level of education (13).

The criteria of personal input and independence separate liberal professions from crafts or small businesses (13). The representative of liberal profession personally performs the task and answers for the result. Differently from business companies, material capital and use of other's labor are not tools of production; their function is only to assist (5). Since a particular task is carried out by the representative of liberal profession himself, it is not delegated to others, work quality is mostly determined by personal trust. Scientists (5) note that the control of liberal professions is implemented based on trust, rather than market principles. Independence means that employer does not render instructions how work should be carried out (15). Representatives of liberal professions control themselves; in a certain way they create a contract with society; for their services they obtain autonomy, security from unfair competition, high earnings and prestige (9).

Liberal profession in scientific literature (4,13) is identified as labor force of a new type, which can be characterized as self-organized and self-controlling. In this case labor force as an ability to work is not the object of demand in the labor market, rather the achievement, result, task performance is purchased (15). Particular attention is given to achievements and experience when hiring representatives of liberal professions, rather than profession itself (4). Not the ability to work is purchased; employer does not organize or control the use of abilities in the value creation process. These tasks are performed by labor force itself: employee organizes controls and answers for the results of his work.

Since high qualification is characteristic to representatives of liberal profession, the acquisition and sustainability of which requires large investments, the main

motive of representatives of liberal professions is earnings (4). Already in 1880 German philosopher Hermann Cohen talked about the dualism of doctor's profession: "doctor's ethical idealism and realization of material interests" (16:65). In the first half of 20th century Talcott Parsons (17: 201) pointed out that liberal profession "are not altruistic islands in the egoistic professional world". Scientists agree with the importance of the material motive in this profession (15,13), however pointing to the personal self-regulation possibilities. Due to the mentioned motive, this activity can be assessed as more altruistic than egoistic.

2. Factors affecting the development of liberal professions

The development of liberal professions, the growth of their social importance is associated, in particular, with rising importance of creativity which is the factor of the global competition.

Creativity becomes an essential instrument in the competitive battle. Already in the 80's we can observe the emergence of concepts of "creative industries" and "cultural industries". These concepts stress the fact that creativity and innovativeness are the specialization of national economics in the global value creation process; that innovations are the only instrument for economic entities to survive in global competition conditions; that the dominant social class in the 21st century is the cultural class.

The employed in the creative sector²³ of Lithuania accounts for 2% of total employment, which is above the European (EU-27) average of 1.7%. Although the creative sector accounts for a small part yet, but this sector shows growth trends and the growing influence on the national economy. Lithuanian creative industries sector generates nearly 5 % value added (more than those created in agriculture, and can be compared to the construction sector), as well as about 5 % the country's exports consist of creative industries products and services (18).

The creativity theory became used in practice in the 60's. Instruments to gain competitive advantage (over the external world and internally, among the business entities in the country) were asked from the industry (particularly the military) and education. These practical instruments had to develop creativity (13). Projects became an important instrument, since they are particularly oriented towards transforming ideas into innovations (ideas themselves are not innovations, they are only their presumptions) (8).

In order to shorten the creation process of innovations, this part of value creation is outsourced, outside the company or even abroad. Outsourcing and offshoring projects, which are based on the purchase of external services, become popular in the 90's. Particular tasks are carried out by specialized service providers, independent contractors. Nevertheless, the long-term development of knowhow in the company is highly effected by external independent and qualified employees hired for project work. However, this way, businesses can concentrate their internal resources towards the strategically important fields and gain competitive advantage through concentration of their internal employees towards the same aim. Thus, transfer of tasks has a strategic meaning: businesses can develop without investing additionally to infrastructure (12).

Therefore, many areas of business activities are taken away from large companies and are transferred to liberal professions in these global competition conditions. Individualization of activities reduces costs, increases the

²³ Creative sector in Lithuania: architecture, design, film and video, leisure software, publishing, art ant antiques, music, software and computer services, radio and television, advertising, performing arts and other cultural activities.

demand for independent, self-employed individuals who are not technically employed by the company and raise the importance of services provided by liberal professions. The augmenting role of creativity and development of project work are two major presumptions for the development of liberal professions.

According to the data Empirical Research of Outsourcing in Lithuanian Small Business (19), 64 per cent of all respondents use outsourcing and 34 per cent do not use it in small business sector. The main aims of the use of outsourcing in small business companies in Lithuania are cost reducing, increase in productivity, and improvement of quality. The benefit received in a short-time period has a direct connection with the enterprise's aims encouraging to implement outsourcing. The benefit received in a short time is: decrease in the need of personnel, concentration on the main activity increases, costs reduction. The benefit received in a long time perspective is: reduce in administration problems, decrease in time needed for enterprise's management, improvement of product or service quality.

Thus, the social significance of liberal professions is determined by the growing importance of human capital (or creativity) in the value added creation process, entrenchment of the project activity, the need in reduction of transaction costs and rational use of resources in the global competition. Individualization of activity increases the demand of independent, unrelated to labor relations employees.

Conclusions

Challenges of global economy determine the partial replacement of mass production by more flexible activity oriented towards the needs of a particular individual. The aim of organizations to increase their competitiveness is implemented through the use of flexible employment forms and decentralization of labor relations. Greater labor productivity is attained through reduction of transaction costs and hiring independent employees. Many activities are redistributed from large businesses to self-employed individuals – representatives of liberal professions, who can be characterized by independence, high qualification and creative abilities, their relations with contractors are based on trust and their motives are more altruistic than egoistic.

Further development of knowledge sector, increasing role of creativity in value creation process in global

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economic conditions, determine the augmenting importance of liberal professions as one of the selfemployment forms.

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РОЗВИТОК САМОЗАЙНЯТОСТІ В ГЛОБАЛЬНИХ ЕКОНОМІЧНИХ УМОВАХ

В статті аналізуються фактори, що впливають на розвиток діяльності самозайнятості в глобальних економічних умовах, а саме, ліберальних професій. Мета цієї статті полягає у визначенні факторів, що впливають на розвиток ліберальних професій. Методи, використані в даному дослідженні є послідовністю: науковий аналіз літератури, збір інформації, порівняння, узагальнення та логічний аналіз. Автори цієї статті приходять до висновку, що поява сектора знань, збільшення диференціації та гнучкості виробництва і зростаюча роль творчості в процесі створення вартості визначає зростаючу важливість ліберальних професій, як однієї з форм самозайнятості.

Ключові слова: ліберальні професії, самозайнятість, креативність, професійна кар'єра.

