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CONTENTS

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CONTENTS

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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EMPIRICAL TESTING OF THE NON-SATIATION AXIOM IN THE CONSUMER CHOICE THEORY

The aim of this study is to test the empirical validity of the non-satiation axiom in the consumer choice theory. And to achieve this aim, we decide to use statistical data providing information about the average amount of expenditure per capita in the USA for the consumption of several goods and services that we selected for this study throughout the period 1959-2016, and statistical data providing information about the level of the real disposable income per capita in the USA for the same period. Then, we build up a theoretical model that is based on the Engel curves presented in Luigi Pasinetti with three different shapes, each displaying satiation in the form of zero or even negative slope from a certain level of income onwards. We use this theoretical model as the methodology by which to conduct our empirical study and to obtain the best as possible results from it. And particularly in our empirical study, we conduct a non-linear regression curve fitting analysis between the independent variable level of real disposable income and the dependent variable amount of expenditure for the consumption of a particular good or service. The results from this study show empirical evidence that there is an upper limit on the amount of expenditure that is allocated by a consumer to anyone particular good or service, regardless of how much his income grows. Finally, we reach to the conclusion that this empirical study produces evidence which rejects the validity of the non-satiation axiom in the neoclassical consumer choice theory.
JEL: D11; D12

1. Introduction

The general concept in the theory of consumer choice is that the purpose of each consumer is to maximize utility. And according to the theory of consumer choice, people maximize utility when they choose the maximum quantity of all goods and services that they can

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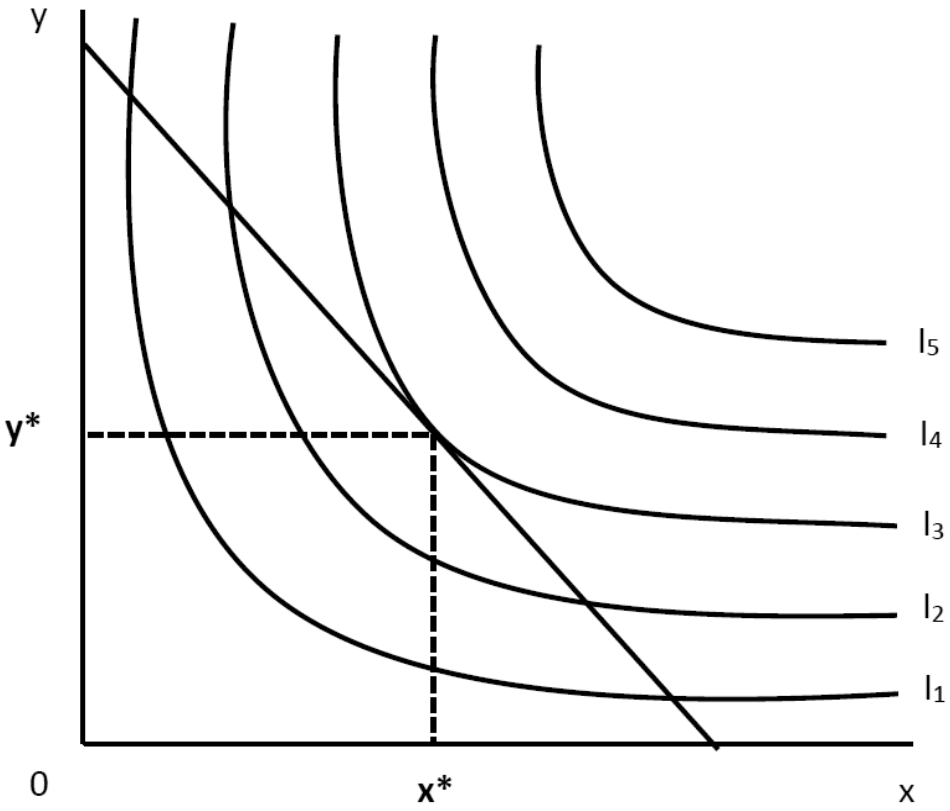
afford. That is, if there was no budget constraint in the consumer choice, then the theory assumes that an individual would maximize utility from the consumption of unlimited quantities of all goods and services that the individual wants to consume. Exactly this assumption about the non-satiation of the consumer wants is one of the five most important axioms in the theory of consumer choice. The other four fundamental axioms in the theory of consumer choice assume that the consumer preferences are stable, complete, transitive, and reflexive.

