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**Представлено дослідження актуальних проблем економічної теорії, страхування, управління ризиками, перестрахування, державного управління, міжнародної економіки, економіки підприємства, менеджменту, маркетингу, управління інвестиціями, теорії фінансів, банківської справи, статистики та шляхи й засоби розв'язання зазначених проблем.**

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**Для научных работников, практиков, преподавателей, аспирантов, студентов.**




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# ABSOLUTE AND COMPARATIVE SUSTAINABILITY OF FARMING ENTERPRISES IN BULGARIA

***Evaluating absolute and comparative sustainability of farming enterprises is among the most topical issues for researchers, farmers, investors, administrators, politicians, interests groups and public at large. Nevertheless, in Bulgaria and most East European countries there are no comprehensive assessments on sustainability level of Bulgarian farms of different juridical type. This article applies a holistic framework and assesses absolute and comparative sustainability major farming structures in Bulgaria – unregistered farms of Natural Persons, Sole Traders, Cooperatives, and Companies. First, method of the study is outlined, and overall characteristics of surveyed farming enterprises presented. After that an assessment is made of integral, governance, economic, social, environmental sustainability of farming structures of different juridical type. Next, structure of farming enterprises with different sustainability levels is analyzed. Finally, conclusion from the study and directions for further research and amelioration of sustainability assessments suggested.***

***Key words: farm sustainability, governance, economic, social, ecological aspects, Bulgaria.***

**Introduction.** The issue of assessment of absolute and comparative sustainability of farming structures of different type is among the most topical for researcher, farmers, investors, administrators, policy-makers, interests groups and public at large around the globe (Andreoli and Tellarini [1]; Bachev [2, 3, 4, 5, 6, 7]; Bachev and Petters [8]; Bachev et al. [9]; Bastianoni et al. [10]; EC [11]; FAO [12]; Fuentes [13]; Häni et al. [14]; OECD [15]; Rigby et al. [16]; Sauvenier et al. [17]; UN [18]). Nevertheless, practically there are no comprehensive assessments on sustainability level of Bulgarian farms of different juridical type in the conditions of European Union (EU) Common Agricultural Policy (CAP) implementation.

This article applies a holistic framework and assesses absolute and comparative sustainability of Bulgarian farming enterprises of different juridical type. First, method of the study is presented and overall characteristics of surveyed farms are outlined. After that, integral, governance, economic, social, and environmental sustainability of the farms of different juridical type is assessed. Finally, directions for further research and practices in sustainability assessment suggested.

**Methods of the study.** We have proved that definition farm sustainability has to be based on the "literal" meaning of that term and perceived as a system characteristics and "ability to continue through time" [3]. It has to characterize all major aspects of farming enterprise activity, which is to be managerially sustainable, and economically sustainable, and socially sustainable, and environmentally sustainable. Therefore, sustainability characterizes the ability (capability) of a particular farming enterprise to exist in time and maintain in a long-term its governance, economic, ecological and social functions in the specific socio-economic and natural environment in which it operates and evolves [6, 7].

In this study we apply a hierarchical framework including 12 Principles, 21 Criteria, 45 Indicators and Reference Values to assess sustainability level of Bulgarian farming structures (Fig. 1). The content, justification, modes of calculation and integration of sustainability indicators are already presented in details in our previous publication in this journal [7].

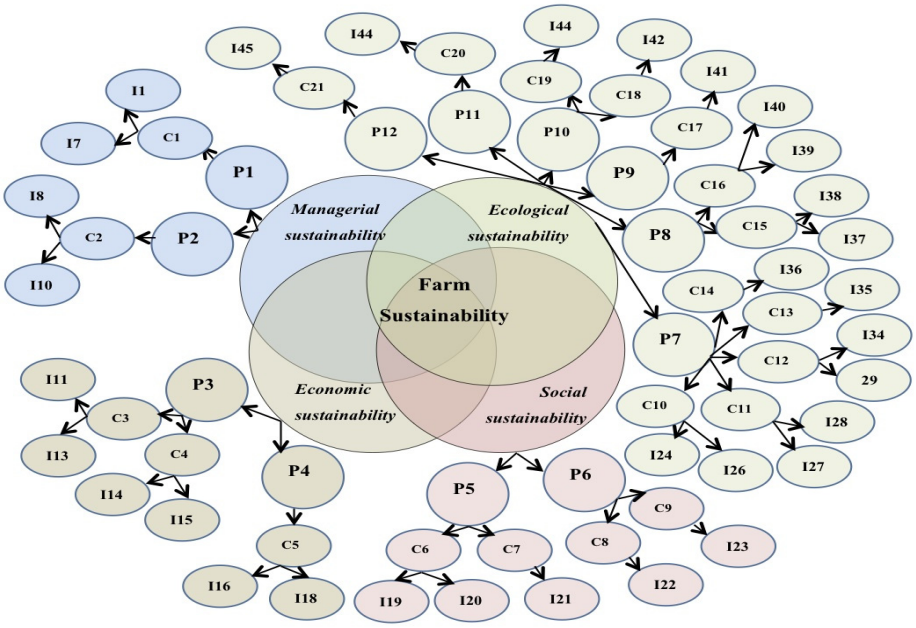



**Fig. 1. Framework for Assessing Sustainability of Bulgarian Farms**

*Source:* the author

Assessment of sustainability of farms in the country is based on a 2016 survey with the managers of "representative" market-oriented farms of different type. The survey was carried out with the assistance of the National Agricultural Advisory Service and the major associations of agricultural producers in the country, which identified the "typical" holdings of different type and location.

Assessment of sustainability level of individual farm is based on estimates of the managers for each Indicator in four qualitative levels: "High/Higher or Better that the Average in the Sector/Region", "Similar/Good", "Low/Lower or Worse than the Average in the Sector/Region", "Negative/Unsatisfactory/Unacceptable". After that the qualitative estimates for individual farms were quantified and transformed into Sustainability Indexes for each Indicator (SI(i)) using following scales: 1 for "High", 0,66 for "Good or Average", 0,33 for "Low", and 0 for "Unsatisfactory or Unacceptable".

For classification of farms according to juridical type (Physical Person, Sole Trader, Cooperative, Company), production specialization (Field Crops, Vegetables, Flowers, and Mushrooms, Permanent Crops, Grazing Livestock, Pigs, Poultry, and Rabbits, Mix Crop-Livestock, Mix Crops, Mix Livestock), geographical and administrative regions (North-West Region, North-Central Region, North-East Region, South-West Region, South-Central Region, South-East Region), and ecological locations (Mountainous or Non-mountainous regions with Natural Handicaps, with Lands in Protected Zones and Territories) the official typology for farming holdings in the country is used. In addition, every manager self-determined his/her farm as Predominately for Subsistence, rather Small, Middle size or Large for the sector, and located mainly in Plain, Plain-mountainous or Mountainous region. The latter approach guarantees an adequate assessment since the farms managers are well aware of the specificity and comparative characteristics of their holdings in relations to others in the region and the (sub)sector.

For the integral assessment of sustainability of a farm for every Criteria, Principle, and Aspect, and Overall level, equal weights are used for each Principle in a particular Aspect, and for each Criterion in a particular Principle, and for each Indicator in a particular Criterion. Sustainability Index for individual Criteria ($SI(c)$), Principle ($SI(p)$), and Aspect ($SI(a)$), and Integral Sustainability Index ($SI(i)$) are calculated by formulas:

$$SI(c) = \sum SI(i)/n$$

$n$ – number of Indicators in a particular Criteria

$$SI(p) = \sum SI(c)/n$$

$n$ – number of Criteria in a particular Principle

$$SI(a) = \sum SI(p)/n$$

$n$ – number of Principles in a particular Aspect

$$SI(i) = \sum SI(a)/4$$

The survey with the farm managers took part in summer of 2016 and included 190 registered agricultural producers, which comprise around 0,2 % of all registered under 1999 Regulation No 3 for Creation and Maintaining a Registry of Agricultural Producers in Bulgaria (Agrarian paper, 2015).

Managers of "representative" farms of all juridical type, size, specialization and location have were surveyed. (Table 1). The structure and importance of surveyed farms approximately corresponds to the real structure of registered agricultural producers and market-oriented holdings in the country.

***Table 1.*** **Type and Number of Surveyed Agricultural Farms (percent, number**)**

| Type and location of farms | Physical persons | Sole Traders | Cooperatives | Companies | Total |
|---|---|---|---|---|---|
| Total | 80,00 | 4,21 | 6,84 | 8,95 | 190* |
| Mainly subsistence | 11,18 | 0,00 | 0,00 | 0,00 | 8,95 |
| Small size | 57,89 | 37,50 | 0,00 | 5,88 | 48,42 |
| Middle size | 28,95 | 37,50 | 92,31 | 70,59 | 37,37 |
| Big size | 1,32 | 25,00 | 7,69 | 23,53 | 4,74 |
| Field crops | 10,53 | 25,00 | 69,23 | 29,41 | 16,84 |
| Vegetables, flowers, and mushrooms | 13,82 | 12,50 | 0,00 | 0,00 | 11,58 |
| Permanent crops | 24,34 | 25,00 | 0,00 | 11,76 | 21,58 |
| Grazing livestock | 17,76 | 25,00 | 0,00 | 5,88 | 15,79 |
| Pigs, poultry, and rabbits | 0,66 | 0,00 | 7,69 | 0,00 | 1,05 |
| Mix crop-livestock | 14,47 | 0,00 | 23,08 | 23,53 | 15,26 |
| Mix crops | 13,82 | 12,50 | 0,00 | 29,41 | 14,21 |
| Mix livestock | 4,61 | 0,00 | 0,00 | 0,00 | 3,68 |
| Mainly plain region | 51,97 | 50,00 | 53,85 | 64,71 | 53,68 |
| Plain-mountainous | 19,74 | 50,00 | 38,46 | 17,65 | 22,11 |
| Mainly mountainous | 14,47 | 0,00 | 7,69 | 17,65 | 13,68 |
| Lands in protected zones and territories | 6,58 | 0,00 | 0,00 | 17,65 | 6,84 |
| Mountainous regions with natural handicaps | 15,13 | 0,00 | 7,69 | 11,76 | 13,68 |
| Non-mountainous regions with natural handicaps | 1,97 | 0,00 | 7,69 | 0,00 | 2,11 |
| North-West region | 15,79 | 37,50 | 7,69 | 11,76 | 15,79 |
| North-Central region | 21,05 | 0,00 | 23,08 | 23,53 | 20,53 |
| North-East region | 15,13 | 12,50 | 38,46 | 11,76 | 16,32 |
| South-West region | 14,47 | 0,00 | 7,69 | 11,76 | 13,16 |
| South-Central region | 19,74 | 12,50 | 15,38 | 29,41 | 20,00 |
| South-East region | 13,82 | 37,50 | 7,69 | 11,76 | 14,21 |

*** mainly Corporations and 5,88 % Partnerships.*

*Source:* survey with managers of farms, July 2016

**Results and Discussion.** Multi-indicators assessment of sustainability level of surveyed farms indicates, that the Index of Integral Sustainability of holdings is 0,55, which represents a *good* level of sustainability of Bulgarian farms (Fig. 1). With the highest levels are Indexes of Environmental (0,61) and Social (0,57) Sustainability of holdings,

while Indexes of Governance (0,52) and Economic (0,5) Sustainability are at the border with a low level. Therefore, improvement of the latter two is critical for maintaining a good sustainability of farming enterprises in the country.

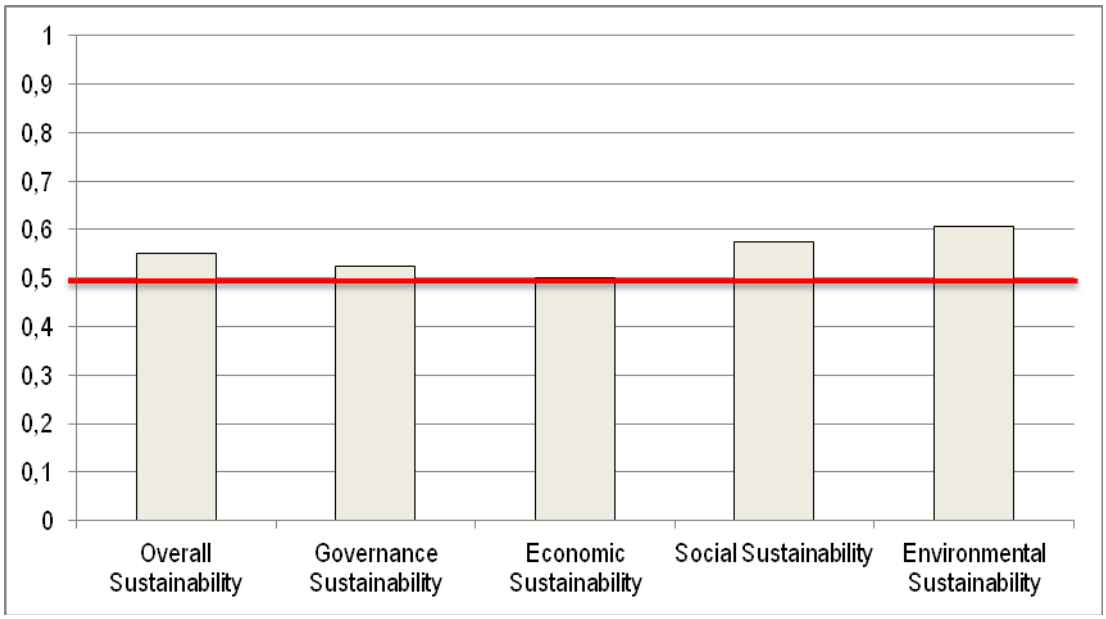



**Fig. 1. Indexes of Integral, Governance, Economics, Social and Environmental Sustainability of Bulgarian Farms**

*Source:* survey with managers of farms, July 2016

Analysis of individual Indexes for major sustainability Principles, Criteria and Indicators let identify components contributing to diverse aspects of farms' sustainability in the country. For instance, governance and economic sustainability of Bulgarian farms are relatively low because of the fact that the Index of Governance Efficiency (0,49) and the Index of Financial Stability (0,47) of holdings are low (Fig. 2). Similarly, it is clear that despite that the overall environmental sustainability is relatively high, the Index of Preservation of Agricultural Lands (0,52) and the Index of Preservation of Biodiversity (0,56) are relatively low and critical for maintaining the achieved level.

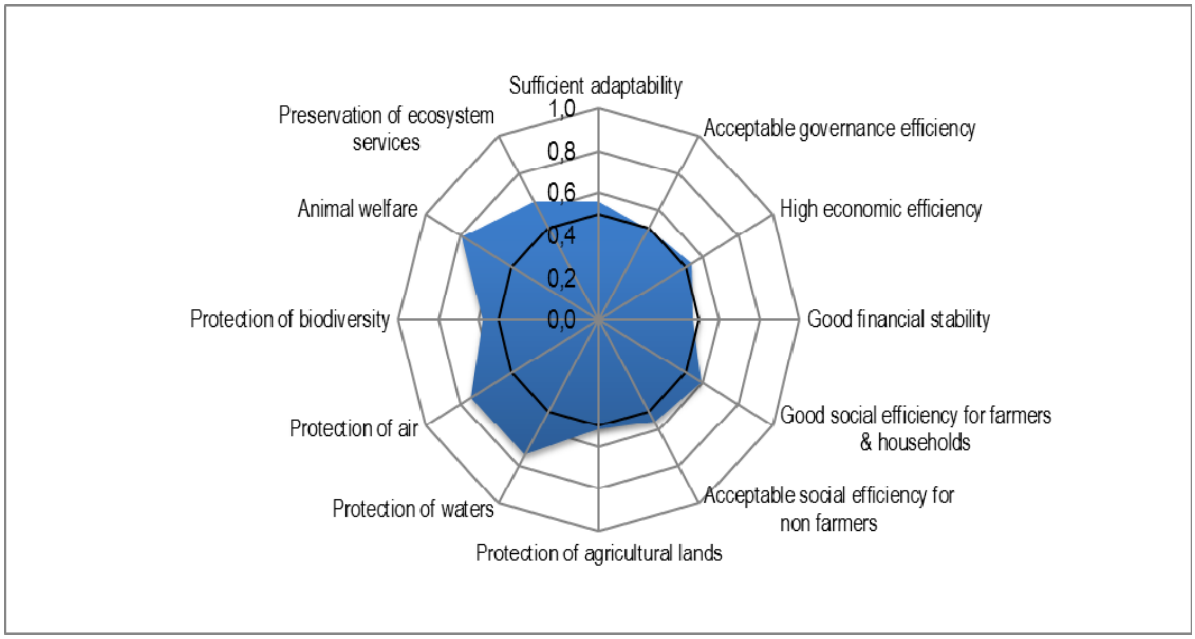



**Fig. 2. Index of Sustainability of Bulgarian Farms for Major Principles for Governance, Economics, Social and Environmental Sustainability**

*Source:* survey with managers of farms, July 2016

In depth analysis for individual Criteria and Indicators further specifies the elements, which enhance or reduce farms' sustainability level. For instance, insufficient Comparative Governance Efficiency and Financial Capability (Fig. 3) are determined accordingly by: a low Comparative Efficiency of Supply of Short-term Inputs in relations to alternative organizations (0,28), and unsatisfactory Profitability of Own Capital (0,41) and Overall Liquidity (0,48) of farms (Fig. 4). Similarly, low levels of Indexes of Preservation of Agricultural Lands and Preservation of Biodiversity are determined accordingly by insufficient Application of Recommended Irrigation Norms (0,46), high level of Soils Water Erosion (0,55), and lowered Number of Wild Animals on Farm Territory (0,53).

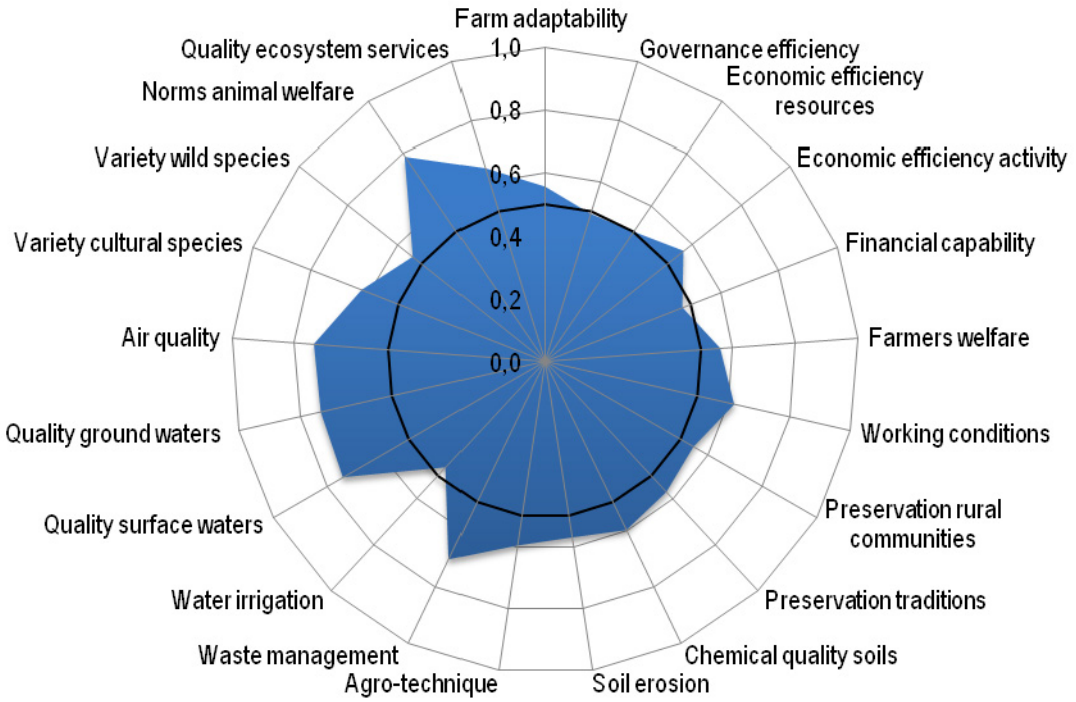
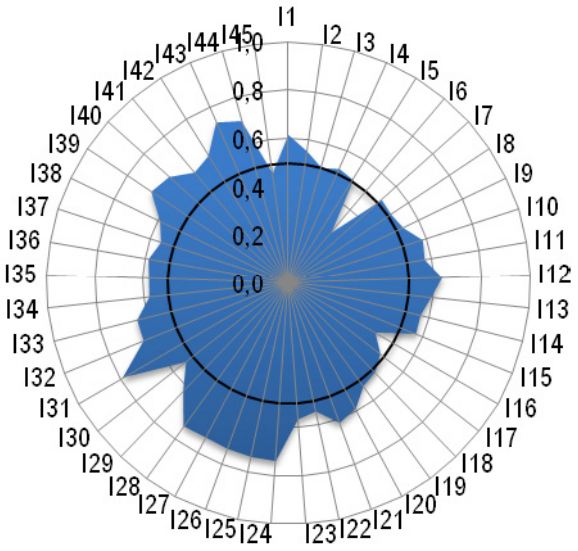



**Fig. 3. Level of Sustainability of Bulgarian Farms for Individual Criteria for Governance, Economics, Social and Environmental Sustainability**

*Source:* survey with managers of farms, July 2016




**I1-Level of Adaptability to Market Environment; I2-Level of Adaptability to Institutional Environment; I3-Level of Adaptability to Natural Environment; I4-Comparative Efficiency of Supply and Governance of Labor Resources; I5-Comparative Efficiency of Supply and Governance of Natural Recourses; I6-Comparative Efficiency of Supply and Governance of Short-term inputs; I7-Comparative Efficiency of Supply and Governance of Long-term Inputs; I8-Comparative Efficiency of Supply and Governance of Innovation; I9-Comparative Efficiency of Supply and Governance of Finance; I10-Comparative Efficiency of Governance of Marketing of Products and Services; I11-Land productivity; I12-Livestock Productivity; I13-Level of Labor productivity; I14-Rate of Profitability of Production; I15-Income of Enterprise; I16-Rate of Profitability of Own Capital; I-17-Overall Liquidity; I18-Financial Autonomy; I19-Income per Farm-household Member; I-20-Satisfaction of Activity; I21-Compliance with Working Conditions Standards; I22-Contribution to Preservation of Rural Communities; I23-Contribution to Preservation of Traditions; I24-Nitrate Content in Surface Waters; I25-Pesticide Content in Surface Waters; I26-Nitrate Content in Ground Waters; I27-Pesticide Content in Ground Waters; I28-Extent of Air Pollution; I-29-Number of Cultural Species; I30-Number of Wild Species; I31-Extent of Respecting Animal Welfare; I32-Extent of Preservation of Quality of Ecosystem Services; I33-Soil Organic Content; I34-Soil Acidity; I35-Soil Soltification; I36-Extent of Wind Erosion; I37-Extent of Water Erosion; I38-Crop Rotation; I39-Number of Livestock per ha of Farmland; I40-Norm of Nitrogen Fertilization; I41-Norm of Phosphorus Fertilization; I42-Norm of Potassium Fertilization; I43-Extent of Application of Good Agricultural Practices; I44-Type of Manure Storage; I45-Irrigation Rate

**Fig. 4. Indicators* of Assessing Sustainability of Bulgarian Farms**

*Source:* survey with managers of farms, July 2016

Low levels of indicators identify the specific areas for improvement of sustainability of farms through adequate changes in management strategy and/or public policies. For instance, despite that the overall Adaptability of Farms is relatively high (0,56), the Adaptability of Farms to Changes in Natural Environment (climate, extreme events, etc.) is relatively low (0,5). Therefore, effective measures are to be undertaken to improve the latter type of adaptability through education, training, information, amelioration of agro-techniques, structure of production and varieties, technological and organizational innovations, etc.

On the other hand, superior levels of certain indicators show the absolute and comparative advantages of Bulgarian farms related to sustainable development. At the current stage of development the latter are associated with respecting Animal Welfare standards, Preservation of Quality of Surface and Ground Waters from contamination with nitrates and pesticides, Preservation of Air Quality, implementation of Good Agricultural Practices, reduced Number of Livestock per unit of Farmland, acceptable Labor Conditions and comparative Satisfaction from Farming Activity, optimal Productivity of Livestock, good Adaptability to Market (prices, competition, demands), and Comparative Governance Efficiency of Marketing of Products and Services.

There is a great variation in levels of individual sustainability indicators for farms of different juridical type (Fig. 5).

Most sustainability indicators of Physical Persons are low and lead to a decrease in sustainability for individual aspects and overall sustainability. In governance aspect of sustainability of these enterprises are low: Level of Adaptability to Natural Environment (0,49), and Comparative Efficiency of Supply and Governance of Labor Resources (0,49), Natural Resources (0,49), Long-term Inputs (0,48) and Innovations (0,49), and extremely low Comparative Efficiency of Supply and Governance of Short-term Inputs (0,26). In the economics aspect sustainability of Physical Persons is particularly low in respect to Livestock Productivity (0,34), Rate of Profitability of Own Capital (0,36), Overall Liquidity (0,44), and Financial Autonomy (0,48). In social perspective sustainability of these enterprises is only low in relation to Income per Farm-household Member (0,49) while in environmental plan in respect to complying with norms for Number of Livestock per ha (0,39), Type of Manure Storage (0,39), Extent of Respecting Animal Welfare (0,43) and Irrigation Rate (0,49). In all these directions adequate measures have to be undertaken by managers and state authority in order to improve aspect and overall sustainability of that type of farms.

At the same time, a number of indicators for environmental sustainability of Physical Persons are with relatively high positive positions within the good level: Nitrate and Pesticides Content in Surface and Ground Waters, Extent of Air Pollution, and Extent of Application of Good Agricultural Practices. All these advantages of Physical Persons are to be maintained and enhanced, while other indicators for eco-efficiency increased in order to preserve and increase aspect and overall sustainability of these types of holdings.

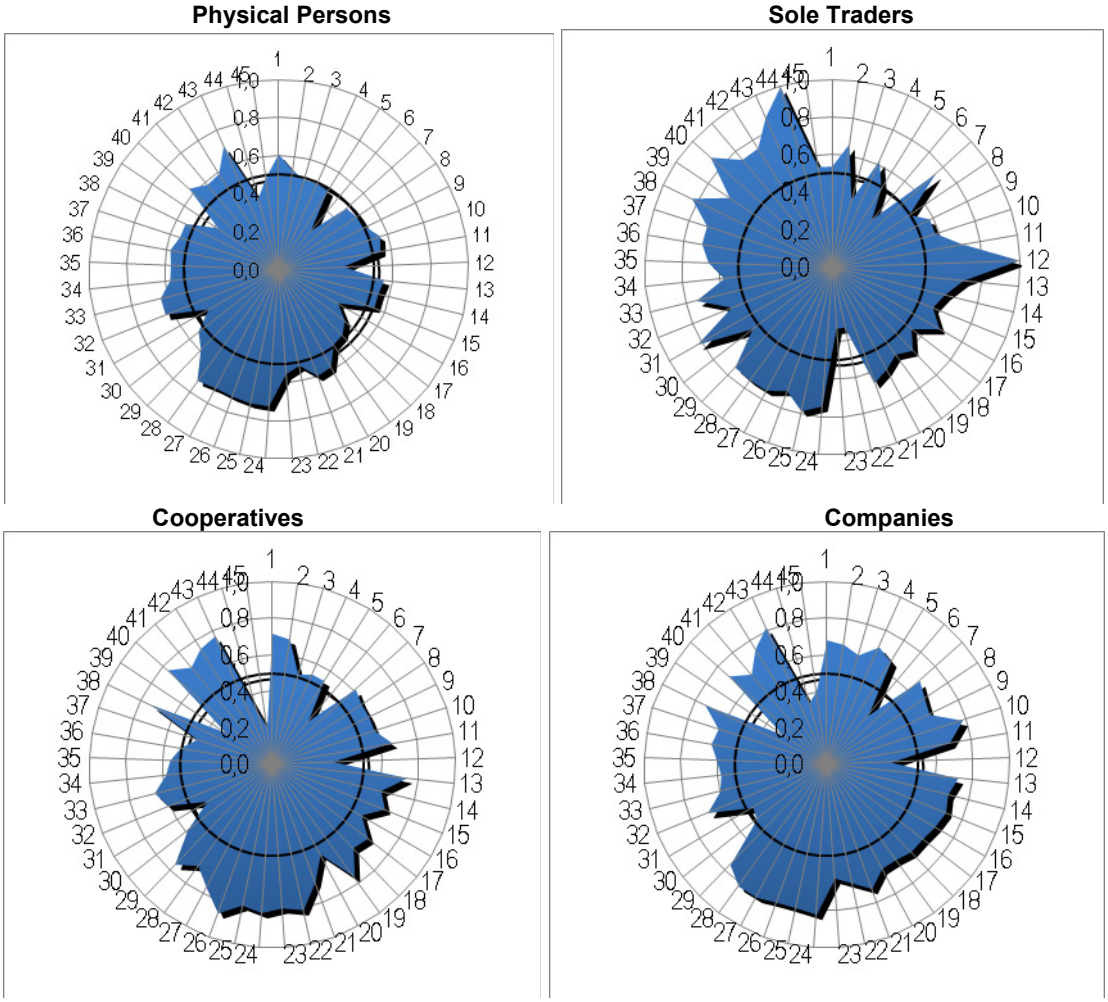



**Fig. 5. Sustainability Indicators of Farms of Different Juridical Type in Bulgaria**

*Source:* survey with farm managers, July 2016

Sole Traders are with low values for governance sustainability in respect to Level of Adaptability to Natural Environment (0,37) and Comparative Efficiency of Supply and Governance of Short-term inputs (0,33), and for social sustainability in respect to their Contribution to Preservation of Rural Communities and Preservation of Traditions (by 0,33).

Simultaneously, Sole Traders have high sustainability for eco-aspects of activity in relation to Type of Manure Storage, Norm of Nitrogen Fertilization, and Extent of Application of Good Agricultural Practices, and marginal to the highest level for implementation of effective Crop Rotation. What is more, enterprises with livestock are with a high sustainability for Livestock Productivity as well as a marginal to the highest level for Extent of Respecting Animal Welfare Standards. Furthermore, many indicators for environmental sustainability of Sole Traders are with high positive values within the borders of good level: Nitrate and Pesticides Content in Surface and Ground Waters, Extent of Air Pollution, Number of Cultural Species, Soil Organic Content, Extent of Wind and Water Erosion, and application of recommended Norms of Potassium and Phosphorus Fertilization. Sole Traders are also with a high position, within the borders of a good level, for Comparative Efficiency of Supply and Governance of Long-term Inputs, Level of Labor Productivity, and Land Productivity. All that also contributes to a growth in their governance and economic sustainability.