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РАЗВИТИЕ САМОЗАНЯТОСТИ В ГЛОБАЛЬНЫХ ЭКОНОМИЧЕСКИХ УСЛОВИЯХ

В статье анализируются факторы, влияющие на развитие деятельности самозанятости в глобальных экономических условиях, а именно, либеральных профессий. Цель этой статьи заключается в определении факторов, влияющих на развитие либеральных профессий. Методы, используемые в данном исследовании являются последовательностью: научный анализ литературы, сбор информации, сравнения, обобщения и логический анализ. Авторы этой статьи приходят к выводу, что появление сектора знаний, увеличения дифференциации и гибкости производства и возрастающая роль творчества в процессе создания стоимости определяет возрастающую важность либеральных профессий, как одной из форм самозанятости.

Ключевые слова: либеральные профессии, самозанятость, креативность, профессиональная карьера.

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THE ANALYSIS OF FOREIGN DIRECT INVESTMENTS IN SPHERE OF NANOTECHNOLOGY INNOVATIONS IN EUROPEAN UNION

The paper studies present state of direct investment in technological innovations in the European Union. The EU member states are found to demonstrate different economically motivated preferences as to investment in nanotechnology. The EU investment strategies are assessed from the viewpoint of challenges facing developing and transition economies. Keywords: nanotechnology, nanomaterials, investment, innovation, ecology.

Introduction. With fast growing rivalry for leadership in promising areas of the global market it is important to determine each country which can provide her successful participation in this competition and will receive an opportunity to qualify for a future technological rent. Fulfilled requirements and activity in the field of research and development are not of the most important case but also the action appropriate to the efforts of competitors, aimed at preparing for the coming technological revolution. It is largely attributed to the widespread use of nanotechnology.

The stakes in the struggle for the leadership of nanotechnology are very high. From the results of this competition depends not only on the country's place in the international division of labor, but also its role in the global financial system. With all the possible adjustments of the system it will continue to serve the appropriation of technological rent-leading innovation competition countries. The higher the demand for advanced technology, the more attractive is the currency of the country that can offer such technology. Position of the countries in the new global division of labor is planned to be determined by the year 2020, when the characteristic of this wave of technology will become dominant in the leading world economies. By this time the restructuring of the global financial system can be completed.

Not surprisingly, the nanotechnology race participants are closely observing the actions of each other. Comparative analysis of the efforts and achievements of the countries and regions in the field of nanotechnology presents many foreign Foresight studies and research reports. One of very important goal of this research is to work out recommendations for future development of direct investment into nanotechnologies sphere as an innovative sphere.

Reserch. Europe has not managed to become a leader in the development of information and communication technologies and are now concerned that a similar could happen with the new wave of technology. In "The Sixth Framework Program for Research and Technological Development" (FP6) nanotechnology are among the priorities of European research [4]. This priority is preserved in "The Seventh EU Framework Program for Research and Technological Development" (FP7 2007-2013) [5]. The European Commission – the largest sponsor of nanotechnology research in Europe.

Until now, the EU hopes to rivalry lay nanotechnology on the formation of a kind of "common market" of relevant studies and their active financing process. However, so far only a united Europe has achieved leadership in nanotechnology number of scientific publications which is significantly inferior to U.S. in particular, the number of nanotech patents.

When analyzing the reasons for the lag of the EU on the U.S. marked as a weak support of European nanotechnology research from business and less clear compared to the U.S. and Japan.

Among the states – members of the European Union, which collectively spend on nanotechnology much more money than the Commission, the leader is Germany, followed by France and the United Kingdom.

With foreign direct investment, the picture looks different. In Europe, only a third of the funding comes from the business. In U.S. private attachment cover 54% of the cost, and in Japan – two thirds. In absolute terms, EU spending's on research in the field of nanotechnology are less than 2.5 billion EUR. It reflects the difference between Europe and its competitors on nanotechnology research: the level of public funding is comparable, but the European industry is lagging behind the other participants in the race.

The main purpose of this study is to analyze the processes of direct investment of innovative technologies, such as nanotechnology, on the example of European Union, France and Ireland.

Nanotechnologies are applied in production of over 80 groups of consumer commodities and of over 600 types of raw materials, component parts and industrial equipment.

World nanotechnologies market shows the annual growth by 15 - 17%. Currently the products manufactured with the use of NT-technologies account for about 0.01% of global GDP. In the structure of NT production of 2012 the leading role was assigned to chemical industry, academic pursuits (intermediary products, as a rule – custom-made ones) and electronics. In the global NT-structure the production of NT materials dominate.

The largest consumers of goods of nanotechnologies market in 2011 were the following:

• environmental companies (56% of overall market volume);

- electronics industry (20.8%);
- energy industry (14.1%) [6].

Such an allocation ,in the experts' opinion, is to change. The demand for NT products, according to the estimations of Lux Research, is to be allocated by 2015 among the market directions as described below:



Potential Demand for Nanotechnology Products in 2015 (%)

Fig.1. Potential demand for nanotechnology products in 2015

Source: designed by authors

According to the forecast, the highest demand will be observed for NT materials: carbon NT tubes, NT wires, NT porous materials, nanoparticles, NT-structured materials, dendrimers, quantum dots, fullerenes and products of NT electronics.

Essential number of companies working in the sphere of nanotechnologies is concentrated in the EU countries contains data on annual financing of nanotechnologies in the leading EU companies and agencies.

Allocation of foreign investment projects in economy sectors of France was similar to general allocation of the

EU investments. In 2011, France was among the leaders in attraction of foreign investments into industry, particularly – in chemical industry, metal processing and agricultural and food sector.

The average amount of investments in the field of nanotechnologies in France made 206.7 million EUR per year in the period of 2007-2011. The surge of nanoscience and nanotechnologies in the country is connected to the number of government projects, particularly with the Nanotec 300 that gave rise to influx of foreign investments at the first stage.

Table'	l. Foreign inv	vestment	in the	nanotechnol	ogy se	ctor in	France in	2007-20)11
			(in n	nillions of EU	R)				

	2007	2008	2009	2010	2011	Total for the period						
Investments in mill.EUR:	153,8	174,5	202,7	235,6	270,6	1037,3						

Source: European Nanotechnology Landscape Report 2011

At the same time, the investments got an uneven allocation in the period concerned. Some relevant stagnation was observed in the field of micro technologies and microelectronics due to decrease of capital expenses in the filed of microelectronics (1.7 million EUR in 2007-2011). In the meantime, rather strong growth in amount of overall operational costs in the period of 2010-2011 was observed (61.4%) that was a logical outcome of investments made in the previous years.

As for geographic allocation of investments, relevant data are provided in the Table.



Fig. 2. Geographical distribution of investment in nanotechnology sector in France in 2007-2011 yy.

Over the last few years the intense growth and development of nanotechnologies market and productions that include nano-components can be observed in the world. Optimistic predictive estimates of the market in 2015 reach 2.4 trillion USD. During the last years over 16,000 nanotechnology companies were created, and their number doubles every 1.5-2 years. The USA, Japan, Germany and South Korea are the leaders of global nanotechnologies market. France belongs to the "B league", and Ireland is a common player in the world market.