First, the axiom of stable preferences assumes that the preferences of the consumer are given and cannot change or evolve throughout time. Second, the axiom of complete preferences assumes that for any pair of bundles, for example, x-bundle and y-bundle are given, either (x_1, y_1) is preferred to (x_2, y_2), or (x_2, y_2) is preferred to (x_1, y_1), or else the consumer is indifferent as between (x_1, y_1) and (x_2, y_2). Third, the axiom of transitive preferences assumes that if (x_1, y_1) is preferred to (x_2, y_2), and (x_2, y_2) is preferred to (x_3, y_3), then (x_1, y_1) is preferred to (x_3, y_3). Fourth, the axiom of reflexive preferences assumes that any bundle is as good as itself which means that the consumer is indifferent as between (x_1, y_1) and (x_1, y_1). These are the four fundamental axioms of consumer choice theory, though, as Deaton and Muellbauer (1980, pp. 26-29) point out, they are generally supplemented by the additional axiom of non-satiation of the consumer wants. And from a theoretical point of view, without any of these five axioms, the consumer choice theory would not work which means that each of them is equally important. But in our study, we focus particularly on the non-satiation axiom.

It turns out that the whole theory of consumer choice can be formulated in terms of preferences that satisfy the five axioms described above. Also, the consumer choice theory can describe preferences and graphically by using a coordinate geometric construction known as indifference curves map. On this map, each indifference curve includes multiple bundles of two goods (x, y) among which the consumer is completely indifferent. That is, each bundle lying on an indifference curve brings the same utility to the consumer. And taking into consideration the non-satiation axiom, it follows that any bundle lying on a higher indifference curve is strictly preferred to any other bundle lying on a lower indifference curve. This means that if there was no budget constraint, the consumer will always want to choose a bundle from the highest possible indifference curve which is equal to infinity. But because there is a budget constraint, the theory states that the optimal choice of the consumer is the bundle (x^*, y^*) lying on the highest possible indifference curve tangent to the budget line. And the budget line includes those bundles that the consumer can afford. This means that the optimal choice of the consumer (x^*, y^*) is the best one that he can afford (Barten & Böhm, 1982).

Figure 1

The consumer choice theory graphically described by using indifference curves map



As seen above, the non-satiation axiom is probably the most important axiom in the theory of consumer choice because exactly this axiom makes the theory to describe the consumer behaviour and choice as simple as possible. If the non-satiation axiom is empirically valid, it follows that when the income increases, the consumer increases the quantities of the goods and services that he is consuming because that is how the consumer maximizes utility. And since the consumer maximizes utility when his income increases because that allows him to purchase higher quantities of the goods and services that he is consuming, it follows that the level of income determines the welfare of the consumer. That is, the level of income determines the quantity of goods and services the consumer can afford, and the quantity of goods and services the consumer can afford determines the ordinal scale of utility that the consumer obtains.

The aim of this study is to test the empirical validity of the non-satiation axiom in the consumer choice theory. The working hypothesis that is being raised in this study argues that when the level of income increases which allows the amount of expenditure to increase for the consumption of higher quantities of the same goods and services, at some point the consumer wants to satiate. The methodology that is being used in this study is the conduction of non-linear regression curve fitting analysis between the independent variable level of real disposable income and the dependent variable amount of expenditure for the consumption of a particular good or service. And the structure of this study is the following. First, in section 2 we make a literature review on alternative consumer choice theories assuming that the consumer wants to satiate. Then, the methodology for the conduction of this study is discussed in section 3. In section 4, we outline the range of the study so that will produce the most reliable results. Then, in section 5 we introduce the empirical data that is being used for the conduction of this study. Section 6 presents the obtained empirical results from the study. And finally, in section 7 we make an analysis on the empirical results and then we reach to a conclusion whether the hypothesis is being confirmed or rejected.

2. Literature Review

Frank Knight (1944) argues that the consumer choice theory attempts to explain the consumer behaviour and choices in a relativistic way which loses touch with reality. And that relativistic interpretation of consumption is adopted in the theory for the sake of greater objectivity. But here comes the first problem with this theory and it is because the consumer choice theory relies more on objectivity at the expense of realism, actually the theory is able only to describe the consumer behaviour and choices, but the theory is unable to explain that consumer behaviour and choices.

The lack of realism in the modern theory of consumer choice stems from its axioms which were never empirically tested and proven as valid. These axioms are made in the theory so far as to retain its simplicity and mostly its systematic assertion that the consumer maximizes utility from the consumption of larger quantities of the same goods and services that he has been consuming so far. However, the question that immediately arises here is whether the consumer wants are always insatiable if the consumer continues to increase the quantities of the same goods and services that he has been consuming so far. And actually, if a consumer continues to increase the consumption of larger and larger quantities of the same goods and services, will the consumer soon or later reach either to physiological or to emotional satiation of his wants and preferences?