For Cooperatives, in the borders of a good sustainability level, the highest indicators values are for governance, social and economic sustainability: Level of Adaptability to Market Environment, Level of Labor Productivity, Income per Farm-household Member, Contribution to Preservation of Rural Communities and Preservation of Traditions. Numerous of the environmental indicators of cooperative enterprises are also with superior levels – a high eco-sustainability for Nitrate Content in Ground Waters, and a good eco-sustainability for Nitrate and Pesticide Content in Surface Waters, Pesticide Content in Ground Waters, Number of Cultural Species, Extent of Application of Good Agricultural Practices, efficient Crop Rotation, and application of Norms of Nitrogen and Phosphorus Fertilization. All these positive aspects of the activity of Cooperative enterprises are to be maintained and expended.

On the other hand, Cooperatives are environmentally unsustainable in respect to Irrigation Rate (0,2) and with low levels for Comparative Efficiency of Supply and Governance of Short-term Inputs (0,3), Livestock Productivity (0,33), required Number of Livestock per ha (0,31), Type of Manure Storage (0,31), Extent of Respecting Animal Welfare (0,41), and Extent of Water Erosion (0,43). These parts of Cooperatives' activity have to be considerably improved in order to increase governance, economic, environmental and integral sustainability of these enterprises.

For Companies, within the borders of a good sustainability, the highest are levels for indicators of governance sustainability: Comparative Efficiency of Supply and Governance of Labor Resources, and Comparative Efficiency of Governance of Marketing of Products and Services. In respect to economic sustainability the best levels are for Labor Productivity and Income of Enterprise, while for social sustainability for Compliance with Working Conditions Standards. For environmental suitability superior are indicators for Nitrate and Pesticides Content in Surface and Ground Waters, Extent of Air Pollution, Extent of Application of Good Agricultural Practices, efficient Crop Rotation, Number of Cultural Species, application of Norms of Nitrogen and Phosphorus Fertilization, and Extent of Preservation of Quality of Ecosystem Service.

With the lowest values for Companies are indicators for governance and economic sustainability: Comparative Efficiency of Supply and Governance of Short-term Inputs (0,35) and Livestock Productivity (0,35), and indicators for eco-sustainability: permissible Number of Livestock per ha (0,29), Type of Manure Storage (0,35), Extent of Respecting Animal Welfare (0,41), Irrigation Rate (0,41) and Number of Wild Species on the Territory of Farm (0,49). These sides of activity of corporative enterprises have to be improved in order to increase their governance, economic, environmental and integral sustainability.

Holding of Physical Persons are the most numerous and to a great extent they (pre)determine the "average" sustainability level of all farms in the country. Consequently, the level of integral sustainability of Physical Persons of different type deviates insignificantly from the average sustainability levels of respective categories in the country (Fig. 6).

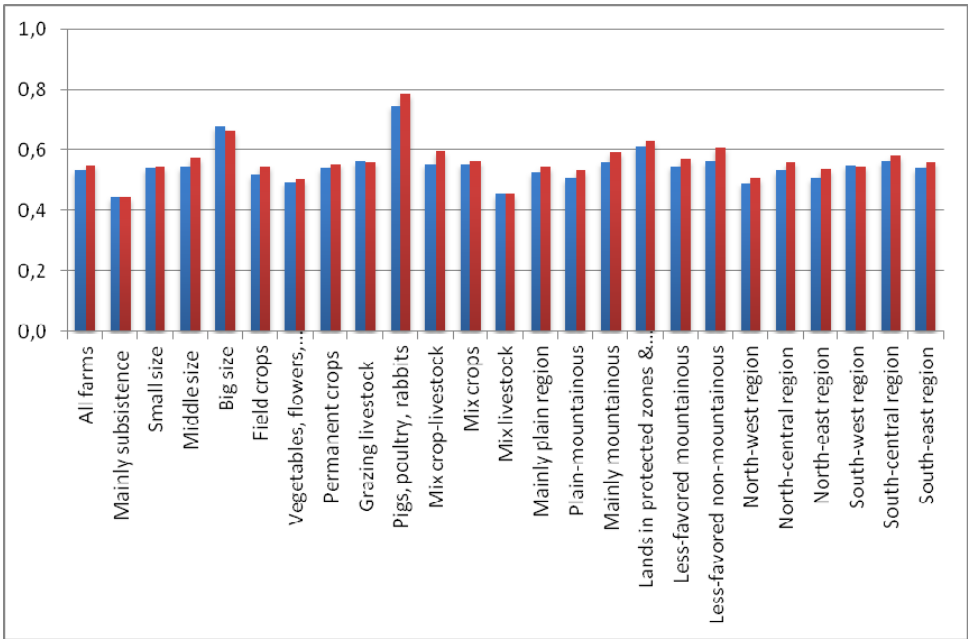



**Fig. 6. Levels of Sustainability of Holdings of Physical Persons of Different Type in Bulgaria**

*Source:* survey with managers of farms, July 2016

There are significant variations in sustainability of Physical Persons depending on their size, specialization, ecological and geographical location. That indicates that the size, product specialization and location of Physical Persons are more important factors for their sustainability than their juridical status.

With the best sustainability, within a good level, are holdings of Physical Persons with Big size, specialized in Pigs, poultry and Rabbits, these with Lands in Protected Zones and Territories, and located in the South-Central region of the country. At the same time, with low sustainability are Physical Persons which are Predominately for Subsistence, those specialized in Mix-Livestock and in Vegetables, Flowers and Mushrooms, and located in the North-West region of the country. According to the ecological location, the lowest (within a good level) is sustainability of Physical Persons situated in Plain-mountainous regions of the country.

There is also a significant differentiation in the share of farms with different level of sustainability for the major type of Physical Persons (Fig. 7). All Physical Persons with Big size for the sector and specialized in Pigs, poultry and Rabbits, and most of these in Mix Cops and Permanent Crops, and located in Non-mountainous Regions with Natural Handicaps and with Lands in Protected Zones and Territories are with a good and a part with a high sustainability. On the other hand, majority of Physical Persons, which are Predominately for Subsistence and these with Mix Livestock are with low sustainability or unsustainable. The portion is also considerable of low sustainable or unsustainable Physical Persons in groups with Vegetables, Flowers and Mushrooms, Grazing Livestock, and Crop-Livestock specialization, those located in Mountainous Regions with Natural Handicaps, in Plain-Mountainous Regions, and in NorthWest and South-Wets Regions of the country.

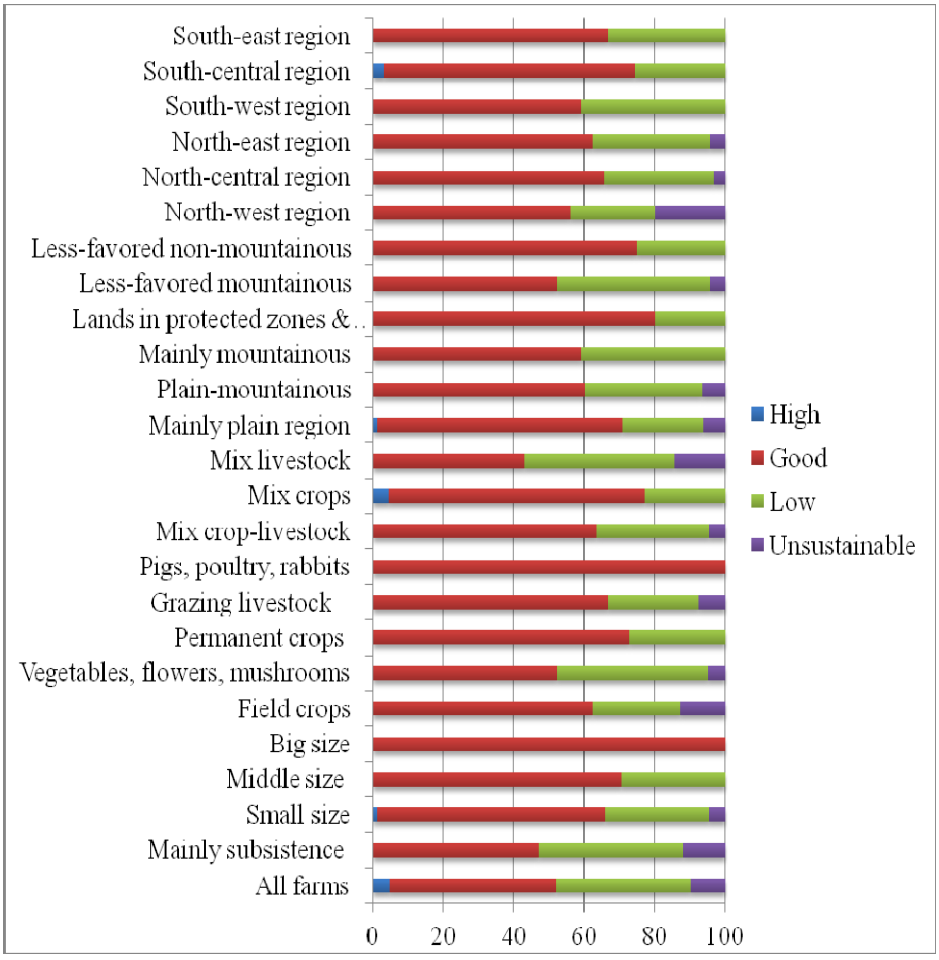



**Fig. 7. Structure of Physical Persons of Various Type with Different Sustainability Level in Bulgaria (percent)**

*Source:* survey with managers of farms, July 2016

For Sole Traders there is also variation in sustainability level dependent on size, specialization, ecological and geographical location. With the highest sustainability are Sole Traders with Big size for the sector, specialized in Vegetables, Flowers and Mushrooms, and located in Plain regions, and in South-Central region of the country (Fig. 8). Simultaneously, with a low sustainability are Sole Traders specialized in Mix Crops and in Grazing Livestock, and in the border with the inferior level those with Small size, and located in Plain-mountainous and North-West region of the country.

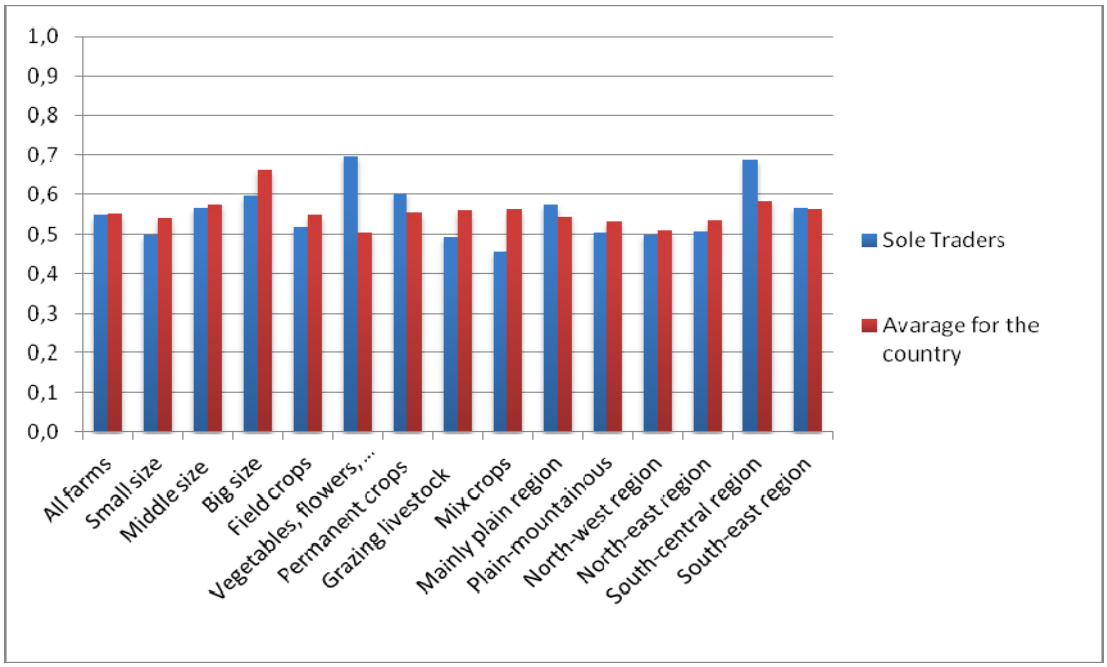



**Fig. 8. Levels of Sustainability of Sole Traders of Different Type in Bulgaria**

*Source:* survey with managers of farms, July 2016

In Sole Traders' groups with the lowest and the highest sustainability levels there are significant deviations from the average levels of sustainability in respective categories of farms in the country. That demonstrates that the specific juridical status of Sole Trader is a critical (and more important) factor determining the level of sustainability in this group, rather than belonging of holdings to a certain type. On the other hand, in other groups of Sole Traders the levels of sustainability are close to the average in the country, which shows that for these Sole Trades the size, specialization and location are dominating for formation of one of another sustainability level.

There are significant variations in the share of Sole Traders of different type with unlike sustainability levels (Fig. 9). All farms with Big size, specialized in Field Crops, Vegetables, Flowers and Mushrooms, Permanent Crops, and those located in North-East and South-Central Regions of the country are with a good sustainability. On the other hand, all holdings with Mix Crops, every other specialized in Grazing Livestock, and one third of these with Small and Middle size as well as situated in North-West and South-East Regions of the country are low sustainable.

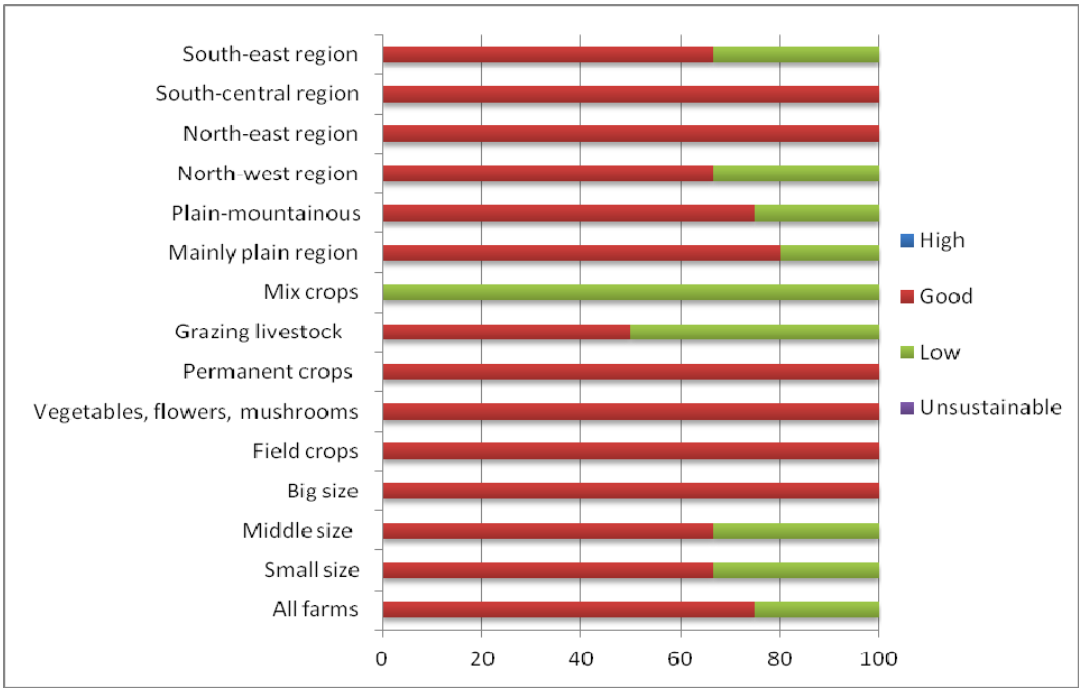



**Fig. 9. Structure of Sole Traders of Various Type with Different Sustainability Level in Bulgaria (percent)**

*Source:* survey with managers of farms, July 2016

For Cooperatives there exists considerable differentiation in sustainability level depending on the size, specialization and location of the farms. With the best sustainability (close to the border with a high level) are cooperatives with Big size for the sector, those specialized in Pigs, Poultries and Rabbits, located in Mountainous regions, Mountainous Regions with Handicaps, and in North-Central region of the country (Fig. 10). With the lowest sustainability are cooperatives located in South-West region of the country.

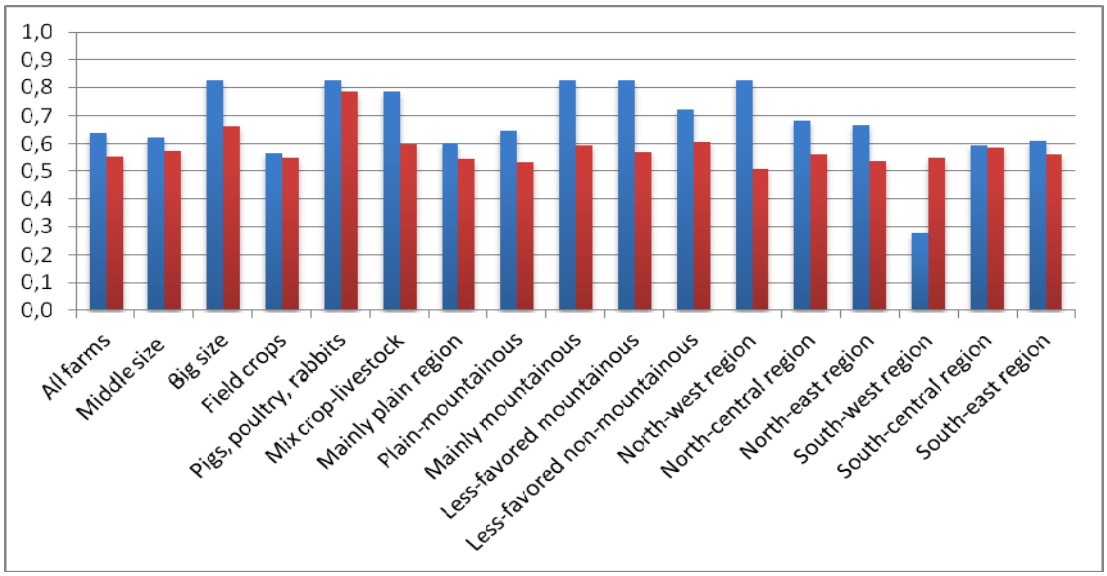



**Fig. 10. Levels of Sustainability of Cooperatives of Different Type in Bulgaria**

*Source:* survey with managers of farms, July 2016

The levels of sustainability of most Cooperatives of different type deviate considerably from the average levels for sustainability in these groups of holdings in the country. That proves that specific "Cooperative forms" (the juridical status of Cooperative) is critical factor determining sustainability levels of cooperative farms of a particular type, rather than their belonging to certain category of holdings in the country.

There are significant variations in the share of Cooperatives with different sustainability level for individual type of farms (Fig. 11). All Cooperatives with Big size, specialized in Pigs, Poultry and Rabbits, Crop-Livestock, and those located in Mountainous Regions, Mountainous and Non-mountainous Regions with Natural Handicaps, and in North-West, North-Central, South-Central and South-East Regions of the country are with a good sustainability. The greatest portion of highly sustainable Cooperatives are among located in North-East Region, and Plain Regions of the country as well as specialized in Field Crops. At the same time, each of Cooperatives in South-West Region and 40 % of located in Plain-Mountainous Regions of the country are low sustainable.

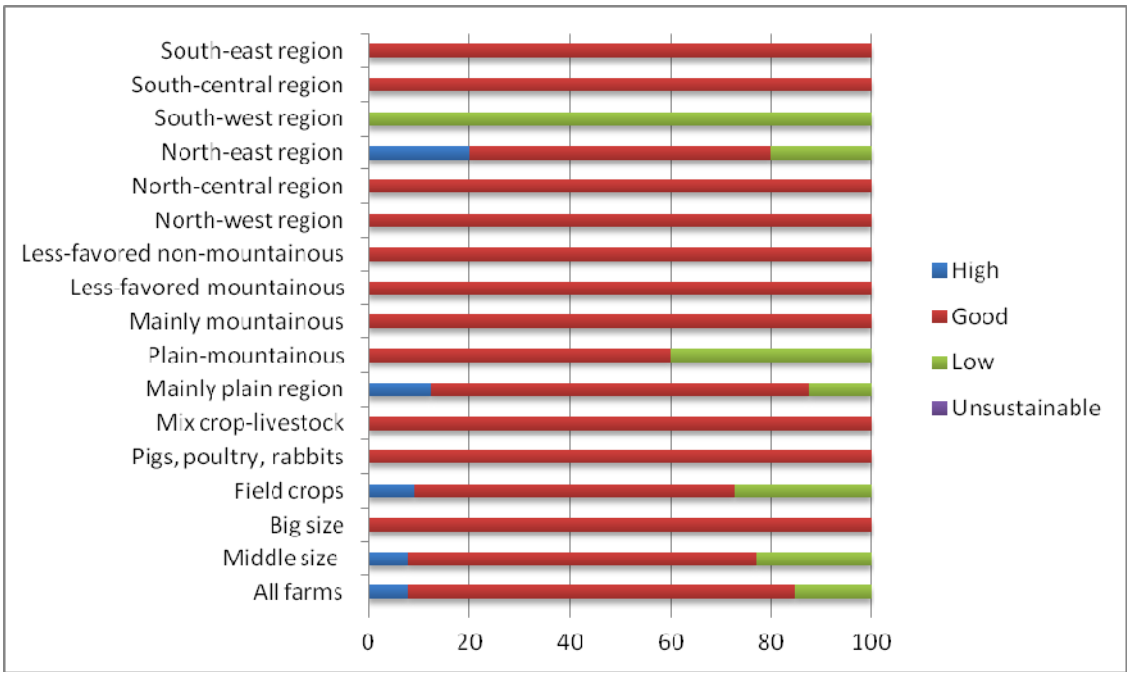



**Fig. 11. Structure of Cooperatives of Various Type with Different Sustainability Level in Bulgaria (percent)**

*Source:* survey with managers of farms, July 2016

There are a significant specificity and variation in sustainability levels of Companies with different size, specialization and location (Fig. 12). With the highest sustainability are Companies with Small size for the sector, specialized in Permanent crops, located in Mountainous regions, and in South-East region of the country. Simultaneously, farms of that juridical type specialized in Grazing Livestock, and located in North-West region of the country are with the lower levels of sustainability.

There are great elevations in sustainability levels of Companies of all type with an exception of firms with Big size for the sector, specialized in Grazing Livestock, and located in North-East Region of the country. That means that for most categories of Companies the specific juridical status is critical for one or another level of sustainability. Sole exceptions are mentioned above three groups of firms, where belonging to farms with a particular (Big) size, specialization (Grazing Livestock) and location (North-East Bulgaria) is an important factor for sustainability formation.

In Companies also there is a great differentiation in fractions of holdings with one or another level of sustainability in each particular group (Fig. 13). All farms with Crop-Livestock specialization, and those located in Mountainous Regions in Natural Handicaps as well as the vast majority of those with Big size for the sector and Mix Crops are highly sustainable. At the same time, a half of the Companies in North-West Region of the country and every third of those in South-West Region are low sustainable.

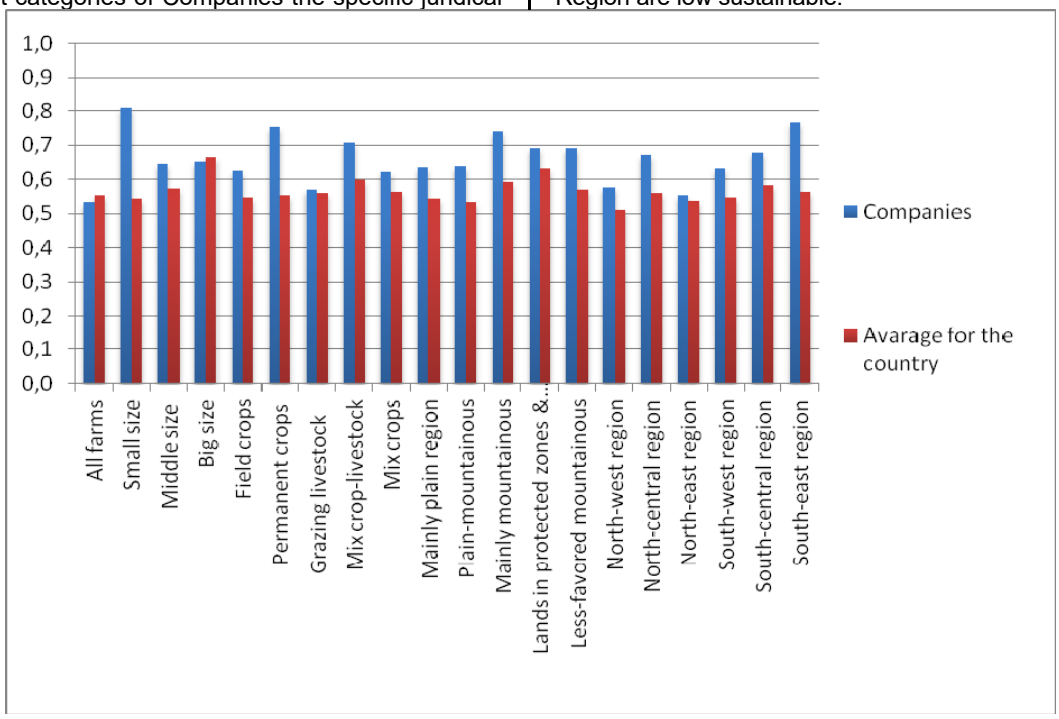



**Fig. 12. Levels of Sustainability of Companies of Different Type in Bulgaria**

*Source: survey with managers of farms, July 2016*

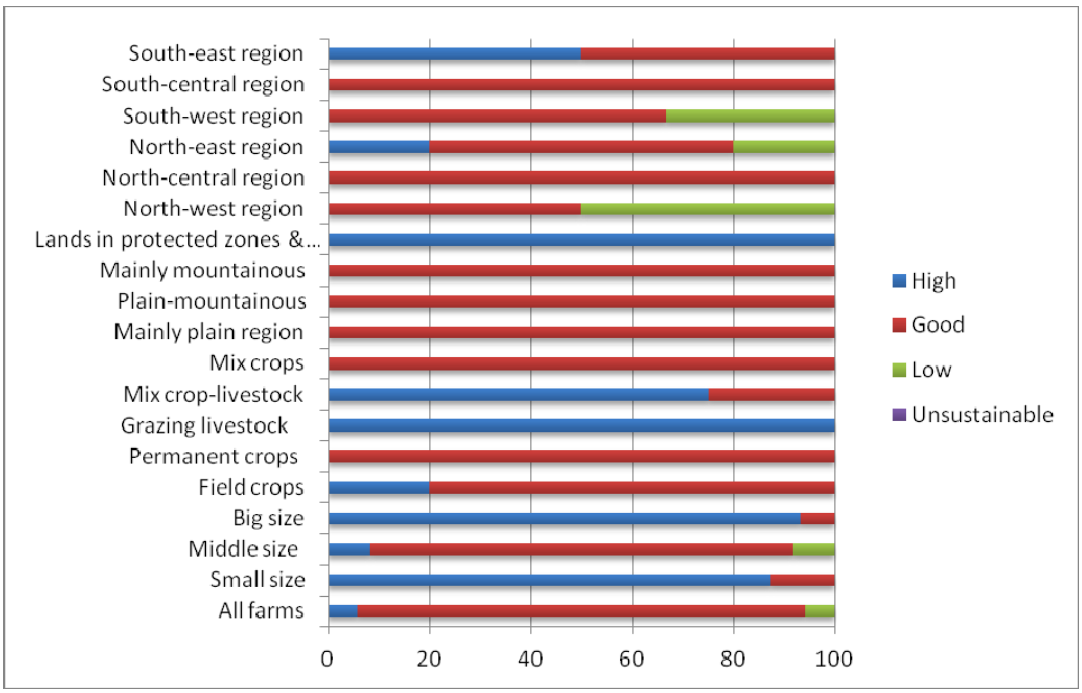



**Fig. 13. Structure of Companies of Various Type with Different Sustainability Level in Bulgaria (percent)**

*Source:* survey with managers of farms, July 2016

**Conclusion.** Our survey includes "typical" and to a certain extent "sustainable" (perspective) agricultural farms, which means that sample sustainability level is higher than the real (average) for the country. Despite that undertaken first large-scale study on sustainability of Bulgarian farming structures let us make some important conclusions about the level of holdings sustainability in the country, and recommendations for managerial and assessment practices.

Suggested holistic framework gives a possibility to improve assessment, analysis and management of sustainability of individual farms and holdings of different type in general and for major aspects, principles, criteria and indicators of governance, economic, social and environmental sustainability. That approach has to be further discussed, experimented, improved and adapted to the specific conditions of operation and development of farms of different type, subsector of production, geographical region and ecosystem as well as the special needs of decision-makers at various levels.

Overall sustainability of Bulgarian farms is at a good level, with superior levels for environmental and social sustainability, and inferior level for governance and economic sustainability. There are great variations in sustainability levels of farms of different juridical type as well as in shares of holdings with unlike level of sustainability. Distribution of farms of different type in groups with diverse levels of sustainability has to be taken into account when forecast the number and importance of holdings of each kind, and modernize public (structural, sectorial, regional, environmental, etc.) policies for supporting agricultural producers of certain type, sub-sectors, ecosystems and regions of the country.

Having in mind the importance of holistic assessments of sustainability of farms and the enormous benefits for farm management and agrarian policies, such studies are to be expended and their precision and representation increased. The latter require a close cooperation between all interests parties and participation of farmers, agrarian organizations, local and state authorities, interest groups, research institutes and experts, etc. Moreover, the precision of estimates has to be improved and besides on assessments of managers to incorporate relevant information from field tests and surveys, statistical and other data, and expertise of professionals in the area.