In Europe, the process of establishment and development of nanotechnologies is coordinated by the European Nano Business Association – a non-commercial organization founded in 2002. Its main objective is the facilitation of the development of strong and competitive European industry based on the use of nanotechnologies. The ENA's mission lies in ensuring professional development of the NT-business emerging in the EU. The EU states followed the path of scientific and technological potential development through integration of efforts of all the EU member states. The number of companies engaged in nanotechnologies is approximately the same in the USA and Europe, while about one half of the European companies are located in Germany.

Overall amount of investments into NT in 2012 made 13.9 billion USD. Influx in the sector of private investments became the main trend of the last year, while corporate expenses for NT research became the main source of financing, and relocated the public investments to the sidelines. The role of venture capital in the development of nanotechnologies is rather small – only 0.8 billion USD of investments fall to its share. The USA accounts for 90% of total venture financing amount [8].

The developments of NT projects do not earn much profit, but many people consider this direction to be a rather attractive financial perspective. France allocated 7.9 billion EUR for stimulation of scientific and research activity, including 1 billion EUR for research centers and 1 billion EUR for laboratories. Partially the funds were assigned in the sectors of bio- and nanotechnologies. For the purpose of foreign investors' stimulation, France offers the best conditions for tax return upon condition of performing scientific research, including those in the sphere of nanotechnologies.

France is one of the most dynamically developing states in the sphere of scientific research. High concentration of qualified staff, excellent research institutes in the state sector, huge national investments as well as modernized university programs are crucially beneficial for France in this respect.

Over the last 10 years 330,000 jobs were created in France within the framework of over 6,000 new foreign investment projects. Special attention is paid to the investments into new technologies. For instance, over the last 10 years France took over 320 projects in the field of new technologies for research and development with foreign investments.

The average amount of investments into the field of nanotechnologies in France made 206.7 million EUR per year for the period of 2009-2013 [9]. The analysis of economic indicators highlights the attractiveness of France as an object for foreign investments, given its position in the European Union, size of domestic market, infrastructure quality, labor force skills and quality of life in the country.

Economic attractiveness of the country is connected with a broad range of macroeconomic criteria. The main indicators include: market size, human resources, scientific research and innovations, infrastructure, administration and financial conditions, investments and labor expenses (including taxation) as well as quality of life [11]. Currently also Ireland is an advanced center of direct foreign investments. For several decades Ireland has been a beneficial place for the companies set up in Europe. Over 1,000 companies operating in various spheres located their offices in Ireland: IT, cloud data processing, social networks, software development, financial services, medicine and biology, international services. Ireland ensures its investors high profits due to combination of the lowest in the world corporate tax rate that is 12.5%, structured tax benefits for research and development, skilled and universal labor resources and economy with competitive costs [10].

In 2012, many new transnational corporations and new companies located their research centers and development centers here. For several decades Ireland has proved itself to be the beneficial place for the companies set up in Europe. The key advantages are the following:

business supporting culture;

• common law system similar to the English common law and known to transnational corporations of the USA;

low corporate tax rate – 12.5%;

• relief from corporate tax for dividends paid to other legal entities;

tax benefits and extended system of tax credits in research and development;

skilled English-speaking staff;

• membership in the EU and Eurozone that provides easy access to the internal EU market;

 the only one English-speaking member of the Eurozone; Easy access from the continental Europe and North America.

One of the ways to overcome crisis for the Irish government now is the attraction of foreign investors to development of nanotechnologies. During the period between 2001 and 2009 Ireland attracted about 282 million EUR of investments into nanotechnologies [11].

One of the main aims of the government of Ireland regarding development of nanotechnologies is their application as a catalyst for formation of economic values and business innovation culture. This strategy implies an increase of financial flow of annual budget for technologies, science and innovations in the field of nanotechnologies which requires at least 114 million EUR of financing during the next 5 years.

Conclusions. The analysis held in the research demonstrated that among European Union member countries France and Ireland apply different approaches to attraction of foreign investments into the field of nanotechnologies. France, being a major scientific center with good infrastructure, aims at the development of nanotechnologies for its own purposes but with the attraction of additional foreign scientific resources; while Ireland considers investments into nanotechnologies as the means of recovery and uprising of its own economy.

Thus, France firstly stimulates scientific purposes, and Ireland stimulates commercial purposes. The strategies of attraction of foreign investments into nanotechnologies of the states analyzed are based on these purposes. We suppose that the French path is the most suitable for economically, scientifically and technically developed countries, while the Irish strategy is suitable for the states with problematic, developing or transition economy.

The development of nanotechnologies and nano-product markets in the leading states is mainly caused by high level of communication systems development and high communication activity of the market participants. Hence, other countries that are planning to cultivate this market shall pay special attention to the development of information and communication technologies. Besides, an important factor is training of scientists. For that purpose the experience of Ireland can be used. This country managed to ensure the increase of level and quality of education for its population at the expense of foreign investments.

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АНАЛІЗ ІНОЗЕМНИХ ПРЯМИХ ІНВЕСТИЦІЙ У СФЕРУ НАНОТЕХНОЛОГІЧНИХ ІННОВАЦІЙ У КРАЇНАХ ЄВРОПЕЙСЬКОГО СОЮЗУ

Стаття присвячена дослідженню прямих іноземних інвестицій в інноваційні нанотехнології на прикладі країн Європейського Союзу. Проведений аналіз обсягів та напрямків інвестицій показав, що країни Союзу розглядають інвестиції в нанотехнології як інструмент прискорення економічного розвитку.

Ключові слова: нанотехнології, наноматеріали, інвестиції, екологія.

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АНАЛИЗ ИНОСТРАННЫХ ПРЯМЫХ ИНВЕСТИЦИЙ В СФЕРУ НАНОТЕХНОЛОГИЧЕСКИХ ИННОВАЦИЙ В СТРАНАХ ЕВРОПЕЙСКОГО СОЮЗА

Статья посвящена исследованию прямых иностранных инвестиций в инновационные нанотехнологии на примере стран Европейского Союза. Проведенный анализ объемов и направлений инвестиций показал, что страны Союза рассматривают инвестиции в нанотехнологии как иструмент ускорения экономического развития.

Ключевые слова: нанотехнологии, наноматериалы, инвестиции, инновации, экология.