The modern theory of consumer choice developed in its simplistic model during the first half of the twentieth century assumes that the only constraint for a consumer striving to maximize utility is the level of his income. Besides the consumer income, there are some other constraints which the simplistic model of consumer choice ignores. In practice, it is reasonable to think that the consumer wants can be satiated at some point. And one of these other constraints is the physiological capacity of an individual who is unable to consume an unlimited quantity of goods satisfying his physiological needs. For example, from a

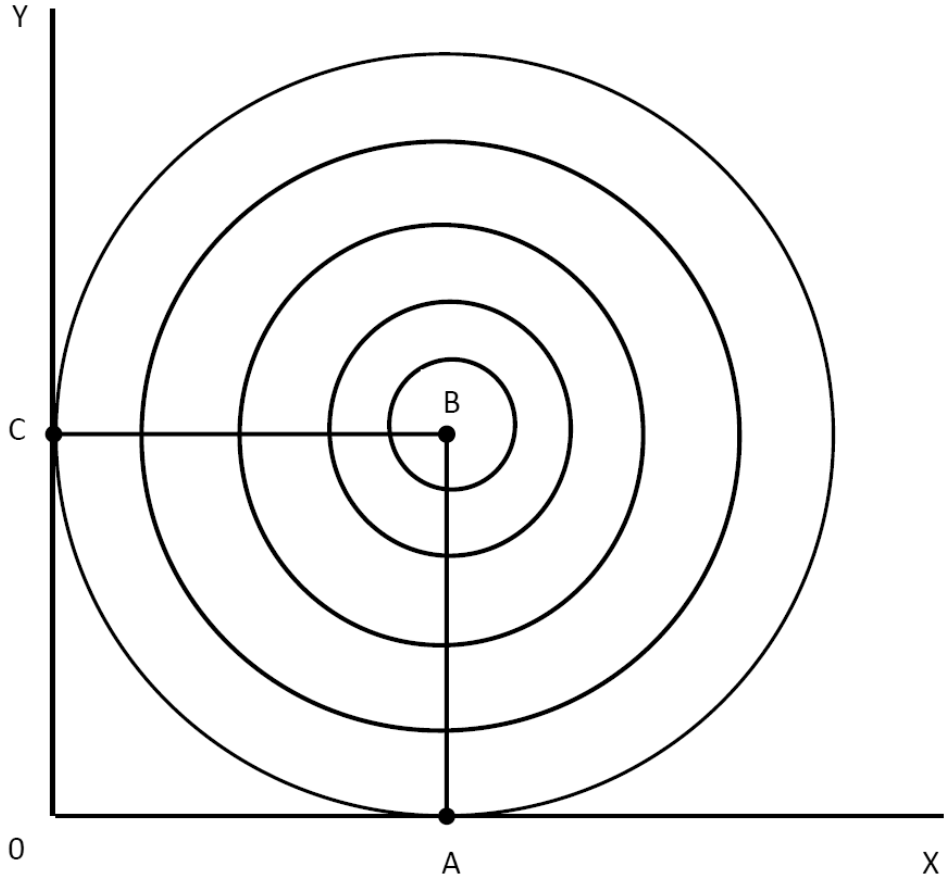
realistic point of view, it is impossible for a consumer to eat an unlimited quantity of food without his hunger to be satiated at least for some short period. Even in this occasion, if we assume that the non-satiation axiom is valid, it is still impossible for a consumer to eat an unlimited quantity of food because the capacity of his biological body will not allow him to eat an unlimited quantity of food. Another constraint is the satiation of the consumer wants related with the emotional needs of an individual. From a realistic point of view, if an individual continues to increase the quantities of the goods and services that satisfy his emotional needs, soon or later his consumer wants become satiated as well.

Frank Knight (1944) argues that Vilfredo Pareto (1906), William Earnest Johnson (1913), Eugen Slutsky (1915), and John Hicks and Roy Allen (1934) developed a very unrealistic consumer choice theory which relies on many empirically unproven axioms. And if these axioms are put under empirical validation, we cannot say whether the modern consumer choice theory will still work. The modern theory of consumer choice assumes that the consumer wants are non-satiated and will never be satiated in future time. But the truth is that the non-satiation axiom is a necessary condition for preserving the theory systematic in its explanation that a consumer maximizes utility from consumption of larger quantities. And if the non-satiation axiom is empirically proven as invalid, then the modern theory of consumer choice should be rejected as false. For this reason, Frink Knight (1944) holds the opinion that the modern consumer choice theory, which was developed during the first half of the twentieth century, constitutes a movement in a backward direction. However, during the second half of the twentieth century many alternative models were developed in the consumer choice theory making the realistic assumption that the consumer wants is possible to be satiated.