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## АБСОЛЮТНА І ПОРІВНЯЛЬНА СТІЙКІСТЬ СІЛЬСЬКОГОСПОДАРСЬКИХ ПІДПРИЄМСТВ У БОЛГАРІЇ

***Оцінка абсолютної і порівняльної стійкості сільськогосподарських підприємств є одним із найактуальніших питань для дослідників, фермерів, інвесторів, адміністраторів, політиків, зацікавлених груп і населення загалом. Проте в Болгарії і більшості країн Східної Європи не існує комплексних оцінок рівня стійкості болгарських ферм різного юридичного типу. У статті оцінено абсолютні і порівняльні показники стійкості основних сільськогосподарських структур у Болгарії – незареєстровані ферми фізичних осіб, індивідуальних підприємців, кооперативів та компаній. Викладено метод дослідження і представлені загальні характеристики обстежених сільськогосподарських підприємств. Після цього проведено інтегральну оцінку управління, економічної, соціальної, екологічної стійкості сільськогосподарських споруд різного юридичного типу. Проаналізовано структуру сільськогосподарських підприємств із різними рівнями стійкості. Запропоновано висновок із дослідження і напрями для подальших розвідок і поліпшення оцінок стійкості.***

***Ключові слова: стійкість ферми, управління, економічні, соціальні та екологічні аспекти, Болгарія.***

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## АБСОЛЮТНАЯ И СРАВНИТЕЛЬНАЯ УСТОЙЧИВОСТЬ СЕЛЬСКОХОЗЯЙСТВЕННЫХ ПРЕДПРИЯТИЙ В БОЛГАРИИ

***Оценка абсолютной и сравнительной устойчивости сельскохозяйственных предприятий является одним из наиболее актуальных вопросов для исследователей, фермеров, инвесторов, администраторов, политиков, заинтересованных групп и населения в целом. Однако в Болгарии и большинстве стран Восточной Европы не существует комплексных оценок уровня устойчивости болгарских ферм различного юридического типа. В статье оцениваются абсолютные и сравнительные показатели устойчивости основных сельскохозяйственных структур в Болгарии – незарегистрированные фермы физических лиц, индивидуальные предприниматели, кооперативы и компании. Изложен метод исследования и представлены общие характеристики обследованных сельскохозяйственных предприятий. После этого проведено интегральную оценку управления, экономической,***

*социальной, экологической устойчивости сельскохозяйственных ферм различного юридического типа. Проанализирована структура сельскохозяйственных предприятий с различными уровнями устойчивости. Предложены вывод из исследования и направления для дальнейших исследований и улучшения оценок устойчивости.*

*Ключевые слова: устойчивость фермы, управление, экономические, социальные и экологические аспекты, Болгария.*

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# CAPTIVE AS AN INSURANCE FORMULA FOR RISK MANAGEMENT: ADVANTAGES AND DISADVANTAGES

***This article introduces subject of an insurance captive entity, with focus on how it could be used as insurance formula for risk management. Captive might be the most appropriate insurance formula for risk management. However, the level of achieved success depends on many factors.Insurance captivesare understood as entities which are formed and owned by companies mostly for the purpose of insuring own risks (pure captive or single parent captive). More and more often captives are also formed by a group of companies (group captives) to insure their properties and liabilities towards 3rd parties. Captives are widely used by many companies nowadays. However, many of them,are used solely for a purpose of a risk cession and premium transfer, with an intention to use captivesmore as a profit center in a low taxation country rather than for the purpose of risk management (i.e. a more appropriate role for captive would be to support their owners in enterprise risk management – ERM).***

***This article touches on why captives are not used to their full potential. It may be toochallenging for many decision makers to embrace on captives as risk management formula and extend captives' roles to utilize all possible advantages resulting from owning a captive.***

***Captive can deliver risk management in a more comprehensive way than most commercial insurers on the market. The article also presents advantages and disadvantages of owning an insurance captive.***

***Key words: captive insurance company, group captive, captive domicile, risk, risk management.***

Introduction: **What is a captive?** The term captive is used nowadays in a few different meanings.In finance and insurance context it is mostly used in the following two meanings: **A captive finance company** is a subsidiary whose purpose is to provide financing to customers buying the parent company's products or **a captive insurance company** as a subsidiary that provides risk mitigation services for its parent company or fora group ofcompanies (captive owners).

There are obviously many more formal and more detailed definitions, which come from either international organizations (i.e. from OECD) orfrom particular countries' tax and insurance legal regulations (domiciles) or else from within insurance theory.

OECD understands captive as *"a wholly owned subsidiary of a multinational group of companies which exclusively insures or reinsures the risks of companies that belong to the group. A captive insurance company is usually established in a low-tax country".* Whether premiums paid to captive insurance companies by their owners are recognized as business expenses depends on the tax laws of a captive owner [1].

Moving beyond the meaning of captive as defined by OECD or domiciles'' legal systems, the writers believe that captive does not have to be neither owned by an international group of companies nor does it have to insure exclusively against risks of its owner. In fact, it is often quite contrary because in certain jurisdictions (i.e. in the USA) local tax authorities demand that premiums paid into a captive can only be recognized as a legitimate business expense when there is a sufficient risk shifting and risk distribution between different lines of insurance and different risk owners (meaning, sources of risks come from different activities of different owners), i.e. it was the case according to the court judgment in 1991 for Harper Group case, in which context the OECD definition is not correct [2].

As an insurance entity, captive is formed by its parent company (or group of companies) for the purpose of insuring its own business (more rarely also to insure third party business, except for the US and/or group captives). Insurance captive more and more oftenalso plays roles, in which it is used as insurance formula for risk management.

Captives used for business purposes have a long tradition. Some insurance writers go back to ancient times in a search for similarities between contemporary group captives' owners and traders travelling in those days in convoys and self-insuring as a group the common business voyage.

In the modern times, **Frederic M. Reiss** brought a term "captive" and a concept of owning an insurance company into practice for his first client, the Youngstown Sheet & Tube Company in Ohio in the 1950s. Later on, F.M. Reiss created the first captive management company, International Risk Management Limited (IRML) in 1962 in Bermuda to provide administration services of his clients' captives (IRML is now part of Aon Corporation).

Another term that is closely connected with insurance and reinsurance captives is a **domicile**.

Domicile of captive is a tax jurisdiction where business income taxes and other fees are paid by insurance captives.

Insurance captives are often licensed as reinsurance captives (certain domiciles offer different type of a license for reinsurance captive activities). These reinsurance captives effectively reinsure risks of captive owners, which are placed with country insurers all over the world. Local country insurers act as fronting insurers for reinsurance captives. Local country insurersusually retain a small risk on their books (risk sharing takes place between fronting insurerandreinsurance captive) and the rest of a risk is fully reinsured by a captive. Re-insurance captive pays a fronting fee for that service (which includes local claims handling services provided by local insurer).

Domicile can mean a country but it could also mean a certain part of a federal country i.e. a State within the USA.

Captives can write all kinds of insurance risks, including non-life and life (employee benefits). These can also include new kind of risks like cyber risks, supply chain risks, reputational risk and even space risk (vide new captive created by Elon Musk) as well as many others.

Even when captives are not able to insure certain risks, they can *support captive owners with typical risk managerial tasks* such as:

1) Identifying risks
2) Analyzing risks
3) Evaluating and ranking risks
4) Treating risks
5) Monitoring and reviewing risks

Next, captives are able to support their owners with the development of a strategy to manage risks, which typically include:

1) Risk acceptance and management of retained risks
2) Risks avoidance
3) Risk mitigation (reducing potential negative effect or a probability of risk occurrence)
4) Ceding all or part of the risk to another party (i.e. from captives to reinsurers)
5) Exploiting risks (turning negative risks into positive opportunities)

For the purpose of this article, a **risk** is understood as:

i) probability of materializing of an undesirable event
and
ii) probability of loss occurrence (as a result of that event), which violates interest of an entity and is always in reference to particular events, which when materialize lead to a possibility of causing losses,

While **risk management** in practice is stimulating:

i) probability of materializing of particular undesirable events
and
ii) such influencing the course of undesirable events that their effects do not violate interests of those that are subjects to them" [3].

Every company faces uncertainty and risk. In Frank Knight's work "Risk, Uncertainty and Profit", the authorexpressed opinion that uncertainty is *not* measurable (nonquantitative) but risk can be measured (probability). The sources of uncertainty are not defined and therefore next to impossible to be measured. However, any new information received can remove or reduce uncertainty. "New information also provides the risk manager greater insights into the risks facing the enterprise. The organizational treatment of information and systematic approach to learning are key competencies" [4].

In August of 2004, the Treadway Commission's Committee of Sponsoring Organizations (COSO) issued its **Enterprise Risk Management**(ERM) – IntegratedFramework after three yearproject was completed. It is widely believed that ERM implementation should be considered as the one that needs to beintegrated with a company strategy-setting [5].

Aligning risk management with a company strategy is based on selecting those risks which decision makers agree as identified and/or acceptable and/or those that management believes in as the ones that can bring attractive opportunities. However, besidesthe so called explicit risk, there are also implicit ones which play a key part in active risk management. There are also embedded risks that are hidden and more difficult to be identified.

The setting of company strategy in risk management should consider a decision on whether or not to form an insurance captive or more actively using an existing captive for risk management purposes.Captive should become part of a company insurance strategy towards risk management.

Insurance captives can support their owners in their Enterprise Risk Management (ERM) programs because of the following reasons:

I. Captives should have good recognition of what risks can be insured and/or self-insured. This is on a condition that a captive fulfils its role well and has a better risk recognition than most other commercial insurance entities. ERM is about understanding balance sheet management and how to manage risks

II. Boards of management of insurance captives consist of people with cross industry experiences and backgrounds. Appropriate ERM should be addressed through focused internal resources, including board members. The broad business views are always necessary to manage company risks

III. Most captives manage claims professionally. Many captives also manage claims with utmost efficiency because they are managed to the benefit of captive owners. Claims management expertise is needed to implement a successful ERM strategy

IV. Captives are qualified at risk quantification and pricing. Good pricing knowledge is needed for the risks to be priced appropriately; also when a risk may seem as uninsurable in the commercial marketplace, it may very well be insurable on reinsurance market, after a certain part of is retained by captive.

The most comprehensive work published on captives was written by P. Bawcutt "Captive Insurance Companies" (four editions in total). The work, besides covering the topics of why captives are formed, discussed formulas of their activities, examined operations of captives and covered many organizational, legal and tax issues. It also described many of the captives' domiciles in the world (however this is the state of knowledge for 1996) [6].

One of the largest international researches conducted on captives in the most recent years, which also covers usage of captives for risk management purposesin international insurance programs was Global Risk Management Survey conducted by AON in 2015 [7].

However, overall, the state of knowledge on the activities of insurance captives is limited and dispersed (especially taking into account the large number of active captives in the world in approximately 70 different domiciles). There is a serious gap in the scope of knowledge on captives (especially amongst European and Asian companies), which decreases opportunity to understand why captives play such an important role on the US insurance market and what can be learned from it for other countries, where captives are less popular or not present at all.

**The main characteristics/market data for insurance captives [8]**

There are approximately 7000 registered and presumably active captive insurers worldwide. Most of them (75 %) are owned by US companies.

90 % of Fortune 500 companies own insurance captives.

Captives are formed in many domiciles around the world of which the most popular in North America are Bermuda, the US states of Vermont and Utah, andCayman Islands, while in Europe, most captives are registered in Guernsey, Isle of Man, Luxembourg and Dublin [9].

Reasons for above locations (domiciles) are special local captive law, tax regulations and availability of captive experts (captive management companies).

Insurance captives (and reinsurance captives) are either so called "managed captives" or"standalone captives". Most captive management is outsourced to captive management companies that are located in domiciles that hold the primary licenses for captives. On the other hand, so called "standalone captives" have own management and employees, which means they are not managed by third parties.

*Table 1.* **Number of insurance captives worldwide**

| Year | Number of insurance captives worldwide |
|---|---|
| 2006 | 4951 |
| 2007 | 5119 |
| 2008 | 5211 |
| 2009 | 5525 |
| 2010 | 5587 |
| 2011 | 5831 |
| 2012 | 6125 |
| 2013 | 6412 |
| 2014 | 6839 |
| 2015 | 6939 |

*Source:* Business insurance survey

Captive (can) play important role as insurance formula for risk management in the operations of their owners. Insurance formulaof captives carries many peculiar advantages and some disadvantages specific for this type of insurance activity.

**Advantages of captives.**There are many reasons why companies decide to form own insurance organizations (captive insurers). Behind each of them there are financial and/or operational reasons. Depending ona particular captive's domicile, there may be also very reasonable capitalization requirements, which could be met with i.e. a letter of credit (in the USA or Caribbean). In the EU, a couple of domiciles offer a legal solution called "cell captives", which require lower amount of paid in capital, as long as no third party insurance business is written. As a rule no minimum written premium is required for captives (in many domiciles) and insurance coverage of all commercial lines – property and liability, including workers' compensation, directors and officers can be written (also supply chain risks, cyber risk, reputation risk and many other kinds of insurance that cannot be easily found on the market). One of important reasons forcaptive formation is more and more an opportunity to use it for risk management purposes – according to AON Global risk management survey [10].

More about captive advantages in detail:

**Captive as a formula for risk management and an incentive for loss control** (Enhanced Loss Prevention and Claims Management). The advantage of risk management role of captive should be interesting for every responsible company with knowledgeable risk management that has taken a conscious decision to formcaptive in order to fully explore it for risk management purposes.This is the case for companies that understand captive role as solution that goes beyond a mere profit centerregistered in a lower tax domicile. Retaining risks does not bring uncertainty for those who think of opportunities rather than threats. The motivation for enhanced loss prevention and improved claims management comes from the fact that captive's technical result becomes at the end the direct financial benefit for the captive owner.

**Remedy for high costs of insurance for a particular risk(s).** Captives are often set up when the situation on an insurance marketplace is such that owning a captive becomes a better a common sense alternative in order to escape from very high costs of insurance programs. It is especially an easy decision for those companies that are aware of their loss history and those that takeactions on risk mitigation and therefore are much better in managing risks than other companies operating in the same type of industry.

**Tax regulations, which do not allow companies to maintain untaxed reserves against future losses**. One of the main reasons why many companies decide to form separate entities for risk management (captives) are because of the tax laws, which do not allow any company to maintain untaxed reserves for future losses. Insurance captives solve this problem becauseinsurance reserves can be held by captives for as long as required, the funds can be invested and taxes do not have to be paid for as long as these funds stay as insurancereserves.

**Lack of availability of insurance protection against certain risks.** Insurance availability becomes an issue for certain types of risk – i.e. relatively new cyber risks or supply chain risk or specialized liability covers or reputational risk – theymay not be available at all. Captives can solve this availability problem by insuring companies against those risks under a cover that is designed especially for captive owner and reinsured on an excess of loss bases.

**Insurance coverage tailored to needs**. Many companies conduct their businesses in specific conditions, territories and/or in unusual types of business activities. Specific covers may be available on the general market but not with an exact scope of cover needed. Owning a captive should mean that the risks are recognized and managed exactly as needed by captive owner.

**Reducing operating costs**. Commercial insurers'business costs are very high. Marketing, commissions, administrative and management costs can make total operating costs exceeding level of 30 %of earned premium. After adding expected profit margin in many lines of insurance business overall spent is so high that less than 60 % of premium earned is left for any future claims to be paid. Captive insurers do not have such high costs. As a rule they are located in the territories with lower labor costs and lower corporate income tax. Administrative costs of captives are kept at a bare minimum (often administrative part is outsourced to lean captive management organizations) and in the case of captives there are no distribution costs (neither marketing nor commission to intermediaries because a rule there is no need for an insurance intermediary to be used in a captive structure). However, for the captives located in the European Union the costs of doing business may not need to be significantly lower. Adjusting to Solvency II and BEPS requirements means more capital and higher costs to small(er) captives. External captive consultants may also be quite expensive in the EU, however, overall, when compared to traditional commercial insurer there is usually no need to keep insurance intermediator in the structure, which saves at least 10 % of the premium. Besides the above, all incurred **costs by captive are fully transparent**, which means they can be managed, including also costs generated in the claims handling process. This is almost never the case with commercial insurers due to their complete lack of transparency (as a rule).

**Improved cash flow**.Improvements in cash flow are result of intended flexibility with regards to premium payments writteninsurance agreements concluded between captive owner and captive insurer.Insurance premiums needs to be paid into captive, but the terms of premium payment do not have to be as rigid as they usually are in the case of commercial insurers (i.e. all premium to be paid up front) and scheduling premium payments into install-

mentsdo not need to i.e. carry any cost of financing of premium, which can be paid in line with insurer's time on risk.

**Underwriting flexibility.** Captive as a risk underwriter should be fully aware of the overall risk profile of its owner's business as well as of detailed risk characteristics of its operations. Only, then captive will be in the best position to assess the risks, calculate adequate premiums and to advise on how to avoid or modify risks in order to lower the probability of a loss occurrence. That becomes reality only when captive's representatives are able to have a fully open and trustful discussion about risks, scope of cover and pricing.

There is **balance sheet protection** (of captive owner) because an insured loss is born by captive itself. This is on a condition that captive is properly capitalized and reinsured and pays claims on time.When risk materializes, the balance sheets of insured companies are protected since loss is borne by its captive insurer.

**Earning full technical result from insuranceactivity when insurance risks are in-sourced by captive**(or group captive). Depending on an agreement with a commercial insurer – it may also share some technical result in the case when few losses occur or they occur at a lower value than a predefined one stipulated in insurance contract. However, commercial insurer will never share 100 % of the positive net underwriting results like captives do and it often overstate reserves needed in order to present results lower than they really are.

**Premium stability**.When loss ratio is higher than what commercial insurer expects (and both parties contractually agreed to(i.e. as part of bonus-malus) it is very likely it will charge increased premium at the time of policy renewal.On the other hand, captives do not have to impose premium increases in the same way. The relationship is different between both parties; especiallyso, because both are aware they're very likely to continue to work together in the future as one owns the other. As a result, solutions like retrospective premium are also more likely to be used by captives and their owners (i.e. to decrease impact of insurance premium taxes).

**Direct access to reinsurance market**.Insurance captives have direct access to reinsurance market, which is not accessible for regular policyholders. Buying higher sums insureds (policy limits) from reinsurers, on one hand stabilizes future results of captive and also brings unique underwriting knowledge from reinsurer to captive (hence its owner as well) while on the other hand it can deliver insurance protection at a lower cost than normally purchased through commercial insurers.

**International insurance program.** Many companies decide to form reinsurance captives, which are used as a foundation to build international insurance program by captive owner and captive insurer. It can thenoperate in many countries worldwide based on fronting arrangements, which are concluded by those (re)insurance captives with locally licensed insurers [11].

As with any other business activity, there are also **potential disadvantages** coming from owning captive, in example:

**A capital is needed to form captive and there can be an issue of underemployed capital.** It is hard to call a requirement for capital a disadvantage because capital is needed for any business activity. However, depending on captive'sdomicile, the capitalrequirements can affect cash position of a future captive owner. Putting up capital can be financially challenging. It can also be the case that capital could be invested in a more effective way in another business activity. On the other hand, in some domiciles, a letter of credit and parental guarantee can also be used as capital and fulfillment of regulatory requirements (not in all domiciles). Any company's capital structure should be as efficient as possible. The same logic applies to captive. Its capital structure usually consists of one source, which is owner's equity. Most captives are formed with the minimum amount of capital allowed by regulator in a particular domicile. Over time, captive accumulates earnings (in excess loss reserves) and uses them to increase capital account.

**Excessive costs of forming a captive and its later management**. Captive needs to be viewed as an investment with proper return. ROE [Return on equity] calculations need to be made. Therefore, any prospective captive owner needs to be aware of all potentialcosts of forming a captive upfront (the costs' side is one of the crucial elements of the detailed business case) as well as its future management costs (whether management is going to be outsourced or not?). There are many different managers or consulting firm available on the marketplace that charge fees (sometimes relativelyhigh fees), which may also exceed what had been anticipated before a decision on captive formation was made.

**Inexperienced captive management**. It is quite conceivable that company forming a captive, instead of hiring a professional executive to manage it (or experience external captive management company), decides to assign this role to a manager within a company (captive owner). Sometimes, inexperienced captive management (including supervisory board) is regarded as not so relevant when many of captive's services, including captive management are outsourced to professionals. Question is whathappens when captive management is not outsourced and captive does not have professional captive executive truly engaged in the role? Could such a captive be still considered as a serious risk manager for its owner, directors and officers?With the exception of rental or cell captives, many captives are run nowadays by people who have never managed an insurance company before. Single-parent and group captive directors and officers must then rely on the knowledge and experience of staff and/or external consultants. When this takes place, almost always captive employees may not have desirable risk management experience, also in relation to specifics of captive owner's business and as a result, thewhole idea and an approach to captive as insuranceformula for risk management maybe questionable?

**Lack of risk management advice from captive to its owner**. In line with the above points, it is extremely important for captive to employ professionals in risk management area or have them accessible from external captive management company. If captive management services are out-sourced, it is mandatory to have a competent risk manager – working for a company owning a captive – who will know, not only the explicit risks but also have the ability to discover and manage implicit risks, and will also be aware of how to utilize captive to its full potential.

**Substandard returns on investment or return on equity.**It is up to each company to define what constitutes "substandard" return for its businesses. There are wide varieties of investments vehicles through which captive's assets can earn a very decent rate of return. There might also be better potential returns to be achieved through other business activities rather than by investing in captive insurance entity. Investment returns' needs are to be determined by company management before a decision on captive formation is made.

**Tax challenges for captive owner** (in country of its headquarters). Insurance premiums paid to captives have been challenged many times in the past, particularly by the Internal Revenue Service in the USA. There have been many court cases, which were not always won by captive

owners. The two recent positive rulings came out in 2014 [12]. Two Tax Court rulingsstated that parental guarantee given to captive by its parent cannot be held as an argument against actual risk sharing taking place. Secondly, court adopted the position that risk distribution depends on presence of sufficient number of individual risks and not on the number of insureds.Legal and fiscal issues are of utmost importance and need to be taken very seriously as they can inhibit captive's growth or even lead to its closure and tax problems to its owner.

**Changing regulations** (i. e. tax interpretations on premium deductibility from IRS, Solvency II, BEPS etc.). Depending on domicile ofcaptive owner and domicile of captive itself, regulations may be more orless friendly to owning captive and they can change more or less frequently. Nevertheless, changes in the regulations are something that always needs to be watched for. Certainchanges arise as applicable only to a particular domicile but many of them originate on EU level or evenon more international level i.e. BEPS rules coming from OECD, which affect many if not all domiciles worldwide. Solvency II rules affect EU domiciles but certain domiciles outside of the EU (on voluntary bases) adapted to it as well.

**Remote locations**. If we assume i.e. Japanese captive owner that formed its captive i.e. in Bermuda, then some operational challenges may be foreseenfor both entities.They start from perhaps less significant time zone differences,affecting operations between two or more company locations, but then need to also encompassperforming company audits and also supervisory managementboard meetings. There are local auditing firms in every captive domicile and supervisory board meeting do not always have to take place in domicile (depending on tax requirements) but a very remote location of captive can become an issue that becomesdisadvantage to its owner.

**Conclusion:**The subject of utilizinginsurance captive as insurance formula for risk management is a relatively new one.Analyses of insurance captive efficiencies and opportunities coming from owning captive are important for both – academic and practical business aspects. Knowledge of potential advantages and disadvantages of captives is also crucial as it affects present and future captive operationalimprovements and overall performance.In most of the countries studies of captivesas tools for risk management purposes are not catching up with the needs – in both, theoretical and practical aspects. Time is needed for more studies and for captives' evolutionof services they deliver to their owners (captive insurer and captive owner maturity). As a result of all the above and professional and academic interests of the writers, doctoralthesis has been formed as follows **"Captive as insurance formula for risk management in operations of a company"**, with hypotheses: "Captive may be the most appropriate insurance formula for risk management because:

It may be the most adequate for risks specific to activities of captive owner(s)

It may be the most adequate to prevent risks arising from captive owner's activities (causes of loss occurrences)

It may be the most adequate for intended business strategy of captive owner(s)

It may be the most adequate to support captive owners' financial management

It may be the most adequate insurance organization for particular legal form of captive owner

It may be the most adequate organization for captive owner in its insurance relationship within business environment"

Utilizing insurance captives for risk management is equally important for academia needs and for business everyday reality in all CEE country. Most ofCEE countries have been slow with exploring and adopting captive opportunity.

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## КЕПТИВ ЯК СТРАХОВА ФОРМУЛА ДЛЯ РИЗИК-МЕНЕДЖМЕНТУ: ПЕРЕВАГИ І НЕДОЛІКИ

***Розглянуто страховий кептив у контексті його використання як страхової формули для управління ризиками. Кептив може бути найдоцільнішою страховою формулою для управління ризиками. Проте рівень досягнутого успіху залежить від багатьох факторів. Під страховими кептивами розуміють суб'єкти, що формуються і належать компаніям, зазвичай з метою страхування своїх ризиків (чистий кептив або одиничний материнський кептив). Дедалі частіше кептиви також створюються групою компаній (групові кептиви), щоб застрахувати їхнє майно та зобов'язання перед третіми особами.***

***Нині кептиви широко використовують багато компаній. Однак зазвичай виняткова для цілей цедування ризику і передачі премій з метою використання кептиву як центру прибутку у країні із низьким рівнем оподаткування, а не для цілей управління ризиками (тобто, більш прийнятною роллю для кептиву могла б бути підтримка їх власників у сфері управління ризиками підприємства).***

***У статті розкрито, чому кептиви не використовують з урахуванням їх повного потенціалу. Це може бути занадто складно для багатьох суб'єктів, які ухвалюють рішення, щоб охопити кептиви як формулу ризик-менеджменту і розширити значення кептивів до використання всіх можливих переваг, що випливають із володіння кептиву.***

***Кептив може забезпечити управління ризиками комплексніше, ніж більшість комерційних страховиків на ринку. У статті також представлено переваги та недоліки володіння страховим кептивом.***

***Ключові слова: кептивна страхова компанія, груповий кептив, доміцілійський кептив, ризик, управління ризиками.***

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**КЭПТИВ КАК СТРАХОВАЯ ФОРМУЛА ДЛЯ РИСК-МЕНЕДЖМЕНТА: ПРЕИМУЩЕСТВА И НЕДОСТАТКИ**

***В статье рассматривается страховой кэптив с учетом того, как он может быть использован в качестве страховой формулы для управления рисками. Кэптив может быть наиболее целесообразной страховой формулой для управления рисками. Однако уровень достигнутого успеха зависит от многих факторов. Страховые кэптивы это субъекты, которые формируются и принадлежат компаниям, в основном для целей страхования своих рисков (чистый кэптив или единичный материнский кэптив). Все чаще кэптивы также создают группы компаний (групповые кэптивы), чтобы застраховать их имущество и обязательства перед третьими лицами.***

***Кэптив широко используется многими компаниями в настоящее время. Тем не менее, многие из них используются исключительно для целей цедирования риска и передачи премий с тем, чтобы использовать кэптив больше как центр прибыли в стране с низким уровнем налогообложения, а не для целей управления рисками (т. е. более приемлемой ролью для кэптива могла бы быть поддержка их владельцев в сфере управления рисками предприятия).***

***Эта статья раскрывает, почему кэптивы не используются с учетом их полного потенциала. Это может быть слишком сложно для многих субъектов, принимающих решения, чтобы охватить кэптив как формулу риск-менеджмента и расширить значение кэптива вплоть до использования всех возможных преимуществ, вытекающих из владения кэптивом.***

***Кэптив может обеспечить управление рисками более комплексно, чем большинство коммерческих страховщиков на рынке. В статье также представлены преимущества и недостатки владения страховым кэптивом.***

***Ключевые слова: кэптивная страховая компания, групповой кэптив, домицилийський кэптив, риск, управление рисками.***

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# REINSURANCE SERVICE AND ITS ECONOMIC NATURE

***At the reinsurance market the object of purchase and sale is a specific product – a reinsurance service. According to several scientists' researches, the definition of a reinsurance service is clarified as a specific service in the form of selling legally formed liabilities concerning redistribution of already insured risk between insurance companies, which has its price, which is influenced by supply and demand. The author has proposed new approaches to the insurance service interpretation as a dominant, which causes the reinsurance market formation. It is shown that being traded in the reinsurance market, a reinsurance service is an important factor in the functioning and self-development of the market environment, it combines the interests of supply and demand holders and directly influences the market quality characteristics, causing trends of its further development. Supply and demand for a reinsurance service are influenced by both external and internal factors, the most important of them are: the capitalization level of insurers, the balance of their insurance portfolios, the condition of the state economy, the level of investment attractiveness, monetary and tax policy. The concepts of "reinsurance service demand" and "reinsurance service supply" have been clarified. Reinsurance service demand is a conscious and financially secured desire to buy reinsurance services. Reinsurance service supply is all services submitted in the reinsurance market.***

***Keywords: reinsurance; reinsurance service; reinsurance service demand; reinsurance service supply.***

**Introduction**. In the process of risk transmission from the reinsured person to the reinsurer on the basis of concluding an agreement between them, the process of buying and selling a service – reinsurance protection takes place, the reasonable cost of such protection is determined, the supply and demand for it are formed.

The purchase and sale of a reinsurance service allows some reinsurance participants (reinsured persons) to obtain additional financial guarantees (the compensation of the part of liability for a risk by the other subject) for the implementation of their own obligations under the insurance contracts, and other participants (reinsurers) – to expand their own portfolio by reinsuring the part of new objects of the insurance field.

According to par. 2 of the Law of Ukraine "On insurance" [1], reinsurance along with insurance and the activity related to the formation and use of insurance reserves, relates to the direct business of the insurers, namely it is allocated in a separate area of the insurer activity, but there is no definition of the reinsurance service essence in Ukrainian legislation.

In its essence, a reinsurance service is a financial service, as it shows the redistribution of responsibility for the insured financial risk and provides the financial relationship between the reinsured person and the reinsurer.

WTO member states apply the financial services classification according to the GATS (General Agreement on Trade in Services) standards, adopted in 1995, which includes the reinsurance service to the insurance services, which relates to financial services (Table 1).

***Table 1.*** **The insurance services classification according to GATS claims**

| № | Type of insurance services |
|---|---|
| I | Direct insurance |
| A) | Life insurance |
| B) | Non-life insurance |
| II | Reinsurance andretrocession |
| III | Insurance intermediation, including brokerage and agency |
| IV | Auxiliary insurance services |

*Source:* compiled by the author based on [2, 3]

National legislation is harmonized with the European one, because according to the national Classification of Economic Activities (NACE) [4], financial and insurance activities are referred to a separate section K. It should be noted that reinsurance is submitted as a separate segment of insurance.

Thus, according to European and national legislation, reinsurance is a separate way in insurance, which is characterized by specific relationships between particular subjects (reinsured person and the reinsurer), a (reinsurance) service supply, which is separated from other insurance services, although based on the original (insurance) agreement (can not exist without it). Due to these features a reinsurance service needs the further study of its economic essence.

The *purpose* of the article is to deepen the research of the economic nature of a reinsurance service and clarify its economic content.

The *object* of the research is a reinsurance service.

The *subject* of the research is theoretical and methodological aspects of a reinsurance service, studying the features of its economic nature, considering as a dominant, which causes the reinsurance market formation.

**Literature review.** The issue of the economic substance of a reinsurance service is studied in the works of many native and foreign scientists and practitioners, including V.D. Bazylevych, A.S. Bozhenko, N.M. Vnukova, M.G. Kamynkina, O.V. Kneysler, V.S. Komadovska, O.V. Kozmenko, N.I. Mashina, S.S. Osadets, O.O. Okhrimenko, E.E. Solntseva, T.V. Tatarina, K.E. Turbina, Y.P. Shumelda and others.

However, examining the economic nature of a reinsurance service in the reinsurance market scientists see it in different ways.

In particular, the Ukrainian scientist N.M. Vnukova considers reinsurance services as insurance guarantees for a direct insurer [5, p. 210], revealing their important role – to ensure the financial security of the direct insurer.

N.I. Mashina defines it as "a property situation of the original insurance company, acting as the assignor" [6, p. 156]. We believe that the definition does not disclose the essence and specificity of a service, and shows it as a tool to improve the property situation of the assignor (reinsurer).

According to the scientist O.V. Kozmenko, a reinsurance service is "a new kind of services related to the conclusion of a new agreement – reinsurance" [7, p. 85]. This interpretation indicates a special (new), separated from insurance type of services as well as the need to design relationship between the reinsurance parties.