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THE ENERGY COMPONENT OF THE ENVIRONMENTAL SECURITY: UKRAINE IN THE MIRROR

Energy security is important for any state. It is important for the state's environment and economy. Ukraine is an energy dependent state, as well as an import-energy dependent one. The paper is devoted to the statistical analyses of Ukrainian energy sector from the position of its world representation. The purpose of this research is on the base of statistical analysis of current internal and external trends in the energy sector of Ukraine to consider possible mechanisms to stimulate and accelerate environmental-friendly energy security of Ukraine. Main objectives: to trace the dynamics of world and Ukrainian main energy indicators in the synergy with the state energy security index; to cluster launched efficiency-targeted energy projects in Ukraine in geo-industry aspect. Analyses of dynamics of energetic vs environmental performance of Ukraine in 2000–2014 world ranks shows that being in low segment of world rankings on aspects of energy and environmental security, Ukraine shows positive tendencies to the improvement, however with slow steps. In order to identify the most promising and most attractive sector of the economy in Ukraine to investors we held grouping of current launching energy-efficient projects in the aspect of industries and sectors for energy efficiency investments are enterprises of agriculture and consumer goods industry, and the most attractive regions of Ukraine for implementation of investments in energy efficient technologies are Ivano-Frankivsk, Luhansk and Kherson oblasts.

Keywords. Environmental security, energy sector, energy security, ranking.

Introduction. Nowadays there is no state that can be sure in its security. States and its inhabitants constantly are facing the novel challenges and straggling different threats. Currently energy, governance and security became hot topics of all international meetings, mass media news and political debates. XXI century had begun with war conflicts on the planet, which have as an initial cause – energy re-

sources. Energy security is on the top of concerns and a funding platform for all leading states and unions. For example, the EU interests in its strategic programme Eastern Neighborhood Partnership (including Ukraine) are reflected in the Platform #3 – Energy security – that supposes:

- approximation of the regulatory framework;
- development of electricity, gas and oil interconnections;

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energy efficiency and renewable energy;

• establishment and strengthening of a regulatory framework in nuclear safety [1].

Thus, Eastern European Partnership for Energy Efficiency and Environment is a part of the strategic response to energy problems. As to Ukraine, our energy security is an integral part of our economic and national security, a necessary condition for the existence and development. The evidence of recent few years obviously proved these theses. In modern concept the energy security is the attainment of a reliable, stable, cost-effective and environmentally acceptable supply of energy resources for economy and social sector; creation of conditions for the formation and implementation of policies to protect national interests in the energy sector.

Energy security is the association between national security and the availability of natural resources for the energy consumption. Ukraine is considered as a highly energy development country [2], as well keepings positions as not an environment-friendly state [3]. Ukraine occupied just the 95th position of 178 countries ranked on the 2014 Environmental performance Index (EPI) [4], having nevertheless mostly improving trend over the whole state independent period (Table 1).

<i>Table 1.</i> Dynamics of energetic vs environmental performance of Ukraine in 2000–2014
() – Deteriorated, \uparrow – Improved, 0 – No change)

Climate and En- ergy	Access to Electricity	Trend in CO₂ Emissions per KWH	EPI	CO ₂ emissions	Energy Trilemma Index	Energy Security	Energy Equity	Environmental Sustainability	Energy Security Risk	Ecological footprint
0	↑	↑	↑	0	↑	↑	0	0	↓	0
0				0			0	0	4	0

Source: author's compilation based on [5-9]

The ranking representation shows that being in low segment of world rankings on aspects of energy and environmental security, Ukraine shows positive tendencies to the improvement, however with slow steps. So, it pushes the idea that Ukraine does not need some levers for the choosing direction on the improvement, but has a deficit of mechanisms to stimulate and accelerate positive trends. Such mechanisms are renewable resources and an effective usage of internal capacities of state energy security.

Literature review.

Having the aim to study the possibility to use alternative energy sources; to analyze the effectiveness of its application in Ukraine and environment-friendly aspect of its launching, we firstly follow the similar ideas and approaches raised in the scientific literature, particularly in:

• the analyses of types of clean energy that are available today and can be used in practice [10-11];

• the identification the major environmental and economic benefits of alternative energy sources over traditional [10, 12];

• the review of the effectiveness of non-conventional forms of energy by the example of the developed world [13-15];

• the assessment how promising renewable energy can be in Ukraine [16-20];

• the working-out the optimal portfolio of energy sources for Ukraine [21-22].

According to the Energy Strategy of Ukraine until 2030 declared on 24th July 2013 [Energy Strategy of Ukraine until 2030] it is expected to increase the share of renewable energy sources (RES) in the overall balance of the installed capacity to 12.6% by 2030, that the baseline is about 8 GW [23]. While, according to the International Energy Agency's 2030 the share of electricity produced using alternative sources will double compared to today's figures, which represent about 16% of total production [24]. In most developed countries, including the US, Germany, Spain, Sweden, of Denmark, Japan, there are plans to increase the share of renewable energy to 20-50% in the total energy [25]. The European Commission believes that by 2020 Europe will have fifth part of the energy produced from environmentally friendly sources – alternative renewable resource [26].

The arguments in favour of renewable energy can be considered:

• firstly, there is no need to fight for such sources, as wind, solar and bio-resources can be used only where they are. As well, there is mostly no lost while transferring [27];

• secondly, these resources are environmentally friendly, and their development provides an opportunity to invest in the local economy; increase standards of living for local population [28-29];

• thirdly, renewable energy is relatively cheap and inexhaustible [30].

Most of Ukraine's primary energy consumption is fuelled by natural gas (about 40%), coal (about 28%), and nuclear (about 18%). Only a relatively small portion of the country's total energy consumption is accounted by petroleum and other liquid fuels and renewable energy sources [6].

Herewith, the development of alternative energy requires significant investment. Thus, the country should attract investment funds for energy projects, that is quite impossible without insider (local) representative monitoring of its up-to-date energy security and attractiveness of energy sector [3].

The purpose of this research is on the base of statistical analysis of current internal and external trends in the energy sector of Ukraine to consider possible mechanisms to stimulate and accelerate environmental-friendly energy security of Ukraine. *Main objectives:*

 to trace the dynamics of world and Ukrainian main energy indicators in the synergy with the state energy security index;

• to cluster launched efficiency-targeted energy projects in Ukraine in geo-industry aspect.

Statistical analysis.

According to the report data of Ministry of Energy and mines of Ukraine [31] on electricity consumption in Ukraine for 9 months of 2014, consumers consumed 100.0 billion KWh of electricity, which is 4.4 billion KWh or 4.2% less than the same period of 2013. Structure of electricity consumption (net proportion) for 9 months 2014 compared to the same period in 2013 has not changed. The largest share in total power consumption of Ukraine belongs to the consumer group "Industry" - 45.9% and the group "population" - 28.5%. However, there has been marked some reductions of power consumption in the group "Industry" from 46.7% to 45.9% in the total power consumption of Ukraine. These can be explained mainly due to the decline in the share of power consumption of the chemical and petrochemical industry - from 3.5% to 2.9%, as well as the engineering industry - from 3.6% to 3.2%, fuel industry from 6.0% to 5.7%, and the group "Transport" - from 6.1% to 5.4%. This proportion increased power consumption by the group "population" - from 27.0% to 28.5%. Thus, we have declining tendency during 1990-2013 in the Ukrainian

energy efficiency picture (Fig. 1). While the environmental security depicted by CO_2 indicators is slowly increasing, during analyzed 1990-2013 (Fig. 2.).

However, these numbers are not representative without the comparison with sources of energy for such consumption and the origin of these sources (domestic or imported), as well as the comparison with other states. Thus, World Energy Resources: 2013 Survey [10] reports that Ukrainian energy import is growing every year (Fig. 3).



Fig. 1. Energy Efficiency of Ukraine (koe/\$05p)

Source: author's compilation on the base of Energodata [6]





Source: author's compilation on the base of Energodata [6]





Source: http://www.eia.gov/countries/country-data.cfm?fips=UP#ng

Assessing the energy dependence of the country and the current state of the energy sector of Ukraine, we primarily analyze the volumes of domestic production and imports in simultaneous comparison with world indicators (Table 2-3). All considered trends support the only conclusion – Ukraine is weak in the energy production and not comparable with world leaders in the energy sector. The state is deeply energy-import dependent, so cannot be for now ambitious energy player at the global energy scene.

Table 2. Energy production of Ukraine	n comparison to the world (2008-2012)
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	2008	2009	2010	2011	2012			
Total Electricity Net Generation (Billion Kilowatthours)								
World	19157,25	19093,33	20436,99	21182,42	21531,71			
US	4119,387	3950,332	4125,059	4100,14	4047,766			
Europe	3622,685	3463,168	3621,545	3568,373	3581,738			
Russia	982,5228	937,7736	980,8973	996,8391	1012,476			
France	544,0015	507,3284	540,294	531,554	533,324			
Ukraine	181,58	163,626	177,851	184,061	187,142			
Total Renewable E	lectricity Net Ge	neration (Billic	n Kilowatthour	rs)				
World	3740,598	3880,737	4187,615	4423,522	4714,827			
US	392,7357	429,652	440,2314	527,4897	508,3602			
Europe	815,8029	847,4491	947,2352	934,3855	1040,108			
Russia	166,129	175,552	168,101	167,512	167,938			
France	75,052	71,032	79,693	66,294	82,776			
Ukraine	11,442	11,86	13,072	11,322	11,129			
Total Primary Energy	gy Production (C	Quadrillion Btu)					
World	483,5603	480,9301	505,3679	518,5456	530,6832			
US	73,23283	72,6724	74,79281	77,98651	79,21235			
Europe	46,55348	44,84694	45,49784	43,70327	44,00391			
Russia	52,52268	50,01447	53,7411	54,62955	55,29574			
France	5,15679	4,81589	5,1031	5,10562	5,07565			
Ukraine	3,20039	3,03946	3,06757	3,23656	3,27089			

Source: http://www.eia.gov/countries/country-data.cfm?fips=UP#pet

Table 3. Energy Production* trends and forecast (million tones oil equivalent**)

	1990	1995	2000	2005	2010	2013	2015	2020	2025	2030	2035
Total Energy Production	8196,9	8570,4	9331,0	10791,8	12042,7	12816,5	13297,8	14677,3	15720,8	16647,6	17436,7
of which: OECD #	3442,1	3666,8	3842,2	3844,5	3901,7	4020,0	4261,2	4685,7	4879,6	5083,1	5194,1
Non-OECD	4754,8	4903,7	5488,7	6947,3	8141,0	8796,5	9036,6	9991,7	10841,2	11564,5	12242,6
European Union***	898,0	913,3	899,3	844,5	786,0	754,0	748,0	725,2	707,4	704,3	716,2
Europe	1095,4	1161,2	1194,7	1149,1	1081,5	1039,2	1039,1	1025,9	1011,4	1003,4	1006,6
Former Soviet Union****	1672,2	1226,5	1279,0	1571,4	1692,2	1766,0	1760,6	1840,1	1983,9	2030,7	2089,7
US	1664,4	1669,7	1676,4	1633,0	1749,8	1910,5	2108,9	2329,7	2441,3	2546,1	2518,0
China	720,7	892,4	934,0	1504,0	2100,5	2429,4	2516,4	3032,7	3243,2	3406,6	3576,4
India	153,4	190,4	213,8	253,7	342,2	350,5	374,6	443,6	530,4	638,9	761,5

*Energy production comprises commercially traded fuels, including modern renewables used to generate electricity.

**Oil Production is measured in million tonnes; other fuels in million tonnes of oil equivalent

***Memberships as at 1/1/2015.

****Excludes states now in the European Union.

Source: http://www.bp.com/en/global/corporate/about-bp/energy-economics/energy-outlook/energy-outlook-downloads.html

Thus, according to International Index of Energy Security Risk 2013 Edition [8] Ukraine's total energy, transportation, and oil intensities and its carbon dioxide emissions intensity scores are the weakest among the large energy user group. According this authoritative Institution, since 1992, Ukraine has displayed itself in the world as a country with the worst energy security index scores that any country in the large energy user group can be, both nominally and compared to the OECD. Ukraine's scores over the period averaged about 195% higher than those for the OECD, while its overall risk has been trending downward [8]. As net importer of oil, natural gas, and coal, the state energy import and expenditure risk scores are low, and its energy use is very inefficient.

While we coincide this statistical trends with the level of energy security as it is seen from the inside look – according to calculation methodology of the Ministry of Economic Development and Trade of Ukraine – we see quite stable tendency, but of low security level (Fig 4). Remind that latter used method of index calculations determines the list of the main indicators of energy security of Ukraine, their optimal thresholds and the algorithm for calculating [32].

The rapid increase in this indicator in 1998 (Fig. 4) had been caused by a decrease in fuel imports by 5% and the tendency to reduce the energy intensity of GDP. Since 1998 till 2003 the integral index of energy security had a climbing trend, reaching its maximum value of 0.55 in 2003. The fall of the index in 2005 had been caused by the fall in the energy intensity of GDP. Between 1996 and 2011 the energy intensity of GDP decreased from 0.9 to 0.07 kg c.p./USD. Between 2005 and 2011, the energy security index was at the same level, with a slight fall in 2010. Tendencies of 2012 and 2013 kept the same level 0.46.





Source: calculated by the author and V. Nesterenko (bachelor degree student) on the base of data [5, 33]

Methodology. Despite ascertaining of not optimistic tendencies in the energy sector of Ukraine, there are still possible routes for improving. Thus, one of the most important current tasks for improving the energy balance structure can be seen as to increase energy efficiency. This requires some adjustments in all sectors, especially wide-spread implementation of energy-efficient equipment and technology, improvement of standards, increasing of the responsibility for overruns. These adjustments are quite costly, so investments are in demand to move on.