Ukrainian scientist Y.P. Shumelda defines a reinsurance service as a combination of special and non-insurance elements [8, p. 307]: the participation of several insurers in the distribution of responsibility for the insured risk, determining the direct insurer liable for the insured risk, the distribution of paid insurance premiums between insurers, full payment of insurance compensation by the insurer, the possibility of further division of responsibility for the risk. The author identifies the characteristics of a reinsurance service, without revealing specifics of its implementation, the major participants of buying and selling services in the reinsurance market.

Ukrainian scientist O.V. Kneysler determines the reinsurance service as being the one which "characterizes a set of contractual relationships between the reinsured person and the reinsurer regarding determination of the terms and rules of reinsurance and their implementation in order to obtain the beneficial effect in the form of a reinsurance protection and meeting the economic interests of both parties" [9, p. 155]. We believe this definition is the most comprehensive and one that reveals the essence of a reinsurance service.

For a more complete disclosure of the economic nature of a reinsurance service, we are going to consider the features of its sales and pricing.

Russian scientist K.E. Turbina notes that "reinsurance as an independent service has an independent price that is formed as a result of supply and demand for certain reinsurance services, depending on the form and type of reinsurance" [10, p. 469]. Indeed, a separate area of the insurer's direct activity is reinsurance, so a reinsurance service can be defined as a specific service, the price for it (the service) is formed depending on the method chosen, the form and type of contract.

Unlike public researchers and practitioners, Ukrainian scientist O.O.Okhrimenko stipulates that the insurance service is "a complex concept and includes the basic insurance product, additional services, the support" [11, p. 153].

Taking the derivative nature of reinsurance from the insurance and many similar traits and characteristics into account, we share and design the view of O.O. Okhrimenko on the complexity of a service on the reinsurance. So, a reinsurance service includes: a basic reinsurance service (the description of the risks that are transferred to reinsurance, determining the limits of the parties' liability, the price of a reinsurance service); supporting services (legal assistance, evaluation of losses, etc.). It describes the reinsurance service as a specific and yet comprehensive service in the market with the appropriate design.

The complexity of a reinsurance service is also determined by V.S. Komadovska [12, p. 10–11], noting the combination of the main reinsurance service and additional services (recommendations for underwriting, product design, loss control, etc.).

**Research methodology**. The theoretical and methodological basis of research has been made by fundamental scientific concepts of Ukrainian and foreign scientists in finance and insurance, which are represented in the works of native and foreign scientists. In the process of the recearch we have used general scientific and special methods of the scientific knowledge, namely: logical and dialectical method – for the study of contemporary economic and financial theories and works of native and foreign scientists; system analysis and generalization – in determining the economic content of a reinsurance service; abstract logical method – for theoretical generalization and drawing conclusions.

**Main results**. Reinsurance services, despite the legal uncertainty, are financial in nature and in their content relate to financial services and financial infrastructure accordingly [13, p. 274].

As the object of purchase and sale in the market, a reinsurance service has certain characteristics (Fig. 1).

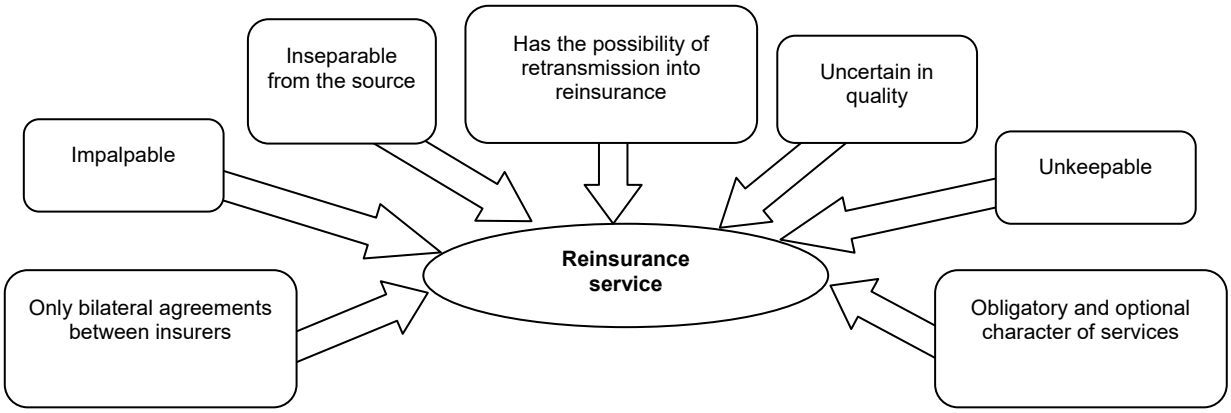


**Fig. 1. Features of a reinsurance service**

*Source:* built by the author according to [2, p. 79]

A reinsurance service correlates directly with the insurance one because reinsurance is secondary, derivative of insurance and therefore, as the insurance service, is the financial one. Due to this, features that characterize the insurance service, are also implemented in the reinsurance service.

The key characteristics of a reinsurance service are: intangibility (due to the ability of the insurance cycle inversion a reinsurance service is intangible and imperceptible when the contract is signed, and the mechanism of this service action is shown only when the insured event occurs under the insurance contract); unsafety (a reinsurance service can not be saved and accumulated for subsequent periods); a reinsurance service inseparability from the source (reinsurance company) indicates the inability to delegate or sell the reinsurance service as a franchise to other market entities, including intermediaries; volatility of a reinsurance service in quality reflects the uniqueness of each contract depending on the individuality of the insured objects and the packet of risks.

In addition to features that are common to all services, the important feature of a reinsurance service is its bilateral agreement character exclusively between two insurance companies.

A unique feature of a reinsurance service is the possibility of its retransmission to reinsurance – the division of responsibility between the retroassignor and retroassignee. The number of retrocessions is not legally restricted, which may result in attracting a large circle of reinsurers both within a country and abroad – it is a kind of proof in favour of a reinsurance service internationalization.

Reinsurance may be provided as a service on a regular basis (obligatory reinsurance), and single, individual by separate reinsurance contracts (facultative reinsurance). In addition, there are the following forms of service: the proportional and non-proportional, based on which the specifics of reinsurance contract types and organization of cash settlements between parties of the contract are determined.

A reinsurance service is characterized by a redistributive character, namely it is formed during the second responsibility division for already insured risk between the reinsured person and the reinsurer.

So a reinsurance service reflects the specific relationship between insurance companies over the repeated (secondary) assignment of responsibility for the risk. A reinsurance service is a financial service and is characterized by a number of features that are inherent to it.

A reinsurance service as the object of purchase and sale in the market is characterized by the available supply and demand in the reinsurance market.

A reinsurance service demand is tailored according to the need for repeated redistribution of the insured risk and ensuring the security of the solvency and sustainability of the reinsurer's operations and the capability of performing its obligations to the insured person.

A.S. Bozhenko determines the demand for reinsurance as a process that "is formed by the insurance companies which diversify their risks, thereby avoiding significant financial losses" [14, p. 321]. This definition of the nature of demand for reinsurance should not be considered complete, because the market is also represented by other entities other than insurers-vendors that directly or indirectly influence the formation of a reinsurance service demand.

Taking into accountthe peculiarities of the need for reinsurance services formation in the insurance market, we are going to determine that a demand is a conscious and financially secured desire to buy reinsurance services.

Indeed, the primary influence on shaping the reinsurance service demand is possessed by the insurance companies that need additional financial security of the accepted risks for insurance. The need for reinsurance support level is embodied in calculating the amount of responsibility for the risk due to another party (the reinsurer).

In addition to the direct participants of reinsurance, the demand creation is indirectly affected by other institutions of the market environment. Among them we should outline the state, which cares about preserving the solvency of insurers by creating the appropriate legislative conditions and thus, facilitates conducting reinsurance transactions with residents and nonresidents with the proper rating stimulating with benefits under the income tax premiums transferred to reinsurance at rates of 0 % and 12 % (unless the reinsurer has a statutory rating).

The next tool of the state influence on the use of reinsurance transactions is to establish a standard for reinsuring the object, for which the sum insured exceeds 10 % of the share capital, insurance and free reserves [1].

The formation of the reinsurance service demand is indirectly affected by the insured persons as well.In accordance with the applicable law, insurers in the insurance contract may not be aware of the possibility of reinsurance operations as an insurer (cedant, reinsured person), who concluded an agreement on reinsurance with the reinsurer, remains liable to the insured person in full accordance with the insurance contract.

Therefore, insurers have no direct impact on creating demand for reinsurance services. However, in some

cases, the agreement to sign an insurance contract by the insured person is his requirement for further risk transfer to a foreign partner of the assignor with high ranking positions in the market. On the other hand, the increase of confidence of people and economic entities to the insurers affects the increase in the number of concluded contracts, the rise of valuation of the objects insured. This leads to the need for risk reinsurance to preserve the financial stability and solvency of insurers. Consequently, the insured persons influence the formation of a reinsurance service demand, but indirectly.

Except the entities that cause the formation of the reinsurance service demand, there are environmental factors, including the following:

– economic stability in the country;

– knowledge and experience in the services offered by reinsurers;

– the service level of reinsurance contracts in the insurance events (flexibility, no slowness in payments);

– confidence to their partners and their underwriting policy;

– the capacity of the domestic insurance market and certain insurers;

– legislative regulation of the reinsurance activity [15, p. 240].

The formation of a reinsurance demand service, in addition to external factors, is influenced by the internal factors (Fig. 2).

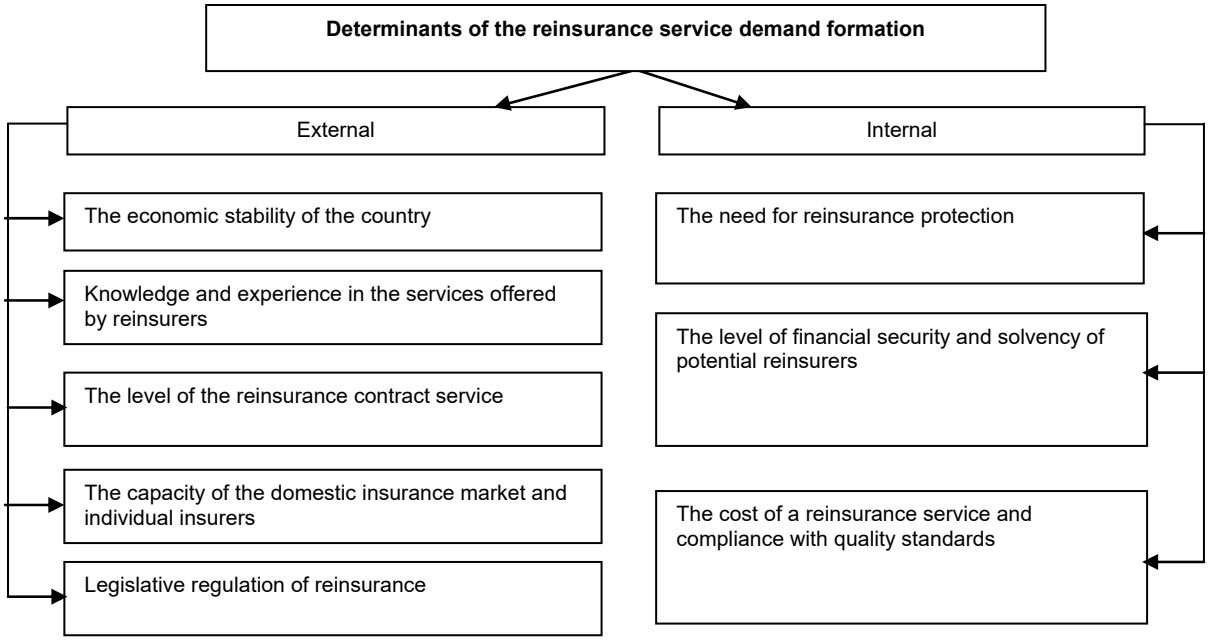


**Fig. 2. Determinants of the reinsurance service demand formation**

*Source:* compiled by the author

Regarding internal factors creating demand, a significant share is occupied by the assignors' need for receiving additional financial guarantees of the other insurers concerning maintaining already insured risk.

On the other hand, a reinsurance servicedemand is affected by the level of the financial support and the potential reinsurer's solvency – the availability of sufficiently large volume of financial resources (insurance reserves, free reserves, retained earnings). Undercapitalized companies with the low level of financial security can not hold themselves cumulative risks or significant risks, which form the need for their reinsurance.

The reinsurance service provided in the market professionally, also identifies efficiently the potential customers wishing to receive such a service and ensure the sustainability of their own reinsurance operations and balance of the insurance portfolio.

In addition to the existing demand, a reinsurance service is characterized by the supply in the market due to the own developed reinsurance programs by public insurers.

The sellers of reinsurance services in the market are the reinsurers.

Consequently, a reinsurance service supply is all services submitted in the reinsurance market.

Both direct insurers and professional reinsurance companies can offer reinsurance services in the insurance market. The consumers of these services are the insurance companies which are interested in receiving additional financial guarantees (reinsurance protection) from domestic or foreign reinsurers for the risks taken by them.

The service supply in the reinsurance market can be affected by numerous factors (Fig. 3).

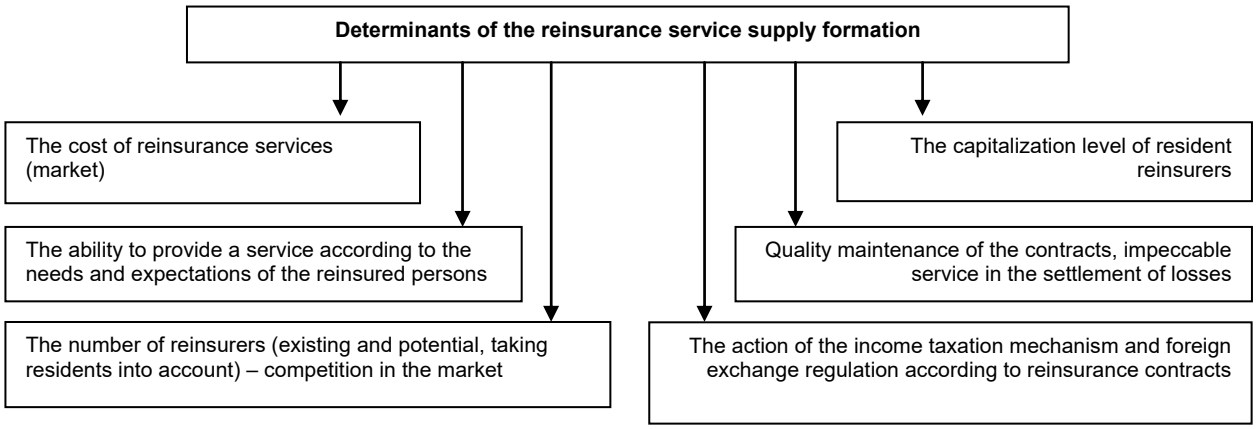


**Fig. 3. Determinants of the reinsurance service supply formation**

*Source:* compiled by the author

Setting the market price for a reinsurance service determines the appropriate supply of such services as well, leaving at the market only those reinsurers that can sell the reinsurance protection for a certain price.

The adjustment of a reinsurance service to meet the needs of reinsurers defines the range of those sellers who can cover the risks of a certain volume corresponding to specified conditions.

The current competition in the reinsurance market is also a significant factor that creates a better reinsurance service supply.

As in any market, the supply creation depends on the quality of a service provided. In case of inconsistencies to expectations (needs), reinsured persons reorient to foreign reinsurance markets.

An important factor influencing the formation of a reinsurance service supply is the operating mechanism of income taxation or currency regulation under the reinsurance contracts. Thus, the delay in receipt of the currency for payments between reinsurance participants affect the further relationship between them and the consideration of Ukrainian insurers as partners in the future.

Reinsurance brokers as agents at the reinsurance market also affect the supply and demand for reinsurance services as they help to regulate the relationship between the reinsured persons and reinsurers for the successful implementation of a reinsurance service [15, p. 240].

A reinsurance service, as the insurance one, has a consumer and exchange value. A consumer value appears in determining the reinsured person's need for obtaining additional financial opportunities and ensuring the performance of financial obligations for the insured risk. At the same time, the reinsurer has no less need for a reinsurance service, aiming to expand his own insurance portfolio and increase revenues of reinsurance payments.

Under the influence of supply and demand in the reinsurance market the value for a reinsurance service is formed.

Like any service that serves traded in the market, a reinsurance service is formed based on already incurred seller's costs and future costs related with performing obligations under the contract.

A reinsurance service price lies in the cost of the reinsurance service. When a reinsurance contract is signed, the reinsurer is paid a reinsurance premium, which is based on the rate and expenses related to reinsurance and the reinsurer's profit. Therefore, the pricing of a reinsurance service is influenced by the following factors:

– the loss ratio of the assignor's insurance operations;
– the size of the administrative costs of doing business;
– the effective conduct of the investment activity;
– the expected company's profit;
– payment of insurance contracts.

A reinsurance service price is determined by taking these factors into account depending on the form and type of a reinsurance contract. There are differences in determining a reinsurance premium for proportional and non-proportional reinsurance contracts.

We agree with the statement of scientists M.G. Kamynkina and E.E. Solntseva [16, p. 25] regarding the ambiguity of settlements between the parties of reinsurance operations. By transferring a risk to the reinsurance the assignor distributes a received premium with the assignee, at the same time, receives a commission on the paid premium from the other party.

The commission should cover costs incurred by the insurer relating to concluding insurance contracts. The difficulty here is the separateallocation of administrative costs associated with those contracts that are reinsured in the future. Therefore, the amount of a commission depends on fluctuations in supply and demand correlation in the market.

Scientists M.G. Kamynkina and E.E. Solntseva outline the following types of commissions, which are used in carrying out reinsurance operations [16, p. 22–28].

– the original fee, payable at the first division of the insured risk (assignment) and can be up 20–40 % of the premium;

– the reinsurance commission payable at repeated risk reinsurance (retrocession) and can be up 10–15 % of the premium;

– the brokerage fee – is the cash compensation of a reinsurance intermediary and covers his costs related with concluding a reinsurance contract, as well as the profit, and can make 1,5–15 % of the premium;

– tantiema – is paid to the insurer-assignor by the reinsurer for profit in promising risks, can be up 5–25 % of the profit.

Contracts of proportional reinsurance define "a partial participation of the parties in the distribution of responsibility. According to an agreed stake in the contract, the insurance premiums and losses that are tied to the sum insured are shared between the parties" [17, p.438].

The distinctive type is disproportionate reinsurance contracts, which are characterized by particular approaches in settlements between the parties of the reinsurance contract. "The compensation, which is provided by a reinsurer, is determined only by the size of a loss and is not dependent on the sum insured and therefore, there is no

apportionment of responsibility for a specific risk and an original commission" [17, p. 443].

If an obligatory method is used, according to disproportionate reinsurance contracts, a reinsurance premium is determined not to a separate risk reinsured, but for the entire insurance portfolio, thus one or more types of insurance may incorporate for the year.

The calculation of premiums in disproportionate reinsurance is conducted with regard to the following factors:

1) pure risk premium required to cover possible losses;

2) guarantee premium to the main reward, since according to disproportionate reinsurance contracts the loss varies considerably each year. The premium size varies depending on: the priority of the assignor, the reinsurer's liability, the insurance type, the insurance portfolio balance, etc.

3) premium to cover the reinsurer's administrative expenses, retrocession profit.

The main objective of the premium calculation in reinsurance on the basis of excess of loss agreement is to determine how often large losses in the homogeneous insurer's portfolio (homogeneous according to risks and insurance amounts) will occur and what the size of these losses will be.

The price of a disproportionate reinsurance coverage is defined as the product of protected premium volume (gross net premium income, GNPI) and XL premium rate (Adjustable Rate, AR).

A reinsurance service price is an important indicator of the reinsurance market development in accordance with the laws of market economy: free competition, supply and demand balance, equilibrium price setting. Domestic insurers are obliged to consider these market laws in determining the reinsurance service price for the creation of an attractive market environment and internationalization of reinsurance.

**Conclusion**: Taking into account the results of studying scientific approaches concerning the nature of a reinsurance service, its distinctive features and pricing, our own definition of a reinsurance service is proposed.

A reinsurance service is a specific service in the form of selling legally formalized liabilities on the redistribution of already insured risk between insurance companies, which has a price, which is influenced by supply and demand.

A reinsurance service has its own special characteristics that distinguish it from other financial services. A reinsurance service is always legally formalized – through concluding a contract. The contract is signed only between two legal entities (insurers). In addition, a reinsurance service as an object of purchase and sale in the reinsurance market has its cost, which is reflected in determining the price of the service and includes both reinsurer's expenses and the profit and the consumer value that defines the incurred reinsurer's costs related to the service implementation. The ability to highlight the value and consumer value of a reinsurance service demonstrates its specific nature at the market along with the insurance service or other financial services. Thus, a reinsurance service is a fundamental factor in the functioning of the market environment, combining the interests of supply and demand holders and directly influencing the quality characteristics of the market, being its dominant, which causes its development and efficient operation based on market principles.

**Discussion**. The priority task for Ukraine is paying enough attention to the economic content interpretation of a reinsurance service that is the object of purchase and sale in the reinsurance market, which is an important and necessary part of the insurance market, forms its structure and development trends. Particular attention herewith is necessary to the issue of the reinsurance service definition at the legislative level for the possibility to improve the functioning and prospects of further development of the reinsurance market, at which a reinsurance service is the dominant of formation.

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## ПЕРЕСТРАХОВА ПОСЛУГА ТА ЇЇ ЕКОНОМІЧНА ПРИРОДА

***Запропоновано нові підходи до тлумачення перестрахової послуги як домінанти, що обумовлює формування ринку перестрахування та є важливим чинником у функціонуванні та саморозвитку ринкового середовища, поєднує інтереси носіїв попиту і пропозиції та впливає на якісні характеристики ринку, зумовлюючи тенденції його подальшого розвитку. Уточнено зміст понять "попит на перестрахову послугу" та "пропозиція на перестрахову послугу".***

***Ключові слова: перестрахування, перестрахова послуга, попит на перестрахову послугу, пропозиція на перестрахову послугу.***

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## ПЕРЕСТРАХОВОЧНАЯ УСЛУГА И ЕЕ ЭКОНОМИЧЕСКАЯ ПРИРОДА

*Предложены новые подходы к толкованию перестраховочной услуги как доминанты, которая обусловливает формирование рынка перестрахования и является важным фактором функционирования и саморазвития рыночной среды, объединяет интересы носителей спроса и предложения и влияет на качественные характеристики рынка, определяя тенденции его дальнейшего развития. Уточнено смысл понятий "спрос на перестраховочную услугу" и "предложение на перестраховочную услугу".*

*Ключевые слова: перестрахование, перестраховочная услуга, спрос на перестраховочную услугу, предложение на перестраховочную услугу.*

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# THE MEASURABILITY OF CONTROLLING PERFORMANCE

***The urge to increase the performance of company processes is ongoing. Surveys indicate however, that many companies do not measure the controlling performance with a defined set of key performance indicators. This paper will analyze three categories of controlling key performance indicators based on their degree of measurability and their impact on the financial performance of a company. Potential measures to optimize the performance of the controlling department will be outlined and put in a logical order. The aligning of the controlling activity with the respective management expectation will be discussed as a key success factor of this improvement project.***

***Keywords: controlling; management accounting, controlling performance indicators, controlling role model.***

**Introduction.** The urge to increase the performance of company processes is ongoing. While the need to measure and increase the performance of output orientated departments such as production is obvious, surveys indicate, that the performance of indirect functions like the controlling are in contrary rarely tracked. Considering the increasing overhead in many companies, the following article describes how to measure and increase the value added of the controlling function. Based on a survey from [1], the performance of the controlling function is measured in only a minority of companies:

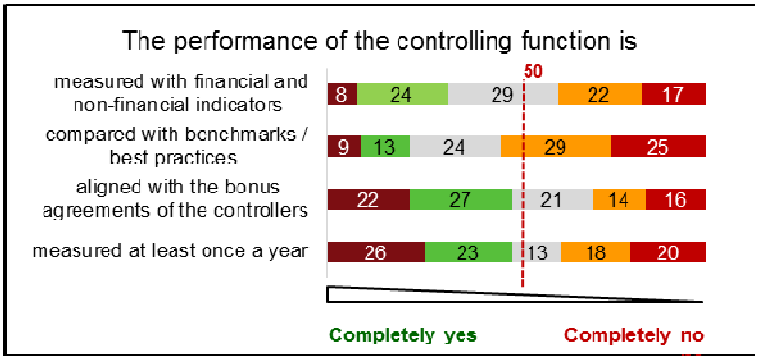


**Fig. 1. Measuring the performance**

*Source:* Author's processing modifying [1]

The survey is remarkable as it indicates that most companies do measure the performance of the controlling function at least once a year and align it with bonus agreements. Compared with the percentage of companies who measure, the percentage of companies who have defined financial or non-financial indicators or use benchmarks is however significantly lower. In other words, a significant percentage of companies seem to measure controlling performance without using defined financial or nonfinancial KPI.

**Identifying relevant KPI.** A basic role metaphor that is used in literature to describe controlling is to portray the manager as the captain of a ship (company) and the controller as the navigator. While the captain is responsible for the entire ship, the navigator suggests the right course used to reach the set goal [2], [3], [4]. Controlling can support management by identifying, planning and steering decisions that contribute to the added value of the company [24]. The controlling function will add to the company's performance, if the value creation of the decision support outweighs the costs of the controlling function:

Value creation by management support
\- Value consumption by controlling costs
= Value added of the controlling function

Literature has established a broad number of definitions to measure value. The purpose of these indicators is to express complex situations in an easy figure and therefore give the management an aggregated and fast overview [5], [6]. Out of the financial value definitions, the EBIT and the Free Cash Flow are very common financial value definition [7]. In general, companies combine the advantages of multiple value figures in their reporting system [8]. The logic and methodology described in this article to improve the value added of the controlling function is however not specific for a

particular financial value definition so that in the following the genuine term performance indicator is used.

Independent from the specific financial value definition the performance of controlling can be measured using three categories of indicators. Input indicators relate to the input allocated to the controlling function such as money or headcount. Process indicators can help to evaluate the efficiency of controlling processes The third category of indicators are output indicators which relate to the quality and relevance of the controlling output, in general controlling analysis and reports [9]:

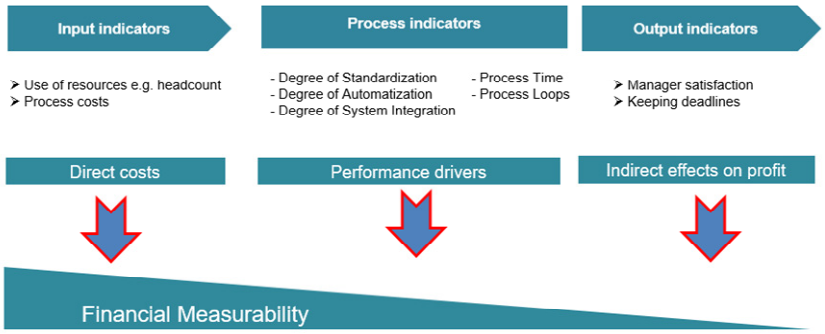


**Fig. 2. The measurability of controlling performance**

*Source:* Author's processing based on [9]

Input indicators represent the costs paid by the company to maintain the controlling function. This costs are mainly payroll costs cost and process costs to maintain IT and other infrastructure used by controlling. A smaller portion of costs relate to travel and training costs.

Process indicators relate to the degree of automatization, system integration and standardization of processes and the process time needed. Also, the number of process loops needed to finalize a controlling process is an important process indicator. An example for process loops is the number of budget rounds needed to finalize a budget.

Output indicators measure, to what extend controlling delivers relevant information to the management to support their decisions. The controlling function can influence the behavior of decision makers towards effectiveness and efficiency [10] and can give support to prepare decisions and support their execution [11]. Higher decision usefulness of analysis and reports provided by controlling can contribute indirectly to the financial performance of the company by contributing to better decision making by the management. As the controller is not responsible for executing managerial decisions, the contribution of supporting functions like controlling to the financial performance of a company is hardly measurable directly [12]. Although a change in the satisfaction of management with controlling can be measured, the impact of good or bad controlling analysis on corporate financial results can hardly be solely allocated to the controlling function. A satisfaction survey with the management to identify the subjective decision usefulness of reporting is therefore only a measurable "substitute indicator" [6].

The impact on financial performance and the degree of measurability differs between the introduced categories of controlling indicators. While the financial impact of input indicators is directly reflected as cost savings, the impact of improved output indicators such as better management reports on the financial performance is indirect. The following graph illustrates the impact of controlling KPI on the financial performance of a company:

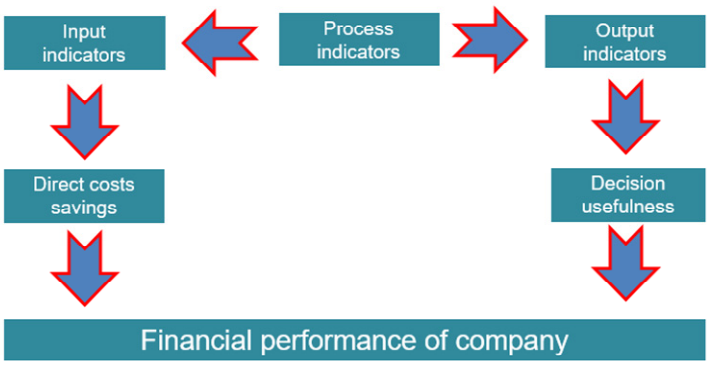


**Fig. 3. The controlling impact on financial performance**

*Source:* Author's own processing

The graph illustrates the central role of process indicators and outlines a remarkable interaction between the three indicator categories. The indicators that directly influence the financial performance of a company such as input indicators and output indicators are difficult to influence directly. In contrary process, indicators can be influenced directly but will increase the financial performance only indirectly by changing related input- or output indicators.

The following example shall illustrate this interaction. A high degree of system integration for example does not directly increase the financial performance of a company but it can influence the amount of manpower needed to prepare financial

reports and herby lead to cost savings for this process. The high degree of system integration can also increase the process speed and accuracy of the report and herby increase the decision usefulness of management reports.

Process indicators are in other words indicators that can be directly influenced during an improvement project. Common targets of optimization projects are to increase the amount of automatization and system integration in order to reduce process time and increase process performance. Successful projects to improve a cost structure normally do not target to cut costs directly but target to influence performance drivers to increase cost efficiency and hereby reduce costs as consequence.

A change in process indicators can be translated to cost savings using assumptions regarding the relation between certain process indicators and costs. For example, a budgeting process with a high number of budget loops will consume more headcount and manpower and herby impose higher costs than an efficient budgeting process with a low number of budget loops. These relations between process indicators and costs can be quantified by analyzing past data or benchmarking.

All indicators should be measured continuously to improve the controlling function. The result of this measuring should be compared with benchmarks or best practices to estimate how the controlling function is positioned within its peer group. If the measuring and benchmarking systematic is established, it is recommended to reflect this systematic in the target setting respectively the bonus regulation of the controllers.