There are already first steps in this direction. The Programme for Energy Saving and Energy Efficiency had been developed by the European Bank for Reconstruction and Development (EBRD) specifically for Ukraine – the credit product UKEEP. The Programme is specifically designed for Ukrainian private companies of any sector that want to invest in energy efficiency or renewable energy. The result should be in the reduced energy consumption, increased production of domestic energy resources and more efficient use of it [34].

As part of the Fund of the Eastern European Partnership for Energy Efficiency and Environment (ESP) there was approved the allocation of grant funds in the amount of 35.0 million euro to finance 11 Ukrainian projects namely [35]:

 the project "Modernization of central heating system in Ternopil" (total EBRD loan – 10 million euro, grant – \$ 5 million);

 "Energy Saving in Zaporizhzhya" (total EBRD loan – 13 million euro, grant – up to 5 million euro);

• the project "Modernization of central heating system in Lviv" (total EBRD loan – 21 million euro, grant – 10 million euro);

• "Development of water supply and wastewater treatment in Mykolaiv" (EIB loan – 15.54 million euro, grant – 5.1 million euro);

 "Modernization of central heating system in Zhytomyr" (EBRD loan – 10 million euro, grant – \$ 5 million);

 "Investing in energy efficiency of central heating companies in 10 Ukrainian municipalities of medium scale" (NEFCO loan – 4 million euro, grant – 0.5 million euro);

 "Investing in energy efficiency of central heating companies in 10 Ukrainian medium-sized municipalities-2" (NEFCO loan – 4 million euro, grant – 0.4 million euro);

 "Energy efficiency of public sector facilities in Dnepropetrovsk" (Energy efficiency in public buildings with the use of "Energy Performance Contract" (pilot project)) (total EBRD loan – 20 million euro, grant – 2.5 million euro);

• Grant for national utilities for:

 developing regulations for tariff regulation system (regulatory reporting forms, procedures and regulations, control orders, etc.);

- development and implementation of benchmarking;

 development of software for online collection and analysis of regulatory reporting licensees (grant – 1.65 million euro);

 "Improved efficiency of utilization of energy resources in public sector institutions in Kyiv" (NEFCO loan – 5 million euro, grant – 1.5 million euro);

• "Energy efficiency increasing in public sector facilities in Zhytomyr" (NEFCO loan – 3 million euro, grant – 1.35 million euro).

And this is not the whole list.

For triggering the objectives of the paper we try to consider these project-investments in the energy efficiency in the workplace. Statistical base – Ukrainian Energy Efficiency Programme web-site [36]. The attractiveness of the project in terms of investors can be formalized by the following function that is quite classical:

$$u = f(inv_{,}IRR_{,}PP_{)}$$
(1)

where *inv* – the amount of the initial investments; *IRR* – internal rate of return; *PP* – payback period of the project. The amount of initial investments directly affects decisions to invest in a particular project. Obviously, it depends on the investor's financial strength, but, nevertheless, in terms of macroeconomic indicators at the aggregated level, we assume that on average the larger the amount of initial investment, the less attractive is the project. The internal rate of return on investment – the main indicator of the investment plan; interest income is the main measure of attractiveness. As to payback period – under the current unstable economic situation, the payback period is an extremely important factor, especially in Ukraine, where long-term investment projects are an abnormal phenomenon.

Results. In order to identify the most promising and most attractive sector of the economy in Ukraine to investors we held grouping of projects in the aspect of industries and sectors where energy-efficient technologies operate. The calculation results are given in Table 4.

Industry	Number of completed projects	Average amount of initial investment, \$	Average IRR, %	Average PP, years					
Energy sector	1	5 000 000	23	7					
Agriculture sector	14	1 781 343	25	7					
Consumer goods industry	13	3 830 462	42	4					
Large-scale industry	6	19 153 667	65	5					

Table 4. Cluster grouping of investment projects by industry

Source: compiled by the author and V. Nesterenko (bachelor degree student) on the base of data [36]

The analysis presented that among the most promising economic sectors for investing is a large-scale industry (the largest rate of return and payback is small). However, only financially powerful investors can afford to invest in this industry (the average amount of the initial investment – 19 mln. USD). Consumer goods industry requires smaller in-

vestment funds and has the lowest payback period, while ensuring a high level of income. The lowest initial investment is required for the agriculture, but there is a significant payback period and the average percentage of profits.

While holding a similar grouping by region characteristics we obtained following picture (table 5):

Table 5. Cluster grouping of investment projects by regions

Region	Number of completed projects	Average amount of initial investment, \$	Average IRR, %	Average PP, years
Kharkiv oblast	8	911 600	28,5	7
Ivano-Frankivsk oblast	4	23 272 500	30,0	5
Mykolaiv oblast	3	7 850 000	26,5	5
Zapoirizhzhya oblast	3	2 306 500	24,3	6
Lviv oblast	2	3 020 000	20,5	7
Kherson oblast	2	2 608 500	95,0	4
Dnipropetrovsk oblast	2	8 350 000	23,5	5
Luhansk oblast	2	615 750	54,4	7
Khmelnitsk oblast	1	215 000	25,0	5
Cherkasy oblast	1	601 000	32,0	5
Chernihiv oblast	1	1 050 000	53,0	3
Donetsk oblast	1	1 700 000	54,0	3
Kirovograd oblast	1	12 000 000	28,0	4
Kyiv oblast	1	900 000	45,0	3
Poltava oblast	1	1 000 000	155,0	1
Crimea	1	20 000 000	45,0	3

Source: compiled by the author and V. Nesterenko (bachelor degree student) on the base of data [36]

For further ranking of regions on the feature of attractiveness for investments in energy efficiency, we used the following classic formula:

$$RANK_{i} = \frac{inv_{i} - \min(inv_{i})}{\max(inv_{i}) - \min(inv_{i})} \alpha_{1} + \frac{inv_{i} - \min(IRR_{i})}{\max(IRR_{i}) - \min(IRR_{i})} \alpha_{2} + \frac{inv_{i} - \min(PP_{i})}{\max(PP_{i}) - \min(PP_{i})} \alpha_{3},$$
(2)

where $RANK_i$ – index of investment attractiveness of *i* region; *i* – region number; α_i – weights, $i = \overline{1,3}$. Analytical method and correlation analyses based on the statistical information had decided for the calculations the following weights: $\alpha_1 = 0.25$; $\alpha_2 = 0.4$; $\alpha_3 = 0.35$. Taking in account that as the investors appeared to be Ukrainian banks, we assume that they are provided with financial resources. So the amount of initial investment is the least significant. This assumption let us to rank regions of Ukraine on the aspect of investment attractiveness in energy-efficient projects (Fig. 5).



Fig. 5. The ranked index of investment attractiveness of regions

Source: calculated by the author and V. Nesterenko (bachelor degree student) on the base of data [36]

So the most attractive regions of Ukraine for implementation of investments in energy efficient technologies are Ivano-Frankivsk (0.51), Luhansk (0.46) and Kherson (0.42) regions. The least attractive - Donetsk (0.23), Chernihiv (0.22) and Kiev (0.20) regions.

Conclusion & discussion. Having such not optimistic situation in the energy sector Ukraine faces the necessity to draft the optimal possible portfolio of energy sources for Ukraine, and this portfolio should be oriented in the direction to the renewable future. From the definition of renewable energy sources it is quite obvious that for maintaining their production there is no need of raw materials and utilization of wastes. Therefore, most indicators used to determine the effectiveness of innovations and new technologies in production are not quite suitable. However, in the system of parameters for the research it should be used technological, economic, social and environmental efficiency indicators.

Energetic component of ecological security of Ukraine showed that the main energy resources are the nuclear (47%) and coal (37%), which is a bad thing for the country's energy security through outdated production technologies and a significant negative impact on the environment. Another problem in this respect is not only environmental but also economic: 35% of state import is import of energy consumption. Using the methodology for calculating the integral index of energy security we showed that the situation is unstable. Comparison of energy indicators of Ukraine with the same world levels had proved quite weak position of Ukraine. While the analyses of 34 projects for implementation of energy efficiency in Ukraine we proposed rank function for the evaluation of projects' attractiveness in the aspect of industries and regions of Ukraine. The rank analyses depicted that the most popular among economic sectors for energy efficiency investments are enterprises of agriculture and consumer goods industry, and the most attractive regions of Ukraine for implementation of investments in energy efficient technologies are lvano-Frankivsk, Luhansk and Kherson oblasts. The analysis of modern ecological situation in Ukraine found that it remains consistently high air pollution in large cities and industrial centres. To solve priority problems of modern ecological situation in Ukraine the state should ensure full funding of measures provided by national, regional and local programs to develop effective mechanisms of economic enterprises and improve production technology. The movement to the better energy future for Ukraine is impossible without renewable strategies and mathematically ground calculation of energy portfolio for very particular future year.

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ЕНЕРГЕТИЧНА СКЛАДОВА ЕКОЛОГІЧНОЇ БЕЗПЕКИ: УКРАЇНА У ВІДОБРАЖЕННІ

Метою даного дослідження є на основі статистичного аналізу поточних внутрішніх і зовнішніх тенденцій в енергетичному секторі України розглянути можливі механізми для стимулювання і прискорення екологічно дружньої енергетичної безпеки України. Основні завдання: простежити динаміку світових та українських основних енергетичних показників в синергії з державним індексом енергетичної безпеки; кластеризувати в гео-галузевому аспекті запущені енергетичні проекти, орієнтовані на підвищення енергоефективності в Україні. Аналіз динаміки енергетики та екологічної діяльності України в 2000-2014 на рівні світових рядів динаміки та рейтингів показує, що, будучи в низькому сегменті світового рейтингу з різних аспектів енергетичної та екологічної безпеки, Україна показує позитивні тенденції до поліпшення, проте повільними кроками.

Ключові слова. Екологічна безпека, енергетика, енергетична безпека, рейтинг.

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ЭНЕРГЕТИЧЕСКАЯ СОСТАВЛЯЮЩАЯ ЭКОЛОГИЧЕСКОЙ БЕЗОПАСНОСТИ: УКРАИНА В ОТРАЖЕНИИ

Целью данного исследования является на основе статистического анализа текущих внутренних и внешних тенденций в энергетическом секторе Украины рассмотреть возможные механизмы для стимулирования и ускорения экологически дружественной энергетической безопасности Украины. Основные задачи: проследить динамику мировых и украинских основных энергетических показателей в синергии с государственным индексом энергетической безопасности; кластеризовать в гео-отраслевом аспекте запущеные энергетические проекты, ориентированные на повышение энергоэффективности в Украине. Анализ энергетики и экологической деятельности Украины в 2000-2014 на уровне мировых рядов динамики и рейтингов показывает, что, будучи в низком сегменте мирового рейтинга по различным аспектам энергетической и экологической безопасности, Украина показывает положительные тенденции к улучшению, однако медленными темпами.

Ключевые слова. Экологическая безопасность, энергетика, энергетическая безопасность, рейтинг.

Apendix 1

ANNOTATION AND REFERENCES (IN LATIN): TRANSLATION / TRANSLITERATION / TRANSCRIPTION

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NATURE OF INTELLECTUAL PROPERTY INSURANCE AND ITS ROLE IN MODERN ECONOMY

Article is devoted to theoretical analysis of nature and mechanism of intellectual property insurance. Types of intellectual property relations and its role in public reproduction are investigated. Peculiarities of intellectual property relations are considered. Classification of intellectual property objects depending on their most essential features is analyzed. Different approaches to classification of intellectual property subjects are considered. Nature and preconditions of origin of intellectual property insurance are investigated. Goals and functions of intellectual property insurance are specified. Risks that related to disposal and commercialisation of intellectual property and connected with peculiarities of intellectual property objects and growing rate of intellectual property rights infringements are analyzed. Three groups of risks concerning disposal and commercialization of intellectual property objects are singled out: risks related to loss or abridgement of intellectual property rights; risks related to possible losses, contingencies and half-received profits connected with commercialization of intellectual property objects; risks of intellectual property rights; risks related to possible losses, contingencies and half-received profits connected with commercialization of intellectual property objects; risks of professional responsibility of participants of intellectual property market. On the basis of analysis of hands-on experience four types of intellectual property insurance are investigated: insurance of intellectual property rights; liability insurance of the intellectual property subjects; professional liability insurance of participants of intellectual property market; liability insurance of the contractors concerning intellectual property disposal. Factors that restrains development of intellectual property insurance in Ukraine are analyzed.

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BOUT FORMS, EFFICIENCY AND ASSESSMENT OF ENVIRONMENTAL MANAGEMENT

We suggest a holistic framework for analyzing, assessment and improvement of environmental management using "agrarian sector" as an example. It incorporates an interdisciplinary approach (Economics, Organization, Law, Sociology, Ecology, Technology, Behavioral and Political Sciences) and includes: specification of managerial actors, needs and spectrum of governing modes (institutional environment; private, collective, market, public modes) at different level of decision-making (individual, farm, eco-system, local, regional, national, transnational, global); specification of critical socio-economic, natural, technological, behavioral etc. factors of managerial choice, and feasible spectrum of managerial forms; defining and assessing comparative and absolute efficiency of eco-management forms and system; improvement of forms of public intervention in eco-management.