**Improving the relevant KPI.** As introduced above the performance of the controlling can be measured using three categories of indicators. For a structured improvement project of the controlling function respectively their described KPI, it is helpful to understand in which aspects and dimensions such improvement might take place and in which logical order the process should be structured.

When reviewing the performance of a controlling organization there are two questions in focus: 1. whether controlling produces analysis and reports that have a significant impact on the decision making process and 2. whether the production of those reports is as efficiently organized as possible [13]. Optimizing processes within controlling contributes to increase the efficiency of the controlling work. The progress in system integration can lead to an increased efficiency in generating various kinds of reports and numbers but might hereby generate an "ocean of data and options" [14]. By creating all those reports without customer or strategy orientation, the effectiveness of the reports can vanish. This phenomenon is also referred to as "effectiveness trap" [15], [16]. The effectiveness should, in other words, be optimized before addressing the efficiency [16].

Increasing effectiveness means to align and synchronize the controlling activities with the management approach and expectations [13]. For this to be achieved, the "products" of controlling and the underlying controlling processes should be evaluated by the customers eg. the management, to what extent this products match their requirements and if they are in line with the strategic challenges and questions of the company [15, 17]. Increasing the customer orientation and satisfaction will increase the extent to which controlling products are considered in the decision process of the management [18].

The services provided by the controlling department can include various degrees of managerial activities. In the beginning of any improvement project, it is therefore vital, that the management evaluates its demand for different services of the controlling function and which importance it assigns to them. The controlling role models can be a basis to elaborate what kind of controlling services the management is willing to appreciate and accept [16]. The general trend is a decreasing importance of data and report generation and an increasing importance of analysis and consulting [19].

After the controlling activities have been synchronized with the management expectations, the efficiency of the controlling process can be addressed. [20] introduced three key measures to increase efficiency in the controlling field, also referred to as the "industrialization in controlling": (1) standardization and simplification of processes for forecast, planning and reporting; (2) improving efficiency by using shared service solutions with two subcategories "center of scale" and "center of excellence"; (3) improving IT infrastructure. This approach was followed by [18] who added (4) simplifying and shortening the reporting material.

The described measures impose a different level of organizational change effort. To avoid resistance in organizations towards the improvement project, it is recommendable to address the measures one by one, starting with the measure, which requires the smallest organizational changes. Systematically, the improvement project can be extended to measures that involve a higher degree of organizational change effort [21, 22].

**Conclusion and outlook.** The controlling function will add to the company's value, if the value creation of the decision support outweighs the costs of the controlling function.

Management expectations towards the effectiveness and efficiency of the controlling functions are increasing. Following recent surveys, the focus of the activities within the controlling function is expected to further shift from passive roles such as data preparation to more active roles, such as advising management and initiating change processes [16]. The controlling department should further streamline its standard reporting activities on the one side and increase its management support to prepare business decisions on the other side.

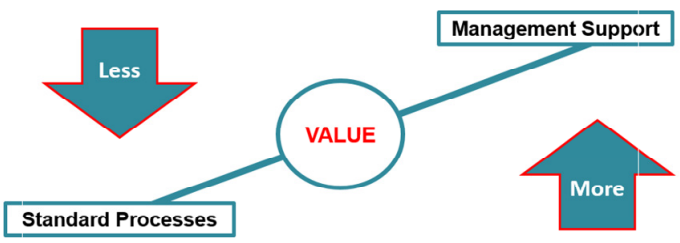


**Fig. 4. How to influence the added value of controlling**

*Source:* Author's own processing

Based on the above research, it can be recommended to improve management support by aligning the controlling activity with the management approach and expectations. Besides reviewing the existing reports for their effectiveness, controlling should identify business-partnering projects to improve the value it adds beyond providing standardized management reports. The necessary resources for such business-partnering projects can be gained by shifting the resources from the unneeded tasks to the uncovered needs. To get the support for this business-partnering role of controlling, some sample projects should be agreed upon with the top management. Those projects can be first set up on the central level as pilot projects, which can be later rolled out through the organization. The required learning and training activities should be provided closely to the projects instead of focusing on formal trainings.

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## ВИМІРНІСТЬ УПРАВЛІННЯ ПРОДУКТИВНІСТЮ

***Прагнення підвищити продуктивність процесів компанії триває. Дослідження показують, однак, що багато компаній не вимірюють контролюючу роботу з певним переліком ключових показників ефективності. У статті проаналізовані три категорії контролю ключових показників ефективності залежно від їх ступеня вимірності та їхній вплив на фінансові показники компанії. Потенційні заходи з оптимізації продуктивності контрольного відділу викладені і поставлені в логічному порядку. Вирівнюючи контролюючу діяльність із відповідним очікуванням управління, як один із ключових чинників успіху цього проекту, обговорено удосконалення.***

***Ключові слова: контроль, управлінський облік, контрольні показники ефективності, контроль ролі моделі.***

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## ИЗМЕРЯЕМОСТЬ УПРАВЛЕНИЯ ПРОИЗВОДИТЕЛЬНОСТЬЮ

***Стремление повысить производительность процессов компании продолжается. Исследования показывают, однако, что многие компании не измеряют контролирующую работу с определенным набором ключевых показателей эффективности. В статье проанализированы три категории контроля ключевых показателей эффективности в зависимости от их степени измеряемости и их влияние на финансовые показатели компании. Потенциальные меры по оптимизации производительности контрольного отдела изложенны и поставлены в логическом порядке. Выравнивая контролирующую деятельность с соответствующим ожиданиями управления, в качестве одного из ключевых факторов успеха этого проекта, обсуждались усовершенствования.***

***Ключевые слова: контроль, управленческий учет, контрольные показатели эффективности, контроль роли модели.***

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# INTERNATIONAL EXPERIENCE OF RETIREMENT INSURANCE AND ITS IMPLEMENTATION IN UKRAINE

***The article attempts to provide an overview of world experience in functioning and development of retirement insurance system based on insurance principles. The world experience in the sphere of retirement insurance and realization of pension reforms in countries with different economic development will help to apply certain elements to Ukrainian pension program. The importance of functioning of multilevel pension models is considered in the study. The analysis has shown that pension models based on redistributive and accumulative pension programs give an opportunity to receive differential pensions to citizens of retirement age.***

***Keywords: pension insurance, redistributive retirement program, accumulative pension program, pension reform, national pension system.***

**Introduction.** The increasing role of insurance principles is currently of great interest in modern society. These principles are especially vivid in terms of long-period financial relations between the state, its citizens and employers. In the words of many scientists the world experience shows, that the objective process and one of the leading directions of social and economic relations development in most countries are strengthening the social orientation of economic systems. These trends explain the constant attention to the development of insurance on the part of all the participants of financial relations and the appropriate state reaction toresponse to pension provision as one of the indicators of the development of the society [9, p. 18].

Ukrainian pension legislation states that the society should create the optimal pension model that would protect the interests of the citizens of retirement age and provide with a high level of their lives with the help of system of pension insurance system. The efforts of either state or employers should be aimed at the general development strategy of the pension insurance system. Consequently, the issue of the pension insurance and its role, principles of creating optimal Ukrainian pension model is of great interest among scientists.

The pension reform in Ukraine is characterized by the formation of a multilevel type of the national pension model. The solidarity pension system and private pension system are used in our country. The implementation of state obligatory accumulating pension system is expected in the nearest future.

The reform of the pension system of any country has a long-term character. This period is accompanied by changes in the economic development of society, which are characterized both by the economic rise and financial crises. Therefore, the national programs of pension reformation must be constantly corrected taking into account the period of retirement reform realization and modern tendencies in the development of national economy.

It is important to explore the world experience of the functioning and development of pension systems on the bases of insurance to make a complete study of the system of pension insurance in Ukraine. Consequently, the aim of the study is to examine experience of foreign countries with different levels of economic development to adopt the most significant characteristics and principles in the formation of Ukrainian pension systems.

We will focus our study on the experience of European countries. It is explained by European direction of development Ukraine has chosen. In addition, our national retirement system follows the multi-level model, which is typical for most European countries.

**Analysis of recent research andpublications.** Nowadays both national and foreign scientists focused their attention on the formation and functioning of retirement system in Ukraine. Retirement reforms in many countries stimulatedthe scientific studies into the identification of role of pension reform and its realization. The need for reforms of our national retirement system leads to analysis ofnational and foreign expertsexperience to develop a set of measures and mechanisms of implementation of theaccumulative obligatory pension insurance in our country. The study of foreign pension reform experience was launched on ideas of O. Morozova [9], L. Luzghina [3], M. Plaksii [17, 18], N. Horiuk [15], T. Salnikova [21], I. Miroshnychenko [8.], M. Malovanyi [4], O. Poplavskyi [19], O. Petrushko [16]. They explored multilevel pension systems of many countries, including European, highlighted the role of redistributive and accumulative pension programs in getting various kinds of pensions.

Research assistants of Scientific Institute of demography and social research named after M. Ptukhi consider the issue of retirement insurance application to transform national retirement system. They take into account the international experience on this issue, particularly in terms of introducing obligatory accumulative retirement system that forms the second level of the national pension system [14, p. 13.].

A lot of statistical and theoretical material on the foreign experience of retirement insurance reform of national retirement systems is concentrated in the International Retirement Bulletin.It highlights the issue of the functioning of all levels of retirement systems of many European countries, especially the use of redistributive and accumulative pension programs [6].

However, it should be mentioned that tendencies of changes in national pension systems, instability in the financial situation of the national economies of most European countries, the further impact of demographic factors on the pension sector require carrying out the additional study of foreign experience of pension insurance and possibilities to realize it in Ukrainian pension system.

**The methodology of the study.** The processes that take place in the society, the trends of economic development in the current context determine certain changes in the methodological approaches to the improvement of the national retirement systems of foreign countries.The impact of the demographic situation and the need to reform the pension systems of the country must be taken into account in the process of studying of international experience in retirement insurance. To evaluate the effectiveness of the system of the other country in modern context the financial aspect must be considered. It is important to determine in what way the size of incomes, retirement age affect the size of the

insurance of retirement contributions, the ratio of taxes between employers and employees, the insurance length of service of participants in pension plans, the retirement age of citizens, the magnitude of the average share of pensions from different levels of the pension system, the amount of administrative expenses on pension system service.

The study into development of the stock market and its abilities to provide the needs of the accumulative retirement programs is of great importance for successful implementation of its elements in our country. The use of pension assets of accumulative retirement insurance during a long period of time causes the formation of their protection systems, as well as the control of their use by the state and financial institutions. The study of experience in terms of the formation of the mechanisms that contributes to overcoming the financial crisis in the sphere of retirement is important.

**Results.** The process of ageing of the population, the growing number of retirement age people, the need for financial resources, strengthening the financial burden on citizens able to work, employers, state budgets in the system of compulsory pension insurance is observed in most countries during the recent decades. The demographic factor caused the need for retirement reform in many countries of the world. First of all, we mean the European countries, where the part of the retirement age population has a tendency to growth. Every year, the vast majority of European countries face the problem of financial security of their citizens that have reached retirement age. Therefore, the search of additional financial resources for the retirement sphere requires certain reforms, improvement of their national retirement systems.

The international practice shows, the world has not found a unique system, which would be able to solve all the problems in the sphere of pension provision, that is to guarantee a minimum standard of living for people of retirement age, to provide a reliable mechanism of stimulation of the working population to implement pension savings individually, to ensure the fairness of pensions, which would be proportionally depended on the amount of paid insurance pension contributions. Therefore, to create the optimal, secure pension model is quite a challenging task and it provides for the formation of several levels [1, p 223].

The main theme for discussions about the reform of the retirement systems in scientific and political circles of Western countries during the last decades is the search for the most effective insurance methods and mechanisms of creation the multi-level interconnected pension systems that supplement each other , the active involvement of the private sector and the insured people to finance the pension costs, to involve in the process of collective and personal pension insurance of persons employed in the informal labour market and the creation of a complex institutions of social protection of elderly people.

The three levels that combine the redistributive and accumulative types of pension provision are typical for national pension models of most European countries. Figure 1 shows the average proportion of pensions at different levels.

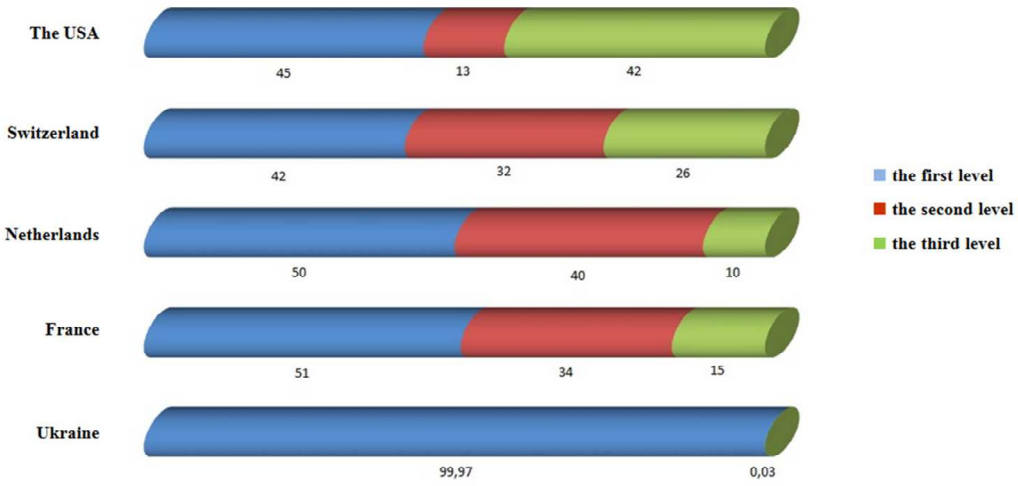


**Fig. 1. Average distribution of different level pensions of retirement system in some countries ( %)**

*Source*: http://epp.eurostat.ec.europa.eu/portal/paqe/portal/statistics/search

Analysis of this graphic picture shows that Ukrainian retirement model is expected to be a three-level model due to retirement legislation, but, in fact, the country uses only solidary system. As a result, Ukrainian pensioners receive a pension only from the first level. In contrast, pension receipts are based on three levels in other countries. An additional feature of this process is that pension receipts received from the second and the third levels dominate in the total value of pension income of retirement age people of the countries as can be seen in Figure 1. This means that redistributive systems are actively used alongside with accumulative ones in these countries. These considerations imply that the use of the financial resources of all three levels of the retirement system in the majority of European countries allows them to maintain a high level of pensions for their retirees that meet the international standards of the ILO [4].

Another important issue insurance experts are working at is a distribution of insurance pension contribution payment between employers and insured. Previous models of pension insurance in most European countries, as well as the countries of Eastern Europe and the former Soviet Union, expected to put the main financial burden of the insurance contribution payment on the employers. The development of accumulative pension programs caused a gradual transformation of the national pension models into the system based on alignment of insurance pension contributions between the subjects of the pension relations.

It is worth noting that European countries with developed market economy started to carry out this transformation earlier. As far as employers were concerned they

werefinancially burden due to poor demographic situation. Recently the size of insurance pension contributions between employers and paid employees has been flattened out in most countries. The experts are sure that this tendency must be maintained in order to enhance the competitiveness of enterprises in the global market and to remove the part of financial burdenof providing pension payments. The Governments of these countries updated existed types of their national pension models through the introduction of accumulative pension system and the obligatory and free pension insurance, shifting this financing for able-bodied population.

Interestingly, but nowadays the post socialist countries are still not able to make such a radical transformation to obligatory accumulation system. To realize this reform, the country needs the appropriate economic conditions, the general development of the national economy, the growth of incomes of the population, the formation of private pension funds, well-developed legislative framework and society ready for such reforms. Therefore, in almost all countries of the former Soviet Union the equal ratio between employers and paid employees is kept.

In 2016 the Government of our country made an attempt to reduce the amount of insurance of pension contributions for the employers to solidary pension system from 36,76–49,7 % to 22 %. Unfortunately, this led to significant growth of the deficit of the Pension Fund of Ukraine almost of 125 billion UAN [10].

As far as the retirement age of citizens in most European countries is concerned, it is higher than in Ukraine and is supposed to increase in future.The appropriate changes in their national pension systems confirm this fact. The demographic crisis and aging population oblige the European Governments to use a not very popular procedure of increasing the retirement age.

Most specialists in the sphere of retirement insurance argue that the important issue of the introduction and effective functioning of the accumulative pension programs is determination of the institutional foundations of these programs management. Analyzing and solving these problems in the countries of Eastern Europe is of great importance for Ukraine, because it will help to choose the right option to manage pension assets in the process of implementing the obligatory accumulative pension model.

The obligatory individual accumulative long-term pension insurance involves solving the main problem, that is, the protection of pension savings of future generations, the preserving of the corresponding fund assets, and the increasing of their investment income. Table 1shows the role of the state and the private sector in the management of obligatory accumulative pension programs that form the second level of retirement systems in most countries of Eastern Europe.

The practical experience of many countries shows that cooperation between the public and private sector in the management of obligatory pension insurance funds has a variety of forms:

1) The state provides normative and legal base and supervision, while non-state pension funds collect fees, manage and account the assets;

2) The state or state institution itself performs all of the mentioned functions and performs the management of accumulative schemes;

3) The state or government institutions collect premiums, control their accounting and provide asset management to the private sector

***Table 1.*** **State and private sector participation in management of obligatory accumulative retirement programs of the second level in Eastern Europe**

| № | Country | Institutions that collect insurance premiums | The asset management company | Accounting |
|---|---|---|---|---|
| 1 | Bulgaria | State National Income Agency | Private pension funds | Private pension funds |
| 2 | Hungary | Pension funds | Private pension funds | Private pension funds |
| 3 | Romania | State National House of Pension Provision | Private pension funds | Private pension funds |
| 4 | Poland | State Social Security Institute | Private pension funds | Private pension funds |
| 5 | Slovakia | State Central Insurance Agency | Private pension funds | Private pension funds |
| 6 | Croatia | State Central Register of Insured Persons | Private pension funds | State Central Register of Insured Persons |

*Source:* http://epp.eurostat.ec.europa.eu/portal/paqe/portal/statistics/searchdatabase

The analysis of this table shows that the pension asset management of accumulative insurance system is carried out by private pension funds. They also control premiums and personal accumulative accounts.

The participation of the state in the management of accumulative insurance schemes of the second level in the mentioned countries is quite important. With the help of its financial institutions the state collects premiums on obligatory accumulative pension insurance and distributes them between private pension funds according to the features of the national legislation of each European country.

Accumulative pension systems have a long-term perspective. Therefore, the accumulative pension insurance is associated with of risks in the financial, investment, political spheres. Due to introduction of accumulative type in the pension systems of the countries of Eastern Europe the reforms are accompanied by significant difficulties and require a long period of time.

The efficiency of accumulative pension insurance depends, primarily, on the size of the administrative costs in the total value of the pension assets of accumulative pension programs.

Table 2 shows the high level of administrative costs in national accumulative funds in comparison with other countries. Expenses are many times higher than the corresponding figures in other countries. At the primary stage of the second level implementation it is important to take into account the experience of many countries of Eastern Europe, which also faced the problem of reducing administrative costs during the first years of its functioning. Today, Poland, Slovakia, Slovenia have a very low level of administrative costs in the total value of the pension assets of accumulative pension programs.

***Table 2.*** **Administration expenses in general rate of pension assets of accumulative pension programs in some countries**

| № | Country | % oftotal value of pension assets |
|---|---|---|
| 1 | Spain | 1,3 |
| 2 | Czech | 1,4 |
| 3 | Hungary | 1,0 |
| 4 | Slovenia | 0,9 |
| 5 | New Zealand | 0,7 |
| 6 | Australia | 0,6 |
| 7 | Slovakia | 0,5 |
| 8 | Poland | 0,4 |
| 9 | Denmark | 0,1 |
| 10 | Ukraine | 5,9 |
| 11 | Macedonia | 1,9 |
| 12 | Latvia | 1,9 |
| 13 | Nigeria | 1,3 |
| 14 | Bulgaria | 1,2 |
| 15 | Costa Rica | 1,0 |

*Source:* [15]

Our results demonstrate that Ukrainian stock market is not developed, the amount of activated pension assets at the third level is still not large and they do not help to reduce the administrative costs of private pension funds. The administration of pension assets of the second level at the primary stage of its functioning was given to accumulative pension fund, which is reflected in the new national pension legislation, and this innovation is, to our opinion, to the point. It will perform the functions of their accounting, saving, investment, and development of investment policy. Administrative costs are predicted to be much lower than that of private pension funds. Taking into account the lack of practical experience of the use of financial resources accumulative pension programs, such a regulating state investment model is the most optimal.

**Conclusion.** To sum up, the principles of insurance play an extremely important role the sphere of pension ensuring. This statement confirms the study of foreign experience in terms of formation of national pension systems, which are being reformed with the help of the pension insurance system.As a result, he optimum pension model that would protect the interests of the citizens of retirement age and provide a high level of their lives must be created.

The study of national pension systems of most European countries showed that they use a multi-level pension model where both redistributive and accumulative pension programs. They allow pensioners to receive several different types of pensions, and, consequently, increase their retirement income and reduce financial risks.

The low level of pensions of Ukrainian pensioners, activation of the first level only of the national pension system force the Government to continue carrying out the reform of the pension system. The experience of the European countries is extremely important for the successful implementation of the pension reform. Both the solidary and the accumulative pension system types are considered.

Undoubtedly, a new phase of pension reform involves the reorganization of the solidary pension system. First of all, the unification of pension payments in it, that is the calculation and payment of pensions at this level at equal standards for all categories of citizens. In addition, the introduction of the accumulative pension system, which forms the second level of the national pension system, is planned. According to the bill number 4608 is being considered by the Supreme Soviet of Ukraine, the second level is supposed to be introduced in July 1, 2017 [17]. It will be a starting point to further development of private pension provision and it is supposed to consist of professional accumulative and obligatory accumulative systems.

New stages of pension reform continue to confirm the key role of the national pension system in the formation the pension insurance. Therefore, the study of the theoretical and practical aspects of its further development, the formation of the corresponding complete system in the sphere of retirement insurance that is built on the principles of this type of insurance is important and continues to be an up-to-date issue in modern science.

**Discussion.** Obligatory pension system invasion is one of the main tasks of the modern stage of pension reform. There are three pension systems in Ukraine, which were declared almost two decades ago. Among them only solidary system really works. Besides, the third level of this system is not widely spread among the population. Today the situation in the pension sphere does not guarantee worth-while pensions. That is why, the experience of European countries shows that the ability to use various pension programs contributes to getting several types of pensions.

However, Ukrainian scientists and experts argue over the urgency of introduction of the second level of the national pension system. The main argument for economists and experts is the instability of the national Ukrainian currency. Its devaluation will cause the inflation of pensions, accumulated by population by that time. Moreover, economists consider the effect of accumulative pension system possible only in case of stability of the national currency.

The first group of experts thinks that tax reforms are the starting point of retirement insurance transformations. Ukrainian economy needs time to rise. At first, the tax sphere should be reformed and when the economy starts to rise, it is high time to carry out the changes in the field of pension. The second group of financiers believes that considerable toning of economy and, accordingly, the wage fund, will not contribute to the effective functioning of the second level.

Therefore, the main task of the scientists, state specialized financial institutions, and pension experts is to develop and to demonstrate the optimal mechanism of obligatory accumulative pension system, which would be able to minimize all possible financial risks in the second level.

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## ЗАРУБІЖНИЙ ДОСВІД ПЕНСІЙНОГО СТРАХУВАННЯ ТА ЙОГО ІМПЛЕМЕНТАЦІЯ В УКРАЇНІ

***Досліджено світові надбання функціонування і розвитку пенсійних систем, що діють за принципами страхування. Вивчення досвіду системи пенсійного страхування у країнах із різним рівнем економічного розвитку, особливостей проведення в них пенсійних реформ, сприятиме імплементації деяких їхніх елементів у вітчизняній практиці. Заслуговує на увагу функціонування багаторівневих пенсійних моделей, які використовують перерозподільчі та накопичувальні пенсійні програми, що дає можливість одержувати кілька видів пенсій громадянам пенсійного віку.***

***Ключові слова: пенсійне страхування, перерозподільчі пенсійні програми, накопичувальні пенсійні програми, пенсійна реформа, національна пенсійна система.***

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## ЗАРУБЕЖНЫЙ ОПЫТ ПЕНСИОННОГО СТРАХОВАНИЯ И ЕГО ИМПЛЕМЕНТАЦИЯ В УКРАИНЕ

***Исследовано мировые достижения функционирования и развития пенсионных систем, которые построены на принципах страхования. Изучение опыта системы пенсионного страхования в странах с разным уровнем экономического развития, особенностей проведения у них пенсионных реформ, будет благоприятствовать имплементации некоторых их элементов в отечественной практике. Заслуживает внимания функционирование многоуровневых пенсионных моделей, которые используют перераспределительные и накопительные пенсионные программы, что даст возможность получать несколько видов пенсий гражданам пенсионного возраста.***

***Ключевые слова: пенсионное страхование, перераспределительные пенсионные программы, накопительные пенсионные программы, пенсионная реформа, национальная пенсионная система.***

**References (in Latin): Translation / Transliteration/ Transcription**

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# TRANSFORMING CONSUMER AND IT'S IMPLICATIONS FOR THE UKRAINIAN SOCIETY

***This article reviews the changes of consumption patterns in the Ukrainian society over the last 25 years and the impact this transformation had on Ukrainian consumers. The author researches the market forces and the influence those market forces had on the consumer behavior. Finally, the author concludes that the market forces present on the Ukrainian market resulted in transforming consumption patterns and consumer behavior. In this scientific research also presents a critical analysis of the implications for the Ukrainian society and the possible choices of market models.***

***Keywords: Consumption, Consumer behavior, Ukrainian consumer, Ukrainian economy, Ukrainian society.***

An evaluation of Ukrainian economic indexes since 1991, demonstrate a performing well lower its potential. After the difficult transition of the 1990-s, it was an economic boom in the early 2000 – s with growth rates more than 7 %. The shock of the 2008 global financial crisis showed the vulnerability of the economic model. GDP in Ukraine contracted by nearly 15 % in 2009, for example, the OECD countries average was 3.7 %. Economy in Ukraine is very delicate and dependent on external support. This article reviews the changes of consumption patterns in the Ukrainian society over the last 25 years and the impact this transformation had on Ukrainian consumers. The author researches the market forces and the influence those market forces had on the consumer behavior. Finally, the author concludes that the market forces present on the Ukrainian market resulted in transforming consumption patterns and consumer behavior. In this scientific research also presents a critical analysis of the implications for the Ukrainian society and the possible choices of market models.

**Introduction.** The Ukrainian consumption segment operates according to the cultural and social norms and is based in stratification systems that change over time. Consumer patterns transform for both macro and micro factors. At the macro level, such transformation occurs because of structural changes in the environment. At the micro level, this transformation is attributable to personality consumer's varying tastes.

This paper examines the changes of consumption patterns in the Ukrainian society over the last 25 years (1991 – 2016) and the transformation of the Ukrainian consumers as a result of these processes. Also the paper studies the market forces and the influence those market forces had on the consumer behavior. This scientific research is based on the relevant data from the published research papers, government documents, publications and reports.

The objective of this research is to give a picture of transformation of the Ukrainian consumer, the effects and implications for the Ukrainian society. In this paper the following research questions will be answered:

*– What are the effects and implications of the consumer transformation in Ukraine?*

*– How the consumer transformation influence for the Ukrainian society?*

This research paper is structured as follows: Section 2 – Literature review; Section 3 – Conceptual Framework; Section 4 – Practical outcomes; and Section 5 – Conclusions.

**Literature review.** Consumer behavior has been always of huge interest to economists. The understanding of consumer behavior helps the economists to realize how customers select their products and brands; think and feel, also how the consumers are impacted by the economical situation, environment, the reference groups, and family, etc. Consumer's buying behavior is influenced by cultural, social, economic, psychological, and personal factors. Most of these factors are out of control.

Consumer is the study "of the processes involved when individuals or groups select, purchase, use, or order of products, ideas, experiences, or services to satisfy needs and desires" [14, p. 7].

In the economical context, "consumer" refers to patterns of total buying; post purchase and pre purchase activities has implications for repurchase and purchase (Foxall, 1987).

Engel, et al. (1986) generated the term "consumer behavior" as "those acts of individuals directly involved in obtaining, using, and disposing of economic goods and services, including the decision processes that precede and determine these acts" (p. 5). Cheung et al. (2005) collected specific literature in order to categorize the contradictory and fragmented studies (published from 1994 until 2002; 351 papers), presenting an integrated framework of the motivating factors of consumer behavior. They thought that five factors clarify consumer behavior: individual characteristics; product or service characteristics; merchant; medium characteristics; and intermediaries characteristics.

The economists were the primary to dominate model constructing, in the context of buying behaviour. Economic theory holds that purchasing decisions are the effect of mostly conscious and "rational" economic calculations.

Thus, every buyer wants to spend the income on those products that will bring the most satisfaction according to his relative prices and tastes. The background of this vision can be traced back to Adam Smith (1776).

Alfred Marshall (1890) generated the classical and neoclassical theory in economics, into a refined theoretical framework. His theoretical work was about simplification assumptions and examination the effects of changes in

single variables (e.g., price) holding all additional variables constant. For example, Eva Muller (1954) wrote that only one-fourth of the consumers bought with any significant degree of deliberation. The Marshallian model ignores the main question of how brand and product preferences are created. Quite a few studies have recognized the impacts of price differentials on consumers" brand preferences; changes in product cues on demand variations; changes in price on demand sensitivity; and scarcity on consumer choice behavior amongst many others (Lewis, et al 1995).

Hirschman and Holbrook (1982) advocated that the purchase decision is a very small component in the constellation of proceedings involved in the consumption experience. Holbrook (1987) suggested that consumer researchers have to expand their view to study "all facets of the value potentially provided when some living organism acquires, uses, or disposes of any product that might achieve a goal, fulfill a need, or satisfy a want" (p. 49).

Overall, it is argued that the scientific study of consumer behaviour is rapidly growing as researchers identify and implement innovative transdisciplinary perspectives and techniques to recognize the nature of consumption behaviour and purchase. This wider view attempts to research consumer behaviour in the light of rapidly evolving values, lifestyles, priorities, and social contexts.

**Conceptual framework.** An evaluation of economic indicators in Ukrainian since 1991, demonstrate a nation performing well lower its potential. After the difficult transition of the 1990-s, it was an economic boom in the early 2000-s with growth rates of more than 7 % [2]. The shock of the 2008 global financial crisis showed the vulnerability of the economic model. GDP in Ukraine contracted by nearly 15 % in 2009 (Fig. 1, 2), for example, the OECD countries average was 3,7 % (Fig. 3, 4), and was followed by a sluggish recovery [1]. Economy of Ukraine is very delicate and dependent on external support.

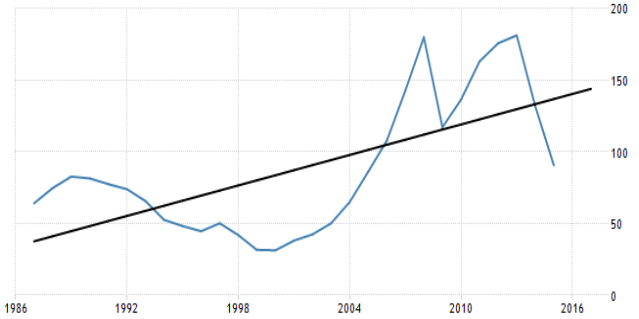


**Fig. 1. Ukraine's GDP, USD Billion**

*Source*: The World Bank (2016)

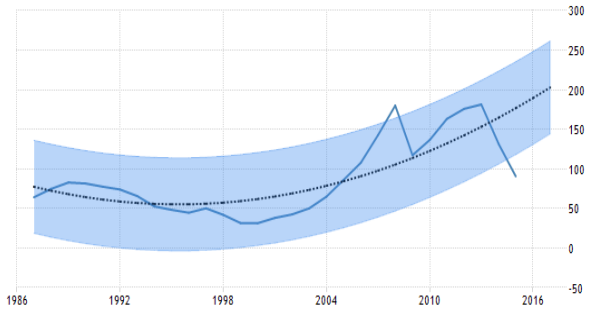


**Fig. 2. Ukraine's GDP (forecast), USD Billion**

*Source:* The World Bank (2016)

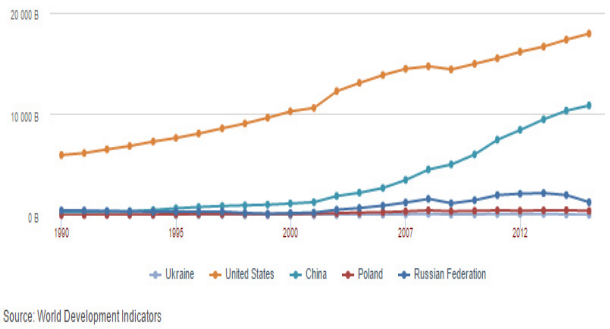


**Fig. 3. GDP of some countries, USD**

*Source:* World Development Indicators (2016)

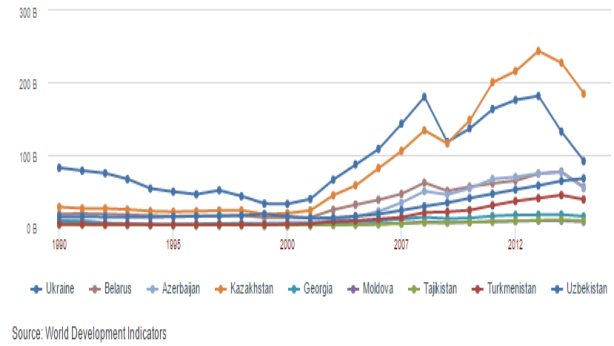


**Fig. 4. GDP of some countries, USD**

*Source:* World Development Indicators (2016)

Since 1991 the market of consumer goods has undergone significant changes. Since the economy was gradually transforming from mostly planned to more market-driven model, the supply eventually became in equilibrium with the demand, in some sectors as a result of increasing the import of consumer goods.

The Market forces that influenced consumer behavior in the last 25 years were:

1) Increase in product choices increased consumers feelings of happiness and satisfaction;
2) When prices of the products started reflecting market forces, consumers became more efficient;
3) High inflation rates correlated with the increase in consumption;
4) Development of market economy restructured social stratification.

After the crisis that started in 2013 the market forces were influenced by the decline of most economic indicators, such as the decrease in overall consumption as a response to political instability. As a result of the increasing variety and availability of products on the market, the adjusting processes in consumer behavior patterns continue to transform the Ukrainian consumer. Some of the responses and adjustments that consumers made during the last 25 years were:

1) Changing consumption basket;
2) Becoming more brand loyal;
3) Participating in the private economy;
4) Doing more comparative shopping;
5) Taking fewer risks;
6) Buying less;
7) Becoming more price conscious;
8) Increase in consumerism;

9) Consumerism correlates with the increase in supply and growing national output.

Ukraine wants to move further towards economic integration, because it is the path to modernization. From the one hand, the early years of adaptation to deep and comprehensive free trade area could be complicated in a quite a few areas. This is not surprising because systemic transformations all the time lead to short-term losses for some. From the other hand, domestic consumers, in turn, will have access to high-quality goods in Ukraine at lower prices. Furthermore, safety and better health standards will benefit Ukrainian consumers as they will be guaranteed of the hygiene and quality of the products on sale and reduce the risk of harm to all.

An additional impediment is that the political situation has to be taken into account. Ukraine became independent when the Soviet Union collapsed in 1991; it remained for the most part dependent on Russia in the ensuing decades. The "Orange Revolution" in 2004 promised new beginnings. However, the post-revolutionary government finally succumbed to scandals and infighting. Pro-Western protests turned into the "Maidan Revolution" in February 2014.

Economic and political turbulence has exacerbated the economic concerns of the majority consumers and influenced them to keep on to cut back on their spending. The political changes correlated with changes towards developing market economy. These changes resulted in high inflation rates (Fig. 5), increase in unemployment (Fig. 6), decrease in social spendings (Fig. 7, 8). Increase in consumption (Fig. 9, 10) up until 2013, and decrease until now.

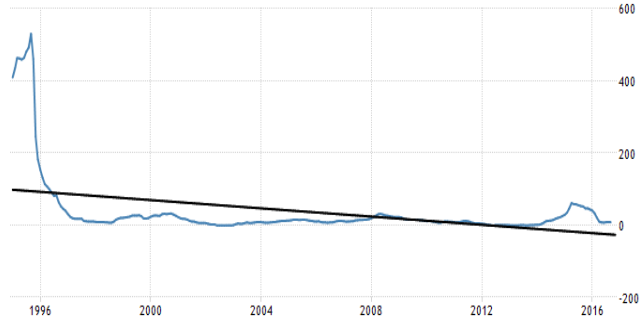


**Fig. 5. Ukraine Inflation Rate**

*Source:* State Statistics Service of Ukraine (2016)


**Fig. 6. Ukraine Unemployed Persons, thousands**

*Source:* State Statistics Service of Ukraine (2016)

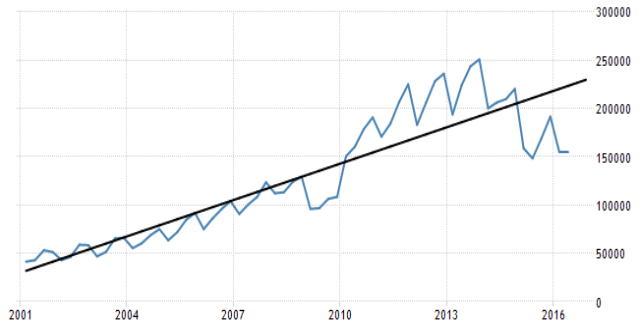


**Fig. 7. Ukraine Consumer Spending, UAH/million (2001-2016)**

*Source:* State Statistics Service of Ukraine (2016)

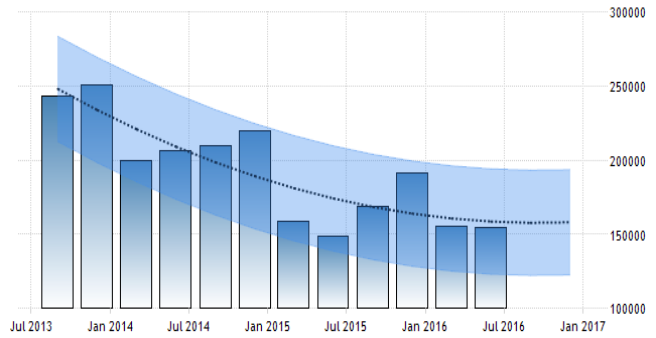


**Fig. 8. Ukraine Consumer Spending, UAH/million (2013-2016)**

*Source:* State Statistics Service of Ukraine (2016)

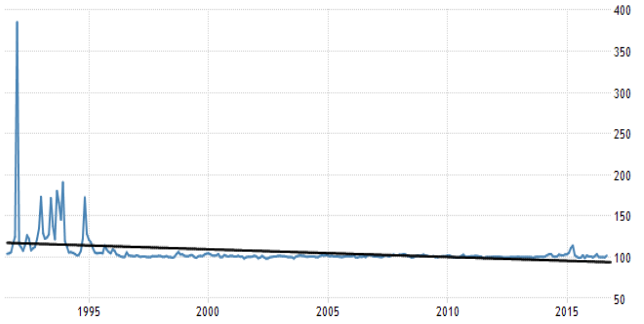


**Fig. 9. Ukraine Consumer Price Index (CPI), Index points (1991–2015)**

*Source:* State Statistics Service of Ukraine (2016)

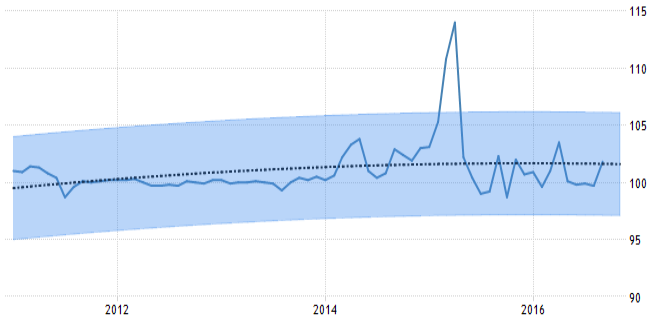


**Fig. 10. Ukraine Consumer Price Index (CPI), Index points (2011–2016)**

*Source:* State Statistics Service of Ukraine (2016)

The author concluded that market forces that influenced consumer behavior:

– Product choice increases consumers feelings of happiness and satisfaction;

– When prices of the products started reflecting market forces, consumers became more efficient;

– High inflation rates correlated with increase in consumption;

– Consumer behavior reflects Maslow's hierarchy (Abraham Maslow, 1943) of needs;

– Development of market economy restructured social stratification;

– Market forces in 2004-2013;

– Further social stratification;

– Consumer behavior reflects Maslow's hierarchy of needs;

– Further Increase in product choices increases materialism and consumerism.

Also, the researcher identified market forces in 2013-2016: decrease in consumption as a response to political instability; further increase in materialism and consumerist; further growth of product choices.

**Practical outcomes.**

*Implications for society:*

An overall increase of product choices leads to continuous growth of consumerism and materialism:

1. The consumer's behavior correlates with Hierarchy of needs (Shama, 1992).

2. The consumer behavior also reflects the correlates with the society individualism vs. collectivism. The change in consumption patterns from decision making motivated by symbolic and experiential needs which correlates with collectivism to consumer behavior based more on own preferences, needs, personal goals – features indicative of individualistic society (Kim, Song, & Yuan, 2011).

Materialism is widely measured by 18 item scale. It distinguishes three dimensions: centrality of possessions, happiness through possessions, success symbolized by possessions. Materialism is defined as a set of centrally held believes about the significance of possessions in lifes (Richins & Dawson, 1992).

It is also defined as the extent to which individuals allow the pursuit of material possessions and goods to assume a main place in their life (Belk, 1994; Richins, & Dawson, 1992).

Materialism correlates with reduced well being because it promotes the lifestyle that undermines the ability to meet the basic psychological needs (Deci & Ryan, 2000; Kasser, 2002).

Material acquisition that is guided by extrinsic controlled reasons reduces well-being (Dittmar et al., 2014). It lowers psychological adjustability and social productivity (Kasser and Ryan, 1994).

There are different reasons why people become materialistic (Fig. 11).

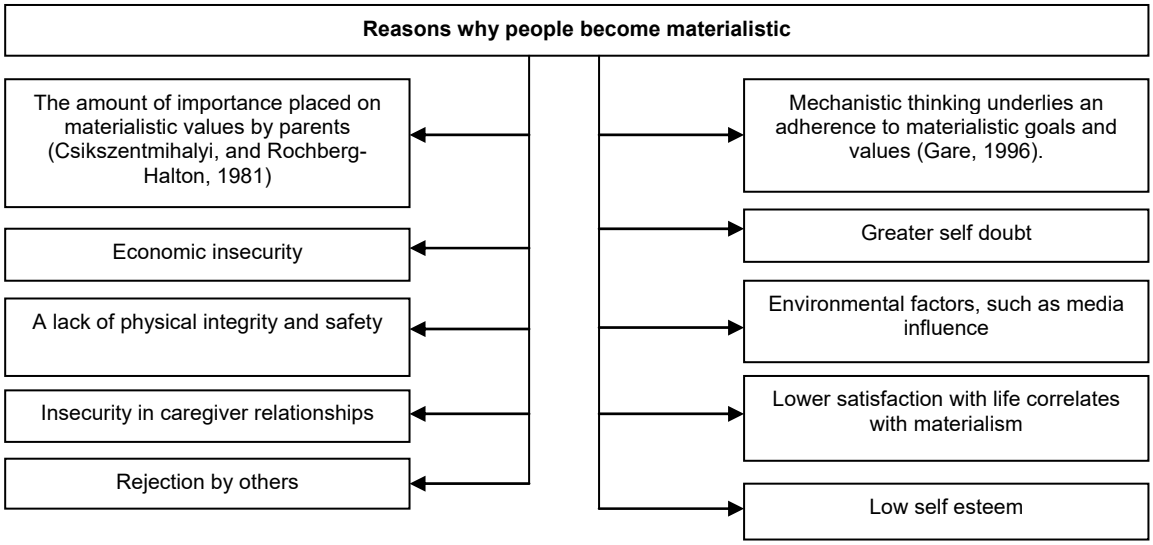


**Fig. 11. Different reasons why people become materialistic**

*Source:* Author

Materialistic goals and values can be viewed as means to deal with insecurities and low self esteem. Crisis and similar factors can act as an antidote to materialism (Kasser, et al., 2014). Another factor that contributes to materialism is how individuals reify extrinsic.

Superior levels of materialism are connected with higher self enhancement motives (wealth, authority, power).

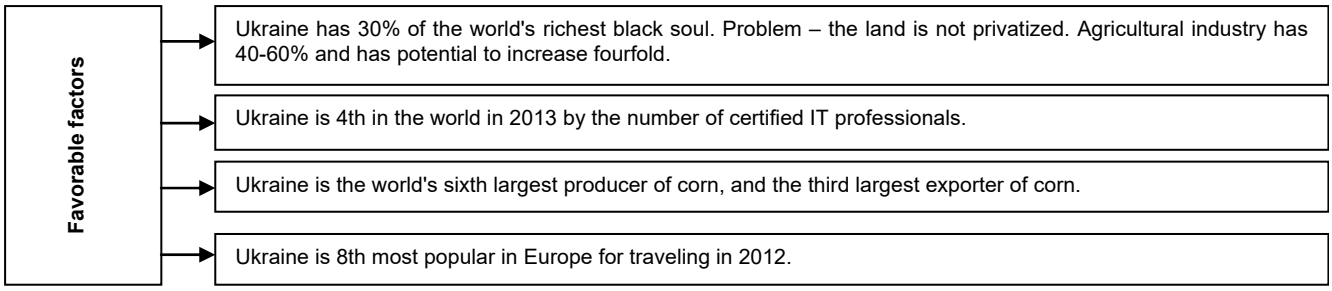


**Fig. 12. Favorable factors**

*Source:* Author

*Effects on the society:*

Increase in consumption continues to influence various segments of Ukrainian society. In this article we discuss five aspects of the changes in consumption. We argue that the increase in consumption affected economic, social, cultural, environmental spheres and that it fostered the Ukraine's progress of embracing globalization.

*Social sphere. Restructuring social stratification:*

The class boundaries are no longer centered around the relations to the means of production, but the consumption patterns and capacities create a new way of defining class differences. Spatial marginalization of the working class contributes and compliments the processes of economic marginalization (Ryabchuck, A., & Onyshchenko N., 2012).

*Globalization*

Increase in variety of the consumed goods correlates with increased exposure to globalization. Globalization has formed the ability to buy life changing products for consumers. It has provided the ability of having a lot of consumption alternatives at sensible prices. It has created changes in cultures and societies across the world.

*Cultural*

The productive system of the modern capitalism is geared towards creating, stimulating and multiplying consumer needs. The maximum satisfaction of wants in the market became accepted as the highest social good. Mass consumption, mass production and Homogeneity of tastes and patterns of consumption. Consumer credit stimulates consumerism ("Conspicuous consumption" is extremely elastic). Contrary to Alfred Marshall's Marginal Utility theory, wants for goods and services are not confined to utility, according to "Conspicuous consumption" theory by Thorstein Veblen, consumption can be "conspicuous" or meant to acquire a certain status through its conspicuous display. The demand in this case will become extremely elastic. Increase in brand loyalty as a result of advertising and importance of image-based difference which has to be manufactured along with the product in order to be competitive. The utility of the product based on its use or differentiation becomes secondary to its brand association.

*Economic*

Sociocultural visibility of consumer expenditures correlate with cross-product elasticities. Income elasticities correlate positively with product visibility. Consumers ' needs and desire of new products shortens products life span and becomes a driver of economic growth. Research and development becomes a tool to achieve innovations that satisfy customers needs in new ways and create new wants.

A set of EU policies for consumer protection includes safety policy and legislation, consumer law to combat unfair commercial practice, unfair contract terms and misleading advertising, both in domestic and international purchases.

To create new products companies directly engage with customers through social media and digital technologies to collect customers feedback on their products. According to recent research, 30 % of the developed market consumers provide more online feedback to companies about their products and services. And 65 % of the developed market consumers use the internet more to research products and services (Accentuate, 2012).

Social media creates platforms for the companies that can be used at every stage of original product development: idea generation, strategy development, product development, testing and commercializations.

As more and more consumers prefer to buy from the companies that use sustainable practices, it becomes essential that companies develop sustainable innovation strategies.

The companies that have capacity to readjust their innovation strategies gain a better understanding of end-user needs and thus have bigger potential in the long run. For example, Proctor & Gamble Connect and Develop Innovation model (C+D) have been successful for over a decade.

Consumers are willing to participate in idea generation stage of product development through practices such as crowdsourcing and lead user innovation. Such practices allow the companies to combine internal research and innovation with external sources and ideas from customers. Practices such as crowdsourcing satisfy consumers needs of creativity, impulsiveness, problem solving and affiliation.

Two major approaches in co-creation process at this stage are random sampling and more knowledgeable users.

Companies also try to empower customers and change the existing concept of consumer involvement at every stage of product development, including testing and launch, when customers help companies to diffuse the innovation and overcome the barriers to it.

*Environmental*

The increase in consumption correlates with increase in environmental pollution.

Postmodernism as a cultural logic of late capitalism (Jameson).

Another important aspect of increase in consumption is the need to enforce a set of ethical principles and rules that will allow to turn the consumer markets and economy into a system that benefits all the members of the Ukrainian society.

In the West a similar idea is referred to as ethical capitalism. In ideal scenario ethical capitalism correlates with ethical consumerism, which can also be viewed as a dominant culture mode where consumers are thoughtful about their purchases and certain things are protected in the procedure of customer decision making. The primary concerns would be environment, people's health and conditions of labor (Cole, 2006).

*Impact on culture*

Some of the most negative impacts of consumerism are mass production, standardization and deterioration of individualism and critical thinking. Essentially the same products are offered to everyone by the standardized production (Arato, 1982). This is referred to as pseudo-individualization phenomenon.

**Conclusions**. As the consumption continues growing and Ukrainian economy enforces more market driven structures, it is important to choose the model of free market that is beneficial for both Ukrainian economy and Ukrainian society: Classical liberal capitalism, Neoliberal capitalism, Social liberalism, Ordoliberalism. Classical liberal capitalism supports private property rights, complete freedom of trade, manufacturing and labor contracting. Markets work with minimal government intervention in terms of restrictions. Neoliberal capitalism emphasizes private property rights, open markets with complete economic freedom, deregulation and privatization, a very limited government role in the economic sphere. Social liberalism as a reaction against classical laissez-fair aligns with the political position of social democracy and proposes balancing individual freedom and social justice. Ordoliberalism strong presence of the state to ensure that free market produces results close to its theoretical potential. However, there are many practical challenges in making a step-change to choose the best model for Ukrainian economy. The author believes that a stronger political will is needed to execute basics in this area.

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## ПЕРЕТВОРЕННЯ СПОЖИВАННЯ І ЙОГО НАСЛІДКИ ДЛЯ УКРАЇНСЬКОГО ТОВАРИСТВА

***Розглянуто зміни структури споживання в українському суспільстві за останні 25 років, а також проаналізовано вплив цієї трансформації на українських споживачів. Досліджено ринкові сили та їхній вплив на поведінку споживачів. І, нарешті, зроблено висновок про те, що ринкові сили, які концентруються на українському ринку, привели до трансформації моделей споживання і поведінки споживачів. У науковому дослідженні також представлено критичний аналіз наслідків для українського суспільства і можливих варіантів ринкових моделей.***

***Ключові слова: споживання, споживча поведінка, український споживач, українська економіка, українське суспільство.***

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## ПРЕОБРАЗОВАНИЕ ПОТРЕБЛЕНИЯ И ЕГО ПОСЛЕДСТВИЯ ДЛЯ УКРАИНСКОГО ОБЩЕСТВА

***Рассмотрены изменения структуры потребления в украинском обществе за последние 25 лет, а также проанализировано влияние этой трансформации на украинских потребителей. Исследуются рыночные силы, и их влияние на поведение потребителей. И, наконец, сделан вывод о том, что рыночные силы, присутствующие на украинском рынке, привели к трансформации моделей потребления и поведения потребителей. В этом научном исследовании также представляется критический анализ последствий для украинского общества и возможных вариантов рыночных моделей.***

***Ключевые слова: потребление, потребительское поведение, украинский потребитель, украинская экономика, украинское общество.***

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# MACROECONOMIC FORECASTING USING BAYESIAN VECTOR AUTOREGRESSIVE APPROACH

***There are many arguments that can be advanced to support the forecasting activities of business entities. The underlying argument in favor of forecasting is that managerial decisions are significantly dependent on proper evaluation of future trends as market conditions are constantly changing and require a detailed analysis of future dynamics. The article discusses the importance of using reasonable macro-econometric tool by suggesting the idea of conditional forecasting through a Vector Autoregressive (VAR) modeling framework. Under this framework, a macroeconomic model for Georgian economy is constructed with the few variables believed to be shaping business environment. Based on the model, forecasts of macroeconomic variables are produced, and three types of scenarios are analyzed – a baseline and two alternative ones. The results of the study provide confirmatory evidence that suggested methodology is adequately addressing the research phenomenon and can be used widely by business entities in responding their strategic and operational planning challenges. Given this set-up, it is shown empirically that Bayesian Vector Autoregressive approach provides reasonable forecasts for the variables of interest.***

***Keywords: forecasting, macroeconomic modeling, bayesian VAR, litterman prior, scenario analysis, IFRS 9.***

**Introduction.** Forecasting, in general, plays a significant role in many aspects of modern business administration. It represents an important part in operation planning and decision-making process, which in turn are prerequisites for successful business management. Since forecasting involves estimation of business-relevant factors both in quantitative and qualitative terms in short-, medium- and/or long-run, organizational decisions and strategy, of course,

are incomplete without direct projections of future trends or at least, without making a quantitative assessment of those trends [3]. Benefits, yielded by accurate and timely forecasts, are huge. First of all, managerial decisions are greatly dependent on proper evaluation of future trends as market conditions are constantly changing and require a detailed analysis of future dynamics. Accordingly, managerial decisions are made in a continuous manner, and are applied to short-term, as well as medium and long term horizons. This circumstance puts on the agenda the need for organized activities, which will involve reasonable predictions of future trends and in this regard, forecasting process is an effective method to improve the quality of decisions by reducing losses from unexpected developments (Shim 2000). In addition, forecasts of a firm's financial indicators (e.g., sales), raises organization's success by allowing cost optimization, efficient distribution of resources and rational budgeting. One more important benefit of forecasting is that projection of important factors, based on all available and relevant information, facilitates integration of plans and strategies in various departments of a firm and helps design a mutual action plan. Also, it facilitates discussions between the parties involved in forecasting process, enhancing team spirit, encouraging coordination and developing a broader and clearer vision of the firm's goals and objectives. Meanwhile, forecasting process helps a manager to identify "weak points" enabling her to effectively manage and deal with them [20].

Financial institutions (and of course, other non-financial firms as well) typically make four kinds of forecasts:

- *Competition forecast*, assessing future moves and tactics of competitors on the market;
- *Technological forecast,* following evolution dynamics of innovations and technological advances;
- *Social forecasts*, studying customers' behavior, taste and sentiment;
- *Economic/financial forecast*, evaluating and predicting financial performance indicators, as well as industrial/macroeconomic indicators.

From practical point of view, the most effective one among aforementioned forecasting activities is *economic/financial forecasting*, as long as it is based on a quantitative framework, results in unambiguous conclusions and therefore, is one of the most important components in decision-making process. It also makes it possible to clearly define different scenarios and analyze possible developments. In addition, as is well known, communication of a quantitative forecast is much easier and more productive compared with the alternative – an expert judgment – because the latter is excessively dependent on the forecaster's subjective beliefs and at the same time, it does not allow elimination of systematic forecast errors since it is usually unknown how data were used in assessments.

As noted above, facing the new requirements under IFRS 9 to use more forward-looking information in credit loss assessments, financial institutions are expected to rely more on *macroeconomic forecasts*. Importance of such forecasts stems from the fact that macroeconomic stance shapes business environment and may significantly affect future business activity.

Typically, business environment is influenced by the following 6 basic macroeconomic indicators:

- Current and expected growth of gross domestic product (GDP);
- Changes in price level and expected inflation
- Trend in total savings
- Rate of unemployment
- Government macroeconomic policy
- Economic and financial environment overseas

Current and expected GDP growth causes changes in demand for a firm's goods and services as far as, on one hand, it is in fact in line with income dynamics of existing and potential consumers. Also, its positive and negative trend significantly influences expectations and purchasing decisions of customers in the economy. On the other hand, consumption is a major component of a country's GDP (70 %-90 %), the dynamics of which, obviously, represents valuable information for consumer product manufacturers in learning behavior, choices and decisions of buyers.

Growth of total savings means for business entities a greater access to financial capital with favorable conditions. This primarily refers to interest rates, which typically fall in times of excess savings. In contrast, scarcity of total savings increases the cost of financial resources and deteriorates credit conditions.

Low inflation, which is seen as an evidence for price stability in a macroeconomic sense, is an important factor for sustainable business environment. In particular, low-inflation helps economic agents avoid volatility, thus facilitating optimal decision-making and planning, and reduces costs related to uncertainty. In contrast, high inflation (or high deflation) creates additional uncertainty and impediments both for firms and consumers.

Unemployment rate in a country, as a rule, is a less relevant indicator shaping business environment in the short term; however, in longer term, high unemployment has a negative impact on consumer demand even in case of high GDP growth rates. Note that if GDP growth is not inclusive, typically it is not associated with job growth and income growth among population.

The macro-economic policies, including monetary, fiscal and structural policies, are one of the most important factors in forming business environment. Economic-cycle-adjusted monetary and fiscal policies, as well as the optimal structural reforms significantly contribute to entrepreneurial activity and boost expectations among economic agents.

Foreign economic and financial developments are vital for sustainable growth of international trade and global financial integration. Unsurprisingly, a firm, which has close ties with export markets and foreign capital markets, is potentially very sensitive to developments in the international arena. A firm's competitiveness is influenced by dynamics of foreign demand, interest rates on attracted foreign resources, exchange rates, etc.

Recently, macroeconomic forecasts have raised particular interest among financial enterprises. Under the new International Financial Reporting Standards (IFRS), accounting rules for financial instruments are set to be altered substantially from 2018. In particular, IFRS 9, which lists the standards for classification and measurement of financial instruments, as well as impairment of financial assets and hedge accounting, introduces a new approach based on more forward-looking information to account for expected credit losses. In other words, these standards require that the loss be recognized not after a credit event but before it – at the very moment of originating a debt-type instrument (the so-called "day one loss"). This in principle means that a bank, while concluding a financial contract, instantly recognizes the "expected" credit loss from it and is not "waiting" for any credible evidence of a credit event (for example, a loan payment past due). This also means that the bank should use all available forward-looking information to assess the potential credit losses and make reasonable predictions of factors that could potentially affect future cash flows from the financial instrument (IFRS 9 Financial Instruments, 2014). Therefore, financial institutions are expected to intensify forecasting activities and extensively rely on projections made through various models.

In this paper, we construct a macroeconomic model for Georgian economy with few variables believed to be shaping business environment (see *Model Description, Data and Diagnostics* section), and carry out scenario generation to analyze likely developments. As noted in IFRS staff paper on incorporation of forward-looking scenarios [13], "relatively simple modelling may be sufficient without the need for a large number of detailed simulations of scenarios", so, we intentionally maintain a rudimental (but straightforward) set-up of the model and scenarios. In particular, we produce conditional forecasts of key macroeconomic variables in vector autoregressive (VAR) framework with Bayesian estimation approach, and construct three types of scenarios – a baseline and two alternative ones.

The paper is organized as follows. The following section makes a literature review focusing on accumulated knowledge in macroeconomic forecasting. The methodology section describes the tools and technique employed in estimation and forecasting exercise. Next, model properties and data are described. The results section provides quantitative outcomes of unconditional and conditional forecasts of key macroeconomic variables along with fan charts. The last section concludes.

**Literature Review.** Forecasting has been emerging as a necessary tool for economic experts along with the development of macroeconomic analysis. In particular, strengthening Keynesian school in academic circles after World War II substantially raised interest in forecasting instruments. In this respect, two fundamental works – Klein (1946) and Klein and Goldberger [14] – should be noted. These works were the first attempt to model Keynesian economy with mathematical apparatus – systems of linear equations. Later, Brookings Institute (USA) developed a relatively sophisticated and complex econometric model which consisted of about 400 equations with vast computer resources having been spent on it (Fromm and Klein 1965). These developments made it particularly relevant to produce official forecasts on a regular basis in the US, Great Britain and the Scandinavian countries.

At the end of the 60s, in academic circles, certain skepticism emerged towards traditional linear equations systems based on Keynesian models. The three main reasons are believed to have caused this: 1) the structural Keynesian models had ambiguous microeconomic fundamentals (Phelps 1970), which made the interaction of variables in the model suspicious; 2) models relied on unrealistic adaptive expectations concept while rational expectations idea gradually was becoming more convincing to researchers [21] 3) conventional rule-based decision-making analysis turned out to be flawed in producing conditional forecast after publication of a classic work by Robert Lucas [18] (known as the "Lucas critique"), because parameters involved in decision-making practices changed with the change in policy. That was when the concept of the so-called "Fundamental Parameters" emerged and based on this concept a new trend in macroeconomic modeling developed.