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TRANSITION TO INFLATION TARGETING IN UKRAINE: NEW TOOLS FOR MONETARY POLICY

Positive experience of inflation targeting in many countries influenced the decision to implement this framework in Ukraine. Authors consider the appropriateness of retaining inflation target under conditions of deteriorating currency market. Uncertainty of forecasts is aggravated by fragile impact of monetary policy on Ukrainian economy in conditions of growing nonlinearity of macroeconomic processes. The authors suggest the possibility of using two channels of transmission mechanism, namely, exchange rate and interest rate, and recommend additional tools to specify targets of monetary policy for the National Bank of Ukraine.

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LIFE CYCLE ASSESSMENT IN HEALTHCARE SYSTEM OPTIMIZATION. INTRODUCTION

Many theoretical approaches were performed with aim to simulate sustainable output by modelling input parameters. However, in result of narrow specification and emphasis on simply economic component of a system, such important factors as integral environmental and social have been often ignored. With purpose to resolve environmentally related problems of institutions, corporations, organizations the more holistic approaches were developing. One of them is a tool called Life Cycle Assessment (LCA). Introduced in 1960's, developing until late 90' when organized as ISO standard, LCA became a practical method for product stewardship in industry. Method ultimately helps to advance the sustainability of products and society's economic activities. A life-cycle approach takes into consideration the spectrum of resource flows and environmental interventions associated with a product or organization from a supply, consumption chain perspective. Such approach is essential for effective management. While established and tested step – by – step methodology exists, there are a number of ways to conduct Life Cycle Assessment. Complexity of different environmental systems has led to the development of new alternative impact models. Transpolation of the methodology from products onto processes reveals an opportunity for application to organizations and units in social sphere, where it would be used to great advantage because of their social role. Performance of LCA in a healthcare system discovers new factors and parameters that should be of a great importance for developing and implementation of effective public healthcare system model based on principles of careful use of resources, social responsibility, improvement of convalescence of patients and economic efficiency.

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UKRAINIAN FISCAL EQUALIZATION: DOES IT NEED AN IMPROVEMENT?

The article states that existing economic and social differences between territories in Ukraine call for use of fiscal equalization instruments. The study shows that implementation of formula-based fiscal equalization has led to a virtually full equalization of differentials in subnational total public revenues and expenditures on the regional level. Findings presented give reasons for reviewing a current fiscal equalization procedure with regard to incorporating into equalization grant allocation formula fiscal incentives for subnational governments.

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GLOBAL WARMING BETWEEN SCIENCE AND POLITICS

During the last three decades, the scientific theory of global warming has become a political ideology. Significant political components are found both in the premises and (especially) in the consequences. But witnessed also at least a decade of negationism: global warming research programs are questionable regarding methodology and the ethics of research. Face to all contestations, "Global warming theory" has already become "Global climate change theory".

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ESTIMATION OF THE INFORMATION SYSTEM DATA COLLECTION EFFICIENCY IN ENERGY COMPLEX

The paper highlights shortcomings of current information system of energy statistics in Ukraine.

The aim of the State Committee of Statistics of Ukraine should be automation of the state statistical activity in energy complex, to be more precise, creation of automated process of data collecting and processing which come directly from statistical unit. Such information system will allow to decrease the complexity of the process of statistical data collecting by eliminating many stages of data processing and to shorten the duration of this process. The study describes the mechanism of automated statistical data collection in energy complex and estimates introduction efficiency of such system. Creation of the information system of energy statistics will allow to improve the quality, efficiency and effectiveness of public administration in the field of energy. Developed information system of energy statistics makes it possible to form the statistical report by different profiles in energy. Summary of data coming from the respondents will be available to end-users on the Internet in the public domain (without registration).

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CREDIT BUREAU BENCHMARKING AS A TOOL FOR ESTIMATION OF BANK'S POSITION AT THE MARKET

The article presents the conception of benchmarking on the market of consumer loans. The essence of such benchmarking is comparative analysis of bank's activity parameters with market average values from bureau of credit histories. Such benchmarking using is considering as a tool for estimation of bank's market position.

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DEVELOPMENT OF SELF-EMPLOYMENT IN GLOBAL ECONOMIC CONDITIONS

The article analyses factors effecting the development of self-employment activities in global economic conditions and, namely, liberal professions. The aim of this article is to identify the factors affecting the development of liberal professions. The methods used in this investigation are followers: scientific literature analysis, collection of information, comparison, generalization and logical analysis. The authors of this article concludes that the emergence of knowledge sector, increasing differentiation and flexibility of production and the growing role of creativity in value creation process determine the rising importance of liberal professions as one of the self-employment forms.

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THE ANALYSIS OF FOREIGN DIRECT INVESTMENTS IN SPHERE OF NANOTECHNOLOGY INNOVATIONS IN EUROPEAN UNION

The paper studies present state of direct investment in technological innovations in the European Union. The EU member states are found to demonstrate different economically motivated preferences as to investment in nanotechnology. The EU investment strategies are assessed from the viewpoint of challenges facing developing and transition economies.

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THE ENERGY COMPONENT OF THE ENVIRONMENTAL SECURITY: UKRAINE IN THE MIRROR

Energy security is important for any state. It is important for the state's environment and economy. Ukraine is an energy dependent state, as well as an import-energy dependent one. The paper is devoted to the statistical analyses of Ukrainian energy sector from the position of its world representation. The purpose of this research is on the base of statistical analysis of current internal and external trends in the energy sector of Ukraine to consider possible mechanisms to stimulate and accelerate environmental-friendly energy security of Ukraine. Main objectives: to trace the dynamics of world and Ukrainian main energy indicators in the synergy with the state energy security index; to cluster launched efficiency-targeted energy projects in Ukraine in geoindustry aspect. Analyses of dynamics of energetic vs environmental performance of Ukraine in 2000–2014 world ranks shows that being in low segment of world rankings on aspects of energy and environmental security, Ukraine shows positive tendencies to the improvement, however with slow steps. In order to identify the most promising and most attractive sector of the economy in Ukraine to investors we held grouping of current launching energy-efficient projects in the aspect of industries and sectors where energy-efficient technologies operate. The rank analyses depicted that the most popular among economic sectors for energy efficiency investments are enterprises of agriculture and consumer goods industry, and the most attractive regions of Ukraine for implementation of investments in energy efficient technologies are lvano-Frankivsk, Luhansk and Kherson oblasts.

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КИЇВСЬКОГО НАЦІОНАЛЬНОГО УНІВЕРСИТЕТУ ІМЕНІ ТАРАСА ШЕВЧЕНКА

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