With decreasing popularity of structural Keynesian macroeconomic models, non-structural models started to enjoy growing interest in academic circles. Non-structural models were predicting variables based on autoregressive and moving average processes rather than within theoretical macroeconomic framework. Sims [22] developed vector-autoregressive (hereinafter – VAR) modeling framework, which, with different modifications, has been extensively used for forecasting purposes. The essential feature of the methodology is that in contrast to the structural framework, the variables are no longer separated as "exogenous" (Independent) and "endogenous" (dependent). Under this approach, each variable is modeled based on both its own historical path and other lagged variables, with some error terms accounted for. By avoiding "unrealistic structural assumptions" [2], VAR models turned out to be the most efficient among existing alternatives (Diebold 1998). In James Hamilton's famous book [12] on time series analysis the nature of vector-autoregressive models was described in detail and also, structural vector-autoregressive models were extensively discussed. The latter enables a researcher to take into account the structural relationships between variables while setting up a VAR model. However, as it turned out later, this approach may be accompanied by two significant obstacles. First of all, due to the abundance of the estimated parameters, a VAR model may face a problem of insufficient degrees of freedom, which, on the one hand, is caused by a multitude of variables, and on the other hand, increasing lags in the specification (so-called overfitting). This leads to the fact that the instead of estimation of parameters a simple description the data is carried out, and the model at least loses its abilities to produce reasonable forecast.

Litterman [17] proposed a Bayesian methodology which seemed to offer a workaround of overfitting problem. According to this approach, as far as a structure of true population parameters in a VAR model is vague, it is better not to put great importance (weight) on a specific value of the model parameter (for example, by restricting coefficients to zero). Instead, the vagueness of the model parameters is recommended to describe with the so-called *prior probability distribution*. As a result, the initial degree of uncertainty, given with the prior, can be improved by information coming from data. In this case, the improvement is carried out from a "signal" and not from "noise", which provides reduction in overfitting risk. It is vital to accurately select a prior and the Litterman approach offers specific rules for forming it. It is believed that due to above-mentioned reasons, Bayesian vector-autoregressive models (BVAR) perform much better in terms of forecasting than the classic reduced-form VAR alternatives or structural models [2].

Abundance of estimated parameters, of course, limits the possibility to include desired number of variables into classical VAR model. The Bayesian approach successfully copes with this problem. In a paper published by the European Central Bank [1], it is clearly shown that with a proper selection of prior probability distribution for parameters, BVAR represents a powerful forecasting tool for large data panels from developed economies. The same study indicates that valuable alternatives in terms of performance are only *factor models*, whose structure is based on the assumption that large data sets can be described through relationships among a few common factors (see e.g. [7]). However, in-sample and out-of-sample forecasting results suggest that BVAR generally is a better choice even when considering factor-augmented Bayesian VAR model (so-called BFAVAR). In recent years, a rich volume of publications accumulated that address various aspects of Bayesian VAR modeling. Some of them are worth noting. Korobilis [16] finds that Bayesian variable selection methods can be used to find restrictions based on the evidence in the data, and at the same time improve over the forecasts of unrestricted VAR models as well. A paper by Koop [15] develops a mechanism that solves certain computational and theoretical issues when the undertaken model is large.

It should be noted that of course, structural econometric models still continue to play significant role in forecasting practices, and in this regard, it is important to mention dynamic stochastic general equilibrium models (DSGE). The framework of such model was first proposed in a seminal work by Rotemberg and Woodford [19], and it gained substantial popularity since the publication of a paper by Galí

and Monacelli [9]. This model has many uses in central banks' policy analysis and medium and long term projections; however, forecasting quality does not exceed that in BVAR alternatives (see e.g. Coenen and Warne [4], and Wickens [24]). In addition, DSGE modeling requires a lot of intellectual resources and costs are justified only in cases when it is used by monetary or fiscal bodies to carry out fundamental macroeconomic analysis [23].

**Methodology.** In this paper, we employ the idea of *conditional forecasting* through a vector autoregressive (VAR) modeling framework. By construction, a VAR model captures all the dynamic interlinkages among the variables included in the model. Therefore, estimated parameters and error covariance can be used to construct forecast paths for these variables both unconditional and conditional on assumed trajectory of a variable (or a set of variables). For clarity, suppose a forecaster expects the monetary policy rate to remain unchanged for the following time periods. Obviously, the model forecasting procedure is required to incorporate this condition in future projections of the variables as unconditional evolution of the system might be well different from that one conditioned on constant interest rate path due to existing correlations among the macroeconomic variables. Meanwhile, conditioning technique not only helps increase the overall forecast accuracy whenever conditioning information turns out to be correct ex post, it also allows for a variety of scenarios to be generated and analyzed.

In essence, the scenario generation in this paper will be implemented through reduced-form VAR model and will rest on all the reduced-form innovations that are compatible with imposed conditions. Hence, we intentionally avoid the task of identification of any structural shocks and maintain the simplicity of the framework without a loss of performance. [6;1].

Since the seminal work of Sims [22], VAR models have gained considerable popularity in modern macroeconomics having been used primarily for forecasting purposes. However, these models proved to be rather uneconomical in the sense that faced with a large set of parameters to estimate (which is typical even in case of small VARs), one needs to employ a sufficiently long time series. Scarcity of data exerts a negative impact on the accuracy of model parameter estimates and, of course, casts doubt on the credibility of the projected results [5]. For example, most of the macro-economic data in Georgia are only available from the years 1996-2000 for obvious reasons, and at the same time, the majority of them are reported in yearly or quarterly frequency. Consequently, the existing volume of data makes it almost impossible to properly estimate a standard reduced-form VAR model that contains three or more endogenous variables. This has an adverse effect on intentions of business forecasters to include all the relevant variables from their desired set of macro- and industry-specific variables.

As noted above, although a traditional VAR modeling may yield inaccurate estimated dependencies between the variables, it may perfectly fit the data (the so-called *overfitting*) solely due to the fact that the model simply contains many variables. In general, the number of estimated parameters increases geometrically in relation to the number of variables and proportionately to the number of lags. In this case, often there is a situation in which the estimators are influenced by the "noise" and not the informative "signal" coming from data. In this situation it is recommended to impose certain restrictions to reduce the parametric space and therefore, the question is how to construct effectively a procedure for setting up appropriate restrictions.

Obviously, the problem of overfitting could be solved with imposing zero restrictions on model parameters. However, Litterman [17] proposed an alternative. According to his judgement, as far as a researcher cannot be completely sure that a particular model coefficient is exactly trivial, he should not ignore the possible variation of the corresponding variable. For this reason, instead of focusing on specific values, the uncertainty around the true magnitude of a parameter can be described with a (prior) probability distribution. Further, the degree of uncertainty can be substituted by the information that comes as a "signal" from the data eventually resulting in posterior probability distribution. Since the procedure reflects a well-known *Bayes Rule* in statistics, VAR models employing this approach have been named *Bayesian*.

**Bayesian Estimation of a VAR Model with Litterman Prior.** Consider a typical reduced-form VAR:

$$Y_t = B_1 Y_{t-1} + B_2 Y_{t-2} + ... + B_p Y_{t-p} + D z_t + u_y \quad t = 1,...,T \qquad (1)$$

where $Y_t$ is an $n \times 1$ vector of endogenous variables and $u_t$ is an $n \times 1$ vector of residuals. The latter is distributed identically, normally and independently with variance-covariance $n \times n$ matrix $V$, and $B_l, L = 1,2,...,p$ and $D$ are $n \times n$ and $n \times d$ matrices, respectively. $z_t$ is a $d \times 1$ vector of exogenous variables.

(1) can be rewritten into a more compact form:

$$Y_t = X_t \beta + u_t, \qquad t = 1,...,T \qquad (2)$$

where $X_t = L_n \otimes W_{t-1}$ is an $n \times nk$ matrix ($k = np + d$), $W_{t-1} = (Y'_{t-1},...,Y'_{t-p}, z'_t)'$ is an $k \times 1$ vector, and $\beta = vec(B_1, B_2,..., B_p, D)$ is an $nk \times 1$ vector. (Symbol $\otimes$ stands for the Kroneker product of matrices; *vec* is vectorization operator creating a column vector from a matrix by stacking its column vectors below one another). The unknown parameters to be estimated are $\beta$ and $V$.

The conditional probability density function (pdf) of the parameters given the data $Y$, according to the Bayes Rule, is

$$f(\beta, V \mid Y) = \frac{f(\beta, V, Y)}{f(Y)} = \frac{f(Y \mid \beta, V) f(\beta, V)}{f(Y)}$$

Note that $f(Y \mid \beta, V)$ is simply a likelihood function, $L(Y \mid \beta, V)$, and $f(Y)$ does not depend on parameters. Therefore, the conditional probability density function of the parameters given the data (called the *posterior pdf*) is proportional to the product of the likelihood of the data given the parameters and the pdf of these parameters (called the *prior pdf*):

$$f(\beta, V \mid Y) \propto L(Y \mid \beta, V) f(\beta, V)$$

The posterior density $f(\beta, V \mid Y)$ summarizes all the information known about the parameters after observing the data and consequently, can be used to derive point estimators for $\beta$ and $V$ (for example, by simply taking the mean of $f(\beta, V \mid Y)$). In turn, a *prior density* $f(\beta, V)$ represents subjective beliefs (or complete ignorance) of a researcher about the parameters before observing the data. The choice of a prior distribution is a significant step in setting up of the model. There are a number of alternatives proposed in the academic literature; however, in this paper we follow the technique called Litterman (Minnesota) prior as this prior is relatively simple to implement.

Under Litterman approach, the prior distribution reflects three statistical properties of macroeconomic time series:

A. Macroeconomic time series are characterized by a trend;

B. The data from the recent past contain more valuable information about the current state of a variable rather than distant ones;

C. Own past values contain much more information about the current state of a variable than values of other variables from the same past time period.

Bayesian VAR modeling implements aforementioned statistical properties through the following restrictions (as we will see below, these restrictions are technically implemented by the so-called hyper-parameters, each of which bears a defined function):

A. Expected value of all lag coefficients other than the first lag is set to zero;

B. Variance of coefficients is inversely proportional to the order of the lag;

C. Coefficients have more prior variance in own equation than in other equations.

Consider the $m$-th $(1 \le m \le n)$ equation from (2) after stacking the observations from 1 to $T$:

$$Y_m = X\beta_m + u_m, \quad 1 \le m \le n$$

where $\beta_m$ are the $k \times 1$ parameter vector of the $m$-th equation, $Y_m$ and $u_m$ are $T \times 1$ vectors, and $X$ is a stacked $X_t$. Litterman (1986) proposes a multivariate normal prior distribution for $\beta_m$,

$$\beta_m \sim N(\beta_m^*, \Omega_m^*),$$

with prior mean, $\beta_m^*$, and diagonal covariance matrix of $\beta_m, \Omega_m^*$.

Next, some restrictions are imposed in order to specify $\beta_m^*$ and $\Omega_m^*$. The *hyper-parameter*, $\lambda_1$, reflects the restriction A (noted above) and represents the prior mean of the coefficient on the first lag of the endogenous variable in equation $m$; the prior parameter vector becomes $\beta_m^* = (0, 0, \ldots \lambda_1, 0, 0)$ with $\lambda_1$ standing on the $m$-th position. $\lambda_2$ reflects the restriction B and characterizes a lag-decay of the prior variance of coefficients. The restriction C is implemented through the hyper-parameter $\lambda_3$. There are three more hyper-parameters, $\lambda_4, \lambda_5$ and $\lambda_6$, which control the tightness of lags of the endogenous variable, the degree of uncertainty on the coefficients of the deterministic and/or exogenous variables in equation $m$, and overall tightness, respectively. Formally, diagonal elements of $\Omega_m^*$ are derived as follows:

$$\text{var}(\beta_m^*) = \begin{cases} \dfrac{\lambda_6 \lambda_4}{l^{\lambda_2}}, \text{ for } m-\text{th lagged endogenous variable} \\ \dfrac{\lambda_6 \lambda_3}{l^{\lambda_2}} * \dfrac{\sigma_{mm}}{\sigma_{jj}}, \text{ for } j-\text{th lagged endogenous variable} \\ \lambda_6 \lambda_{5\sigma} \sigma_{mm}, \text{ for deterministic and exogenous variable} \end{cases}$$

where $l = 1, \ldots, p$.

Next, error covariance matrix in (2) is assumed fixed and diagonal: $V = \sigma_{mm}^2 I_T$ (this means that the only parameters to be estimated are $\beta$).

As a result, the posterior density for $m$-th equation coefficients takes the form:

$$f(\beta_m \mid Y) = N(\hat{\beta}_m, \hat{\Omega}_m),$$

where the posterior variance, $\hat{\Omega}_m$, is

$$\hat{\Omega}_m = (\Omega_m^{*\,-1} + \sigma_{mm}^{-2} X'X)^{-1}$$

and the posterior mean, $\hat{\beta}_m$, is

$$\hat{\beta}_m = \hat{\Omega}_m (\Omega_m^{*\,-1} \beta_m^* + \sigma_{mm}^{-2} X'Y_m)$$

Since hyper-parameters mostly are responsible for controlling the tightness of the variance of model coefficients, the technique is usually referred as *Bayesian shrinkage*.

**Scenario Generation**. We find it sufficient to construct three types of scenarios under Bayesian VAR framework: baseline, pessimistic and optimistic. In practice, one can pick an unconditional forecast for the baseline scenario since the former corresponds to the forecast assuming no explicit restrictions on future evolution of the system. On the contrary, a pessimistic scenario can be built upon the assumption that macroeconomic situation is worse than projected by the baseline. Typically, this might be implemented through assigning lower values to the GDP growth variable via conditioning mechanism. The set-up of an optimistic scenario would be straightforward.

**Model Description, Data and Diagnostics.** We set up a 6-variable and 2-lag quarterly VAR model and apply Bayesian estimation technique to the parameters. The following priors were used (the parametrization is similar to the one commonly used in empirical literature):

- white-noise prior: $\lambda_1 = 0$;
- lag-decay prior: $\lambda_2 = 1$;
- restriction C prior: $\lambda_3 = \sqrt{12}$;
- other priors: $\lambda_4 = \lambda_5 = \lambda_6 = 1$.

The database, employed in the estimation procedure, includes both monthly and quarterly data. The Consumer Price Index (CPI) is constructed and provided by the National Statistics Office of Georgia. The index is computed at monthly frequency and the base date is 2010. The data are available since January 2000. The policy rate is a short-term refinancing rate set by the National Bank of Georgia and is considered a reference point for market rates. The data on it is in monthly frequency starting from January 2008. The data on Lari/US Dollar exchange rate are provided by the National Bank of Georgia at monthly frequency (monthly averages) starting from September, 1995. Money remittances are the inflows measured in US dollars and compiled by the National Bank of Georgia at monthly frequency starting from January 2000. Exports are measured in US dollars and provided by the National Statistics Office of Georgia at monthly frequency starting from January 1995. Real GDP volumes are available from Q1 2003 and are calculated at constant 2010 prices by the National Statistics Office of Georgia.

The monthly data are converted into quarterly via averaging and year-on-year growth rates are computed (except for the interest rate). The estimation procedure exploits the following set of variables:

- Real GDP Y/Y Growth
- Headline Y/Y Inflation (based on CPI)
- Policy Rate
- GEL/USD Exchange Rate Y/Y Change
- Remittances Y/Y Growth
- Exports Y/Y Growth

Since the data panel is unbalanced (ragged-edge data) we first estimate the model on balanced panel, i.e. over the range where data points for all the variables are available.

Then, the periods with missing observations are fitted through conditional forecasting.

Bayesian shrinkage results in the eigenvalues lying inside the unit circle which is an evidence of VAR stability (see Fig. 1).

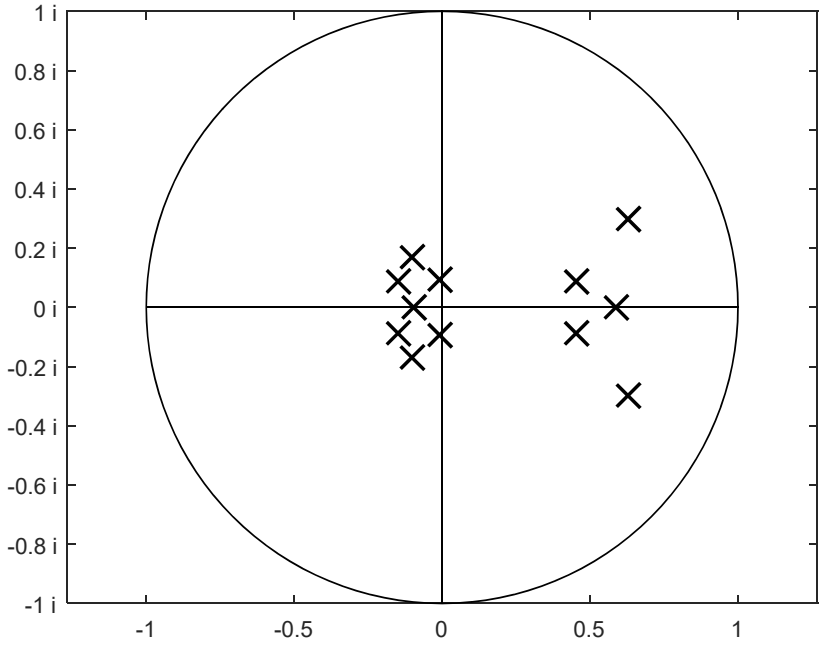


**Fig. 1. Eigenvalues of the BVAR model**

In order to assess forecasting performance of the BVAR model, we undertake an *out-of-sample forecasting analysis*. We divide the sample period by *estimation* and *validation* sub-samples. The estimation sub-sample is used for estimating model parameters and validation sub-sample serves as a source for computing forecast errors. The division procedure starts in 2012Q3, the BVAR model is estimated and a forecast for 8 subsequent periods is made. The differences between actual and predicted values on the validation range are saved. The procedure moves to 2012Q4 and repeats estimation/validation steps. Eventually, after iterating through all possible estimation samples, root mean squared forecast errors (RMSFE) are computed for each 1-, 2-, …, 8-quarter horizons to assess forecasting performance over different time spans. In Table 1 below, computed RMSFEs are compared to the same forecast error metrics of a Random-Walk model (which represents a naïve alternative of the form $Y_t = Y_{y-1} + w_t$) by taking a ratio of the former to the latter. As can be seen from the table, BVAR generally performs better than the counterpart.

***Table 1.*** **Ratio of BVAR Model RMSFE to Random-Walk Model RMSFE**

| | 1-q | 2-q | 3-q | 4-q | 5-q | 6-q | 7-q | 8-q |
|---|---|---|---|---|---|---|---|---|
| Real GDP Y/Y Growth | 0.65 | 0.83 | 0.7 | 0.73 | 0.44 | 0.41 | 0.41 | 0.39 |
| Headline Y/Y Inflation (based on CPI) | 1.04 | 0.88 | 0.75 | 0.57 | 0.37 | 0.19 | 0.2 | 0.26 |
| Policy Rate | 0.95 | 0.85 | 0.78 | 0.66 | 0.73 | 0.71 | 0.63 | 0.69 |
| GEL/USD Exchange Rate Y/Y Change | 1.06 | 1.11 | 0.94 | 1.02 | 0.91 | 0.9 | 0.85 | 0.82 |
| Remittances Y/Y Growth | 0.74 | 0.8 | 0.67 | 0.52 | 0.35 | 0.33 | 0.3 | 0.27 |
| Exports Y/Y Growth | 0.94 | 0.75 | 0.71 | 0.65 | 0.6 | 0.67 | 0.54 | 0.5 |

**Results**. The scenario generation results are summarized in the form of point forecasts of key macroeconomic variables – the GDP growth, the headline inflation, the policy rate and the GEL/USD exchange rate depreciation – below in Table 2 Fig. 2 depicts the probability distribution of baseline forecasts.

**Baseline Scenario**. As noted, the *baseline* scenario corresponds to the unconditional forecast of the macroeconomic variables included in the model. Under this scenario, predicted real GDP growth in 2017 on average stands at 3.7 % which is slightly below the consensus forecast of 4.0 % (IMF, 2016), and the headline inflation is projected to reach almost 3.0 % by end-2017 – the figure to be set as an inflation target for 2018 by the National Bank of Georgia. The monetary policy eases throughout 2017 as the policy rate decreases roughly by 1pp and floats near the neutral one (the neutral rate is estimated between 5.5 % and 6.0 % by the National Bank of Georgia). The Georgian Lari depreciates against the US dollar by annual 6.0 %.

*Table 2.* **The Scenarios for Key Macroeconomic Variables**

| | | Real GDP Growth, % | | | Headline Inflation, % | | | Policy Rate, % | | | GEL/USD exchange rate, change, % | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *Baseline* | *Optimistic* | *Pessimistic* | *Baseline* | *Optimistic* | *Pessimistic* | *Baseline* | *Optimistic* | *Pessimistic* | *Baseline* | *Optimistic* | *Pessimistic* |
| 2017 | Q1 | 3.26 | 3.80 | 2.60 | 1.91 | 1.80 | 2.05 | 5.81 | 5.80 | 5.83 | 2.55 | 2.07 | 3.19 |
| | Q2 | 3.56 | 4.70 | 2.40 | 2.43 | 2.25 | 2.57 | 5.58 | 5.58 | 5.60 | 4.00 | 3.02 | 5.36 |
| | Q3 | 3.85 | 4.60 | 2.50 | 2.72 | 2.71 | 2.80 | 5.52 | 5.52 | 5.52 | 5.34 | 3.90 | 7.27 |
| | Q4 | 3.99 | 4.90 | 2.50 | 2.98 | 2.92 | 3.09 | 5.55 | 5.56 | 5.53 | 6.14 | 4.75 | 8.22 |
| 2018 | Q1 | 4.04 | 4.44 | 3.37 | 3.18 | 3.19 | 3.15 | 5.62 | 5.62 | 5.60 | 6.53 | 5.29 | 8.49 |
| | Q2 | 4.02 | 4.22 | 3.67 | 3.32 | 3.31 | 3.31 | 5.69 | 5.69 | 5.69 | 6.66 | 5.78 | 8.09 |
| | Q3 | 3.95 | 4.05 | 3.79 | 3.40 | 3.36 | 3.44 | 5.75 | 5.74 | 5.76 | 6.67 | 6.13 | 7.57 |
| | Q4 | 3.88 | 3.92 | 3.81 | 3.43 | 3.38 | 3.50 | 5.79 | 5.78 | 5.82 | 6.65 | 6.35 | 7.15 |
| 2019 | Q1 | 3.81 | 3.83 | 3.77 | 3.43 | 3.39 | 3.50 | 5.82 | 5.80 | 5.85 | 6.63 | 6.50 | 6.87 |
| | Q2 | 3.75 | 3.77 | 3.72 | 3.42 | 3.39 | 3.48 | 5.83 | 5.81 | 5.86 | 6.64 | 6.59 | 6.73 |
| | Q3 | 3.71 | 3.73 | 3.69 | 3.41 | 3.38 | 3.45 | 5.83 | 5.82 | 5.86 | 6.65 | 6.64 | 6.67 |
| | Q4 | 3.69 | 3.71 | 3.66 | 3.39 | 3.38 | 3.41 | 5.82 | 5.82 | 5.85 | 6.68 | 6.68 | 6.67 |
| 2020 | Q1 | 3.67 | 3.69 | 3.65 | 3.38 | 3.38 | 3.39 | 5.82 | 5.82 | 5.84 | 6.70 | 6.71 | 6.69 |
| | Q2 | 3.66 | 3.68 | 3.64 | 3.38 | 3.38 | 3.38 | 5.81 | 5.82 | 5.83 | 6.72 | 6.72 | 6.71 |
| | Q3 | 3.66 | 3.67 | 3.64 | 3.37 | 3.38 | 3.37 | 5.81 | 5.82 | 5.83 | 6.74 | 6.73 | 6.73 |
| | Q4 | 3.64 | 3.66 | 3.62 | 3.37 | 3.37 | 3.37 | 5.79 | 5.83 | 5.83 | 6.74 | 6.74 | 6.75 |

**Optimistic Scenario.** Under the optimistic scenario, we condition the forecast on higher GDP growth than that obtained in the baseline and compare results with the latter. In particular, the growth in 2017 is set to 4.5 % on average [11]. As one can imply from Table 2, headline prices rise at a slightly lower rate while the Lari depreciation is not as large as in the baseline. The policy rate is virtually analogous to the baseline figures.

**Pessimistic Scenario.** Under the pessimistic scenario, the GDP is set grow at 2.5 % on average in 2017. This condition is associated with higher headline inflation and Lari depreciation. The policy rate path is again broadly similar to that in the baseline.

**Fan charts.** A fan chart is a common way in finance and monetary policy to visualize probability distribution of forecasts. Below in Fig. 2 we present fan charts of the forecasts for GDP growth, headline inflation, policy rate and GEL/USD exchange rate depreciation under the baseline scenario. The mean forecasts (i.e. the point forecasts) are given by a solid line. Above and below the line, the colored shapes indicate intervals based on forecast standard deviations multiplied by factors of 0.1, 0.25, 0.5, and 0.75.

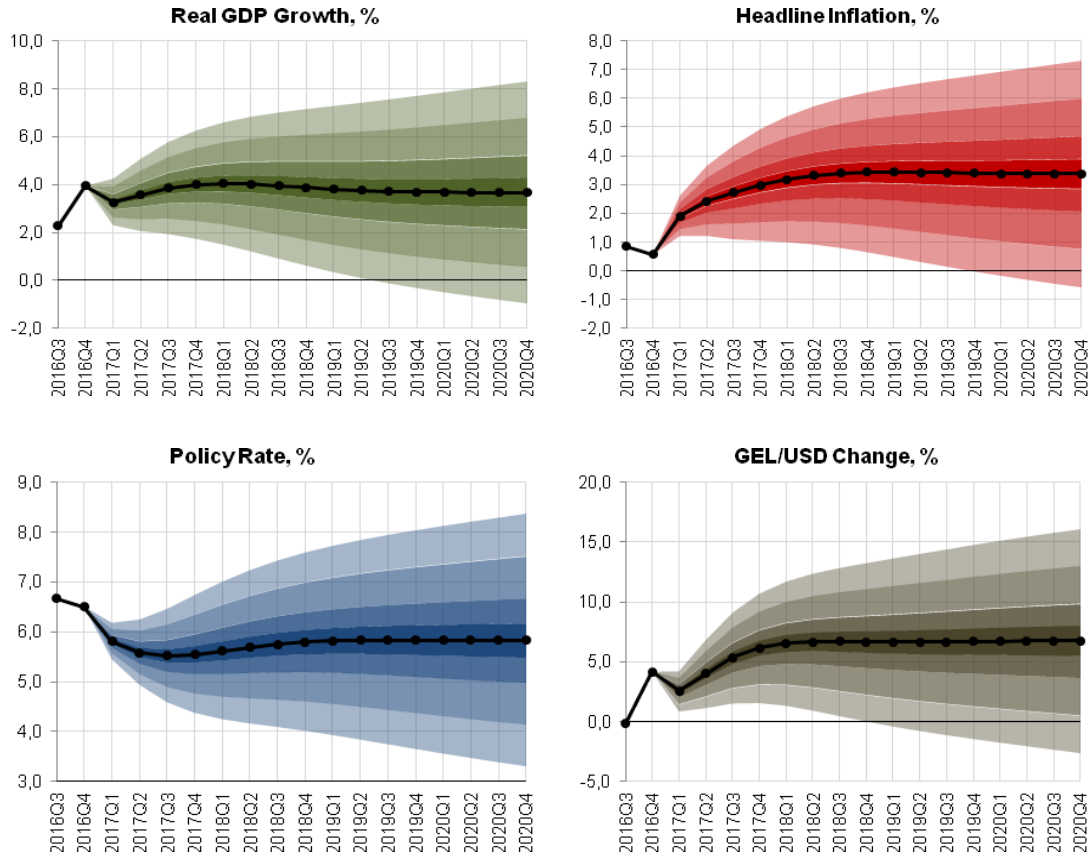


**Fig. 2. Fan Charts of Key Macroeconomic Variables**

**Conclusion.** This paper proposes a flexible and efficient way of generating macroeconomic scenarios based on unconditional and conditional forecasts. The technique is based on Bayesian VAR framework which is viewed as a convenient tool to produce accurate predictions. The baseline scenario forecasts are broadly in line with consensus forecasts by such renowned institutions as the International Monetary Fund, the Asian Development Bank, the National Bank of Georgia, etc. The technique might be particularly useful to financial institutions which are required to incorporate more forward-looking information while making all necessary adjustments to accounting rules of financial instruments under the new IFRS standards. The framework involves a model consisting of six macroeconomic variables; however, it would be a reasonable direction of further research to extend the model over any desired set of factors enabling an investigator to make more inclusive forecasts.

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## МАКРОЕКОНОМІЧНЕ ПРОГНОЗУВАННЯ З ВИКОРИСТАННЯМ БАЙЄСІВСЬКОГО ПІДХОДУ ДО ВЕКТОРНОЇ АВТОРЕГРЕСІЇ

***Є багато аргументів, які можуть бути висунуті для підтримки прогнозування діяльності господарюючих суб'єктів. Основним аргументом на користь прогнозування є те, що управлінські рішення у значній мірі залежать від правильної оцінки майбутніх тенденцій, оскільки ринкові умови постійно змінюються і вимагають детального аналізу майбутньої динаміки. У статті розглянуто важливість використання розумного макроеконометричного інструменту, запропонувавши ідею умовного прогнозування за допомогою системи моделювання векторної авторегресії (VAR). У межах зазначеної структури, макроекономічна модель економіки Грузії будується з кількома змінними, як прийнято вважати, формування бізнес-середовища. На основі моделі вироблено прогнози макроекономічних показників і проаналізовано три типи сценаріїв – базовий рівень і два альтернативних із них. Результати дослідження надають підтверджуючі докази того, що запропонована методика адекватної адресації дослідного феномена може широко використовуватися господарюючими суб'єктами в задоволенні своїх стратегічних та оперативних завдань планування. З огляду на цю настанову, емпірично доведено, що байєсівський підхід до векторної авторегресії дає обґрунтовані прогнози для змінних, що представляють інтерес.***

***Ключові слова: прогнозування, макроекономічне моделювання, байєсівська VAR, Litterman сценарій, сценарний аналіз, IFRS 9.***

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## МАКРОЭКОНОМИЧЕСКОЕ ПРОГНОЗИРОВАНИЕ С ИСПОЛЬЗОВАНИЕМ БАЙЕСОВСКОГО ПОДХОДА К ВЕКТОРНОЙ АВТОРЕГРЕССИИ

***Есть много аргументов, которые могут быть выдвинуты для поддержки прогнозирования деятельности хозяйствующих субъектов. Основным аргументом в пользу прогнозирования является то, что управленческие решения в значительной степени зависят от правильной оценки будущих тенденций, поскольку рыночные условия постоянно меняются и требуют детального анализа будущей динамики. В статье рассматривается важность использования разумного макроэконометрического инструмента, предложена идея условного прогнозирования с помощью системы моделирования векторной авторегрессии (VAR). В рамках этой структуры, макроэкономическая модель экономики Грузии строится с несколькими переменными, как считается, формирования бизнес-среды. На основе модели произведено прогнозы макроэкономических показателей и три типа сценариев анализируются – базовый уровень и два альтернативных из них. Результаты исследования дают подтверждающие доказательства того, что предложенаяметодика адекватной адресации исследовательского феномена может широко использоваться хозяйствующими субъектами в удовлетворении своих стратегических и оперативных задач планирования. Учитывая эту установку, эмпирически показано, что байесовский подход к векторной авторегрессии дает обоснованные прогнозы для переменных, представляющих интерес.***

***Ключевые слова: прогнозирование, макроэкономическое моделирование, байесовская VAR, Litterman сценарий, сценарный анализ, IFRS 9.***

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# TECHNOLOGY-CHANGE CHANGES: IMPLICATIONS FOR UNIVERSITIES AND R&D-SECTOR

***Technology change and the resulting increase in labour's productivityis the major contribution of bourgeoisie. Yet, as the path and the velocity of technology's evolution changes, the phenomenon induces systemic modifications challenging the very nature of capitalism itself. This in turn alters the role of the R&D and academic institutions in the modern society. The present paper contributes to this discussion. We follow a theoretical framework that combines epistemological and economic growth theories in order to suggest the induced changes. Next we discuss the modern role of academia and R&D. We conclude by presenting hypotheses for further research and discussing the induced policy implications.***

***Keywords: technology change, role of Academia, role of R&D-sector.***

**Introduction.** Knowledge is the driving force of the human society. Knowing the way how human knowledge evolves is therefore a main issue in ecumenical philosophic discussion.

Epistemology developed two main rival approaches: on the one hand the traditional Anglo-Saxon view, where the sense of (quasi-) linear continuity prevails: the "new" arises upon (and not aside) the "old", having neither "all-embracing" retrospections, nor "shooting stars".

In the post-war period, "logical empiricism" – the tradition that was developed by the "Vienna Circle"(Schlick, Waismann, Neurath, Hahn and Carnap) and builds upon the critical assimilation of the work of Russel and Whitehead [16] and Wittgestein [17]. – becomes the main philosophic trend in the Anglo-Saxon area. Science is purely a connotative procedure: based on simple empirical generalizations; theoretical terms first and then theoretical laws can be developed. The evolution of knowledge is a **continuous, accumulative process**. The progression of attested theories succeeds through the integration of an older theory in the wider spectrum of a new one. (This is the core of the theory of "Reduction" – Nagel [9]).

In contrast, there is the range of non-linear considerations, stretching from chaotic modeling of stochastically emerging evolutionary ideas to the endogenously generated sequence of longer lasting scientific paradigm shifts.

In the sixties, the dominance of "logical empiricism" has been hardly contested. The book of Kuhn, "The Structure of Scientific Revolutions" [7], can be considered as the turning point in modern epistemology. According to the new current, the extreme positivistic approach is misleading; in order to support a primitive empiricism it sacrifices the main factor of scientific evolution, namely the creativity and imagination of the researcher. The development of science is not a linear accumulative process, but it is a complex phenomenon, with phases of continuity and discontinuity, with deep, radical revisions and breaks. (The contribution of the development of the "history of science" as a separate field by Alexandre Koyrè and Herbert Butterfield in 1959 was very crucial for this recognition.)

Kuhn's basic perception is that the scientific ideas of each epoch are being structured in a sovereign system, which cannot be evaluated on the basis of the contemporary criteria and values. The evolution of science is a **radical, discontinuous succession of violent turnovers**. "Normal science" is the daily activity of a "scientific community" that adopts a specific paradigm – a network of theoretical assumptions, terminology and methodological principals, as well as social and ethical values. It means the confrontation of this scientific community with issues and questions that may arise, by making use of the existing, approved paradigm. As "normal science" evolves, "abnormalities" are being accumulated. Sooner or later, a period of "extraordinary science" is setting up, meaning the confrontation of contradictory "paradigms". This period of crisis results in a "scientific revolution", meaning the domination of a new paradigm, authorized through its generalized acceptance by a new scientific community. A new period of "normal science" will be initiated, where polemic is cooling down, social creativity is being canalized again and scientific productivity is blowing up.

The influence of the pre-existing "logical empiricism" is obvious, as Kuhn recognizes the period of "normal science" as the one where actual science is fruitfully developed. It is also quite interesting that Schumpeter [12] uses a similar schema in order to describe the historical evolution of different schools in economics. He also understands the development of economic ideas as non-linear: a succession of revolutionary periods, "classical" periods and periods of confusion. For a discussion of the application of Kuhn's framework in the history of economic thought look also Blaug [2] and Hutchison [4].

Standard economic growth literature, specifically endogenous growth theory, contributes to the above discussion, as the evolution of technical change is the main reason for which the economy grows in "steady state". The country's openness, the effectiveness of the political system, socio-political views and liberties, structural characteristics and spatial specificities are being employed in order to explain the ability of a society to develop (and / or to imitate and incorporate) practically applied innovations.

Moreover, Romer [15] introduced two effects with respect to the way how existing stock of knowledge affects researchers' "productivity": first, the positive effect – **stepping on shoulders** – which means that new innovations step upon the existing applied ideas; second the negative one – **fishing out** – which starts from the idea that the set of exploitable applications is limited, given the possibilities defined by the present scientific paradigm.

Those two effects will be of key-importance in our following, theoretical discussion: first, we introduce them in a framework that links modern epistemological agenda with the long waves of economic activity; then, based upon this model, we develop a theoretical hypotheses that explains the alteration of the way how technology changes. Following, given the theoretical scenario, we discuss the induced modification in the role of academia and R&D sector. The paper concludes with relevant policy implications and proposals for further research.

**A theoretical discussion: How changes *Technology-Change***

Zarotiadis and Ozouni [20] associate the tradition of Koyrè, Butterfield and Kuhn with a dynamic combination of *stepping on shoulders* and *fishing out* effects that generates a cyclically evolving set of applied ideas within a given scientific paradigm. Thereby, they first rationalized scien-

tific cycles on the basis of underlying socio-economic conditions; second, they developed a model that simulates long waves of economic development, as the result of a cyclical evolution of applied knowledge and thereby of labor's productivity.

(Note that Kuhn, although he adopts a socio-political terminology in order to describe the succession of different periods in the evolution of human knowledge – alone the use of the term "scientific revolution" is indicative, he does not proceed in linking them to the development of human society, even if he, probably, had something similar in his mind. After all, the new current that arises in place of "logical empiricism" asserts that science is a human construction, a cultural phenomenon, similar to art, religion and policy. It interacts with all other sectors of social reality, being affected from endogenous, as well as exogenous factors.)

The following two diagrams depicture the main notion of the specific theoretical framework. In the first we see that, for the duration of a scientific paradigm (vertical axis), *fishing out* starts from not being an issue at all (in the beginning, all discoverable applied ideas are "available"). As applied ideas keep on being discovered, finding new becomes more difficult. Therefore FO-component starts from 1 and falls gradually to zero. The opposite is true for *standing on shoulders* effect: SOS component starts from zero and reaches asymptotically 1 as we exhaust the attainable applied ideas within the specific scientific paradigm. If we put both effects together (multiplication), we get the solid line representing the cyclical evolution of researchers' "productivity" in applied research, again during the given scientific paradigm (for more details on the underlying probability-logic see in Zarotiadis and Ozouni [20]).

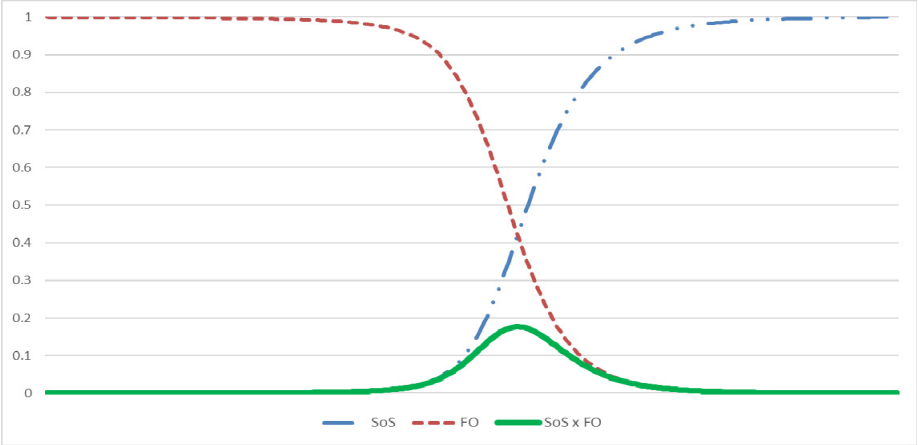


**Diagram 1: Cyclical evolving "productivity" of researchers in applied research**

Based upon this hypothesis, the model proceeds in simulating the evolution of the productivity of labour (affected directly by the produced applied ideas) and thereby of the produced (real) income in the economy. As we can easily imagine, the resulted picture is a longer lasting cycle of economic activity, presented in diagram 2. In that sense, we reproduce and we provide a reasoning for a widely suggested empirical phenomenon, namely the coincidence of long waves with the periods of "scientific paradigms".

Zarotiadis and Ozouni [20] proceed in their theoretical analysis and describe the phase where the "limits" of the present scientific paradigm are being reached in a way that is quite similar to the perception of Kuhn (shortly presented above): "*as we exhaust the limited set of applications … anxiety accumulates gradually in the society. Sooner or later, this tension will be released, leading to new, revolutionary developments of our social knowledge, setting up a new period, where new, previously unthinkable applications can be developed*". Beside to "production" of applied ideas, they also model the activity of researchers in searching for innovative, basic knowledge, in other words for revolutionary ideas that question the existent paradigm and move the frontiers for the applied research ahead. The emergence of a new scientific paradigm can be seen as the result of a **Poisson process** with an arrival rate ε, which, in other words, is the probability for having a new Paradigm Shift in the next moment (approximately now). As we move towards the limits of the existing paradigm, εtends to unity.

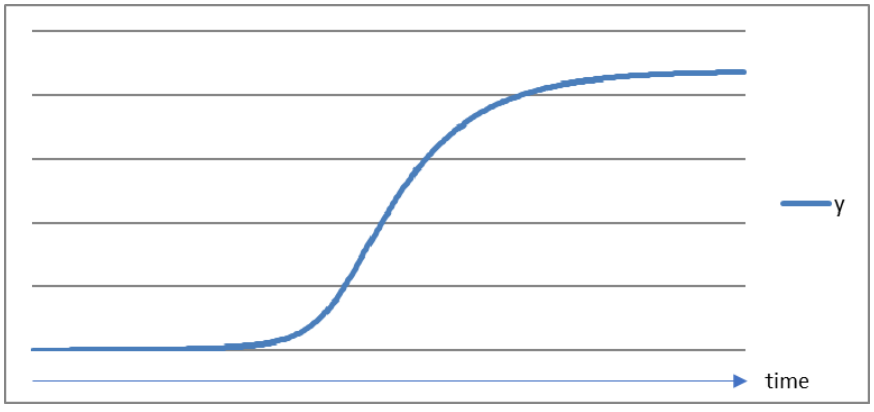


**Diagram 2: Simulation of Long Waves of economic activity (y: per capita income)**

A straightforward analytical expansion of the above is to provide an endogenous determination of how strong the new scientific revolution will beand/or when it will occur, given the specific socioeconomic characteristics of that time. Zarotiadis and Ozouni [21] start from their notion that "*scientific anxiety*" accumulates the more the limited set of

applications is being exhausted. Along with the probability of overcoming the current scientific frontiers, as we reach asymptotically the limits of the present paradigm, also the expected intensity of the breakthrough to come rises too. Thereby, the two theorists elaborate the following hypothesis: "*the earlier a scientific breakthrough occurs … the shorter will be the duration of the new SP, the earlier will probably occur the next scientific breakthrough*".

As "stepping on shoulders" accumulates, productivity of researchers, even in basic research, rises continuously. Scientific breakthroughs become more often, which leads to SP of shorter duration. The general feeling in our days that "things change more rapidly", as well as the inconclusiveness of relevant literature with respect to the duration of current scientific paradigm is indicativefor that. The fourth long wave initiates after 1940 (in 1945 for Europe) and was related to the revolution in natural sciences. This period is also known as the era of atomic energy, oil, automobiles and steel technologies connected with highly structured technology research. Shortly afterwards, the electronic revolution made its appearance with the emergence of the first computers (Mandel, 1980/2003, p.p. 135-136, 1978/2004; [23, p. 39]). The end of the fourth long wave opened a vigorous debate. Some of the analysts state that after the 1970' and the 80', a fifth long wave began, associated with the revolution in electronics, telecommunications and informatics [3, 5, 13, 14]. Some believe that we are still in the longer-lasting downswing of the fourth long wave [18], while others assume that now begins the sixth wave, associated with new developments in nano-bio technologies [8, 19].

The **path of technology change** slowly transforms from **a smooth succession of cycles into a (log-) linear, evolution**.

The following diagram (first presented in Zarotiadis and Ozouni [21]) depict this alteration: in $t_1$, $t_2$ etc. we have the subsequent paradigm shift ($A_1$, $A_2$, etc. represent the respectively shifted frontiers). As history evolves, changes in the scientific frontier become more often, yet shorter. In the margin, innovations that alter the very structure of our basic knowledge appear continuously, aside to the evolving applied knowledge, transforming thereby the cyclical in a (log-) linear evolution.

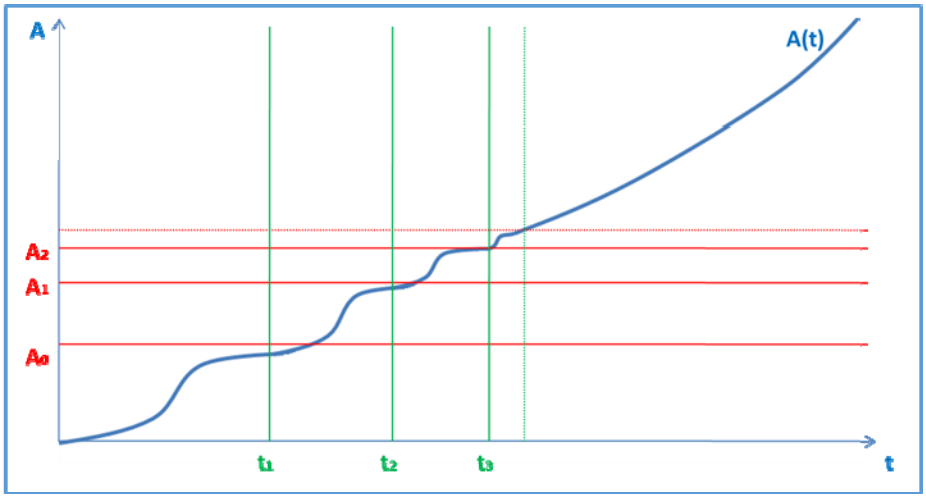


**Diagram 3: Transformation of the path of accumulation of applied knowledge ($A_t$)**

Next to the above described "path-effect" on the process of technology-change, the intensification of change rate itself and the accumulated "stepping on shoulder" over the modern scientific history provokes a "**level-effect**" that questions the very basic nucleus of capitalism, despite the significant, undergoing evolution: the accumulated applied, technical accomplishments reach a level where marginal costs of (re-) producing economic goods is dramatically reduced, being therefore relatively unaffordable low compared to necessary fix capital invested.

Zarotiadis [22] describes in more details this "*de-commercialization of goods and services*", in other words the **maturation of the prospects of a socialization of production**, resulting from the endogenous, systemic development itself: "*… capitalist competition itself is the driving force of a counter-systemic technical change…*" leading to the "*…de-commercialization: decreasing MC/FC…* (marginal over fix costs)*… Last but not least… this endogenous process of de-commercialization causes barriers in the usage of "technological revolution" as a way-out of the recurring systemic crisis; yet, there is an alternative to artificial excludability: structural reforms that enhance the efficiency of the public sector, while broadening the socialized sector of the economy*".

**Academia and R&D in the new socioeconomic environment**

The generalized feeling in contemporary modern societies but also the data and the relevant literature confirm the above theoretical hypotheses. Paradigms shifts appear gradually more often – see the picture in diagram 4 – while the inconclusiveness with respect to the currently valid revolutionary framework support the gradual transformation of the path. On the other, the deeper course of de-commercialization contributes to the systemic turbulences in the cornerstones of bourgeois economy.

Those profound changes in the path and the level of the evolutionary process itself imply new requirements and roles-for academia and the R&D institutions in modern societies. Moving in an era of continuously intensified velocity of scientific changes and relevant applications, research strategies and researchers' abilities and skills must adjust accordingly:

- **R&D processes** have to become **flexible** and to **combine basic and applied research**. A strict separation of those two areas of research may not be any more sustainable given the previously described "path effect".
- Researches need to develop **abilities for creatively questioning and criticizing**, as well as **abilities** in **restating theoretical and empirical methodological issues**.

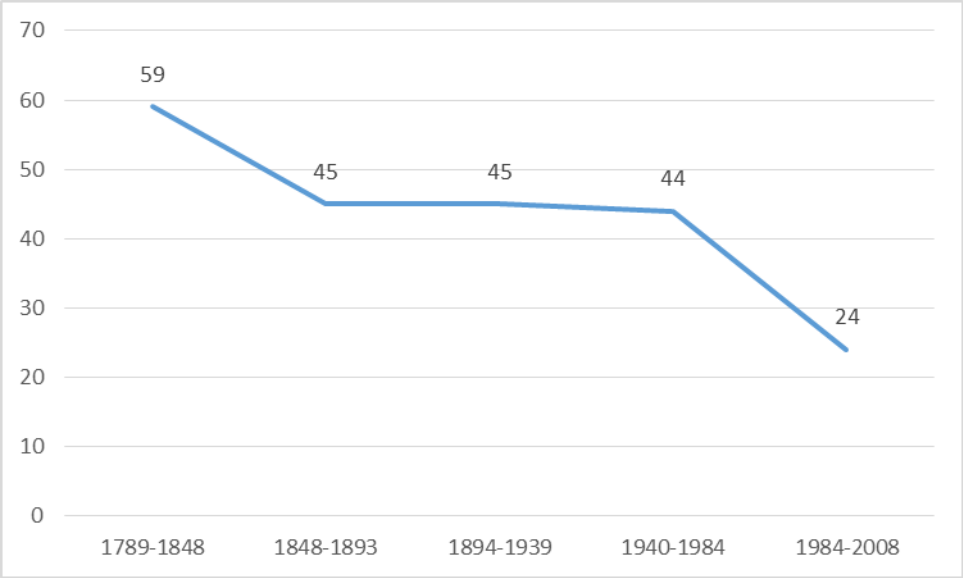


**Diagram 4: Duration of the five occurred long waves [21]**

This in turn calls for analogous transformations in the education provided – especially in the tertiary academic learning process, but also in the previous levels. Universities have to **strengthen**(**again**)**the theoretical and also the methodological aspects of curricula**, while the need for modern lecturing technics that enhance creative and critical thinking becomes more intense. The overused **drive for excellence** has to be **replaced** by the **desire for radicalism** and **thinking out of the box.**

Moreover, the tendency of **gradually including vocational aspects in the academic programs has to be reversed**. Truly, vocational education and applicative abilities are also very important – yet, by mixing those educational goals in the same programs and curricula we may end up not having the necessary level of acquisition. Vocational education and training institutes are indeed crucial, but so are also universities that will educate the future scientists and researchers in a proper way, being able to efficiently couple with a continuously changing scientific paradigm.

In this new epoch there is a call for more **cross-regional**, **cross-cultural**, **cross-disciplinary**, **progressive**, **scientific collaboration**. (Scientific) Breakthroughs are not simply a possibility – they became a normality. Agents need to be able to combine, to question and to create; but above all they need to be prepared to deal with those continuous changes. Therefore, another issue gets even more important in a time of intensified frequency and intensity of change: the need for underlying ethical and social-institutional foundations becomes more intense than ever.

All these lead to a final holistic restatement of academic education and R&D activities: the **social-public aspects** of their nature **rebound**. On the one hand, basic questioning gets more and more into scientific education and activity. Thereby, commercialization of both, academic and research results gets more difficult, while it also becomes meaningless. On the other, the social benefits from the mixed theoretical and applied innovations are more intense. In that sense, Socialization of educational and R&D sector becomes more rational than ever.

**Concluding remarks, policy implications and research hypotheses.** In the present paper we started by reviewing the epistemological literature with respect to the path of scientific evolution. Next we combined the tradition of Kuhn with arguments from the school for endogenous economic growth in a model that simulates cycles of technical applications, labour's productivity and GDP during a specific scientific paradigm.

This model (being initially presented in details in previous working papers) was also the basis to discuss the frequency and the intensity of scientific breakthroughs. Starting from a hypothesis that "*the earlier a scientific breakthrough occurs… the earlier will probably occur the next breakthrough*", in combination to the notion that a long history of accumulated knowledge increased substantially the "productivity" of researchers, even in the basic research activities, we end up with two theoretical conclusions for the change of technical change: (i) the cyclical way of evolution alters into a (log-) linear one (path effect); (ii) applied, technical accomplishmentsare reaching a level where marginal costs are dramatically reduced, inducing thereby a gradual decommercialization (level effect).

All these re-intensify the question for the role, the functioning and the significance of Academia and the R&D sector, provoking substantial alterations:

(i) R&D processes become flexible and combine basic and applied research – researches need to develop the relevant, needed abilities;

(ii) universities have to strengthen (again) the theoretical and also the methodological aspects of curricula, while the overused drive for excellence has to be replaced by the desire for radicalism;

(iii) the tendency of gradually including vocational aspects in the academic programs has to be reversed – vocational education and training institutes are indeed crucial, but so are also universities that will educate the future scientists and researchers in a proper way;

(iv) there is a call for more cross-regional, cross-cultural, cross-disciplinary, progressive, scientific collaboration – breakthroughs are not simply a possibility, they became a normality;

(v) finally, all these strengthens again the need for keeping the social-public aspects in academic education and R&D.

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## ЗМІНИ В ТЕХНОЛОГІЇ: ЗМІНИ ДЛЯ УНІВЕРСИТЕТІВ І НАУКОВО-ДОСЛІДНОГО СЕКТОРА

***Зміна технології і пов'язане із цим збільшення продуктивності праці є основним внеском буржуазії. Проте, з ходом технологічної еволюції, це явище викликало системні зміни, що оскаржують природу самого капіталізму. Це, у свою чергу, змінює роль досліджень й академічних інститутів у сучасному суспільстві. У контексті зазначеної дискусії ми надаємо теоретичну основу, що поєднує в собі теорії гносеологічного й економічного зростання для того, щоб запропонувати індуковані зміни. Крім того, розглянуто сучасну роль наукових кіл і досліджень. У висновку представлено гіпотезу для подальших досліджень й обговорення індукованих наслідків для політики.***

***Ключові слова: технологічні зміни, роль академії, роль сектора науково-дослідницьких робіт.***

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## ИЗМЕНЕНИЯ В ТЕХНОЛОГИИ: ИЗМЕНЕНИЯ ДЛЯ УНИВЕРСИТЕТОВ И НАУЧНО-ИССЛЕДОВАТЕЛЬСКОГО СЕКТОРА

***Изменение технологии и связанное с этим увеличение производительности труда является основным вкладом буржуазии. Однако, с ходом технологической эволюции, это явление вызвало системные изменения, которые оспаривают природу самого капитализма. Это, в свою очередь, изменяет роль исследований и академических институтов в современном обществе. В контексте этой дискуссии мы предоставляем теоретическую основу, которая сочетает в себе теории гносеологического и экономического роста для того, чтобы предложить индуцированные изменения. Кроме этого, рассмотрена современная роль научных кругов и исследований. В заключении представлены гипотезы для дальнейших исследований и обсуждения индуцированных последствий для политики.***

***Ключевые слова: технологические изменения, роль академии, роль сектора научно-исследовательских работ.***

**Annex 1**

# EXTENDED ABSTRACT IN ENGLISH AND REFERENCES (IN LATIN): TRANSLATION / TRANSLITERATION / TRANSCRIPTION

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## ABSOLUTE AND COMPARATIVE SUSTAINABILITY OF FARMING ENTERPRISES IN BULGARIA

***Evaluating absolute and comparative sustainability of farming enterprises is among the most topical issues for researchers, farmers, investors, administrators, politicians, interests groups and public at large. Nevertheless, in Bulgaria and most East European countries there are no comprehensive assessments on sustainability level of Bulgarian farms of different juridical type. This article applies a holistic framework and assesses absolute and comparative sustainability major farming structures in Bulgaria – unregistered farms of Natural Persons, Sole Traders, Cooperatives, and Companies. First, method of the study is outlined, and overall characteristics of surveyed farming enterprises presented. After that an assessment is made of integral, governance, economic, social, environmental sustainability of farming structures of different juridical type. Next, structure of farming enterprises with different sustainability levels is analyzed. Finally, conclusion from the study and directions for further research and amelioration of sustainability assessments suggested.***

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## CAPTIVE AS AN INSURANCE FORMULA FOR RISK MANAGEMENT: ADVANTAGES AND DISADVANTAGES

***This article introduces subject of an insurance captive entity, with focus on how it could be used as insurance formula for risk management. Captive might be the most appropriate insurance formula for risk management. However, the level of achieved success depends on many factors.Insurance captivesare understood as entities which are formed and owned by companies mostly for the purpose of insuring own risks (pure captive or single parent captive). More and more often captives are also***

***formed by a group of companies (group captives) to insure their properties and liabilities towards 3rd parties. Captives are widely used by many companies nowadays. However, many of them,are used solely for a purpose of a risk cession and premium transfer, with an intention to use captivesmore as a profit center in a low taxation country rather than for the purpose of risk management (i.e. a more appropriate role for captive would be to support their owners in enterprise risk management – ERM).***

***This article touches on why captives are not used to their full potential. It may be toochallenging for many decision makers to embrace on captives as risk management formula and extend captives' roles to utilize all possible advantages resulting from owning a captive.***

***Captive can deliver risk management in a more comprehensive way than most commercial insurers on the market. The article also presents advantages and disadvantages of owning an insurance captive.***

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## REINSURANCE SERVICE AND ITS ECONOMIC NATURE

***At the reinsurance market the object of purchase and sale is a specific product – a reinsurance service. According to several scientists' researches, the definition of a reinsurance service is clarified as a specific service in the form of selling legally formed liabilities concerning redistribution of already insured risk between insurance companies, which has its price, which is influenced by supply and demand. The author has proposed new approaches to the insurance service interpretation as a dominant, which causes the reinsurance market formation. It is shown that being traded in the reinsurance market, a reinsurance service is an important factor in the functioning and self-development of the market environment, it combines the interests of supply and demand holders and directly influences the market quality characteristics, causing trends of its further development.***

***Supply and demand for a reinsurance service are influenced by both external and internal factors, the most important of them are: the capitalization level of insurers, the balance of their insurance portfolios, the condition of the state economy, the level of investment attractiveness, monetary and tax policy. The concepts of "reinsurance service demand" and "reinsurance service supply" have been clarified. Reinsurance service demand is a conscious and financially secured desire to buy reinsurance services. Reinsurance service supply is all services submitted in the reinsurance market.***

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## THE MEASURABILITY OF CONTROLLING PERFORMANCE

***The urge to increase the performance of company processes is ongoing. Surveys indicate however, that many companies do not measure the controlling performance with a defined set of key performance indicators. This paper will analyze three categories of controlling key performance indicators based on their degree of measurability and their impact on the financial performance of a company. Potential measures to optimize the performance of the controlling department will be outlined and put in a logical order. The aligning of the controlling activity with the respective management expectation will be discussed as a key success factor of this improvement project.***

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## INTERNATIONAL EXPERIENCE OF RETIREMENT INSURANCE AND ITS IMPLEMENTATION IN UKRAINE

***The article attempts to provide an overview of world experience in functioning and development of retirement insurance system based on insurance principles. The world experience in the sphere of retirement insurance and realization of pension reforms in countries with different economic development will help to apply certain elements to Ukrainian pension program. The importance of functioning of multilevel pension models is considered in the study. The analysis has shown that pension models based on redistributive and accumulative pension programs give an opportunity to receive differential pensions to citizens of retirement age.***

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## TRANSFORMING CONSUMER AND IT'S IMPLICATIONS FOR THE UKRAINIAN SOCIETY

***This article reviews the changes of consumption patterns in the Ukrainian society over the last 25 years and the impact this transformation had on Ukrainian consumers. The author researches the market forces and the influence those market forces had on the consumer behavior. Finally, the author concludes that the market forces present on the Ukrainian market resulted in transforming consumption patterns and consumer behavior. In this scientific research also presents a critical analysis of the implications for the Ukrainian society and the possible choices of market models.***

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## MACROECONOMIC FORECASTING USING BAYESIAN VECTOR AUTOREGRESSIVE APPROACH

***There are many arguments that can be advanced to support the forecasting activities of business entities. The underlying argument in favor of forecasting is that managerial decisions are significantly dependent on proper evaluation of future trends as market conditions are constantly changing and require a detailed analysis of future dynamics. The article discusses the importance of using reasonable macro-econometric tool by suggesting the idea of conditional forecasting through a Vector Autoregressive (VAR) modeling framework. Under this framework, a macroeconomic model for Georgian economy is constructed with the few variables believed to be shaping business environment. Based on the model, forecasts of macroeconomic variables are produced, and three types of scenarios are analyzed – a baseline and two alternative ones. The results of the study provide confirmatory evidence that suggested methodology is adequately addressing the research phenomenon and can be used widely by business entities in responding their strategic and operational planning challenges. Given this set-up, it is shown empirically that Bayesian Vector Autoregressive approach provides reasonable forecasts for the variables of interest.***

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## TECHNOLOGY-CHANGE CHANGES: IMPLICATIONS FOR UNIVERSITIES AND R&D-SECTOR

***Technology change and the resulting increase in labour's productivityis the major contribution of bourgeoisie. Yet, as the path and the velocity of technology's evolution changes, the phenomenon induces systemic modifications challenging the very nature of capitalism itself. This in turn alters the role of the R&D and academic institutions in the modern society. The present paper contributes to this discussion. We follow a theoretical framework that combines epistemological and economic growth theories in order to suggest the induced changes. Next we discuss the modern role of academia and R&D. We conclude by presenting hypotheses for further research and discussing the induced policy implications.***

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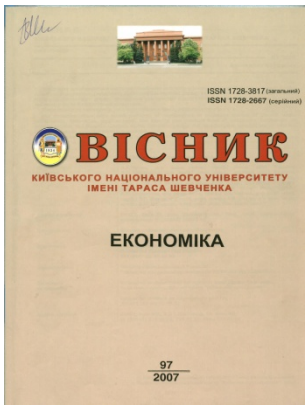


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## КИЇВСЬКОГО НАЦІОНАЛЬНОГО УНІВЕРСИТЕТУ ІМЕНІ ТАРАСА ШЕВЧЕНКА

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