For example, Robert Bishop (1946) developed a model of the consumer choice theory including the realistic assumption that the consumer wants can be satiated at some point while the consumer increases the consumption of the same goods and services. Robert Bishop (1946) developed his model of the consumer choice theory by using a coordinate geometric indifference curves map. In this model, we assume that the economic system consists of only two goods “X” and “Y’, but it is also possible good “Y” to represent a composite good which consists of all other goods except good “X” in that economic system. Actually, the latter option for good “Y” as a composite good, we can say that good “Y” is the income of the consumer who has to make choices between different bundles of good “X” and good “Y” based on his preferences. And we know from the theory that there will be some bundles among which the consumer will be indifferent as well as there will be other bundles which will be strictly preferred by the consumer. However, the indifference curves map of Robert Bishop (1946) is formulated in the form of concentric circles. That is, each indifference curve initially decreases until it becomes horizontal at some point, then it rises until it becomes vertical at some point, and finally, the curve bends back toward its starting point. And since all indifference curves are in the form of concentric circles, this implies that there is a limited number of indifference curves.

Figure 2

An alternative model of the consumer choice theory including satiation of consumer wants



Source: Robert Bishop, 1946.

In the above model developed by Robert Bishop (1946) on Figure 2, the points on the indifference curves map of greatest interest for our study are those points lying on AB and CB as well as point B which intersects AB and CB. All points on AB represent the maximum quantity that an individual is willing to consume before reaching absolute satiation with good "X". In the same way, all points on CB represent the maximum quantity that an individual is willing to consume before reaching absolute satiation with good "Y". And the point B represents the maximum quantity that an individual is willing to consume before reaching absolute satiation with both goods at the same time. The area of OABC consists of all bundles that an individual is willing to consume while his consumer wants are still non-satiated. Once, he gets to some point on AB or CB, his consumer wants are absolutely satiated either to good "X", or to good "Y", or to both. Outside the area of

OABC, the consumer will be unwilling voluntarily to consume larger quantities of the both goods.

Stanley Lebergott (1993) asked the rhetoric question: "is the pure imperturbable belief that consumer wants are insatiable, which many economists seem to hold, really acceptable? He adds: "Obviously, the growth of (real) consumption expenditures is not simply a matter of multiplying the items consumed – eating ten hamburgers per day rather than two, using two hundred pairs of shoes rather than twenty, playing on five pianos rather than one. Although multiplicative growth of this kind occurs to a certain extent, it cannot exclusively explain the growth of per capita consumption" (Stanley Lebergott, 1993, p.69). As Stanley Lebergott refers to an empirical study based on the Engel's Law that was conducted by Samuel Houthakker (1957). In that study, Houthakker proves that the demand for many consumption items can reach to a point of satiation.

Ulrich Witt (2001) also criticized the simplistic model of consumer choice theory. Witt argues that the neoclassical economic theory is implicitly biased towards the supply side. Research is mainly concerned with the question of how production grows. And it matters less what companies produce or how they go about selling it. As Ulrich Witt, himself puts it: "a sustained growth of per capita consumption is explained by a continued relaxation of the budget constraint, i.e. by rising real income, explicitly or implicitly assuming that the demand for at least some of the consumption items on which the preference ordering is defined has not yet been satiated by current consumption or is not satiable in general" (Witt, 2001, p. 24).

To assume that satiation of the consumer wants plays a crucial role in the consumer choice theory, first the theory must determine which are the motivational factors causing a change in the state of the consumer wants. However, the modern neoclassical theory of the consumer choice does not give an explanation on the motivational factors that are responsible for the state of the consumer wants. And the reason for this ignorance of the motivational factors is because the model of the neoclassical consumer choice theory is built on simplistic axioms which were never empirically proven as valid. As two of the axioms state that the consumer wants are given, cannot evolve throughout time, and cannot satiate. Hence, the potential ability of consumer wants and preferences to change and satiate remain outside of the neoclassical paradigm.

However, over the past decades, a number of economists have argued for an introduction to the theory of consumer choice of those missing motivational factors which better explain the behaviour and choice of the consumer rather the level of income alone. One of these economists who insisted for a theoretical revolution in the consumer choice theory is Ulrich Witt (2001). Witt suggested an alternative motivation-based theory of the consumer choice arguing that utility is derived from the satisfaction of human needs. The general concept in this motivation-based theory of consumer choice is that with increasing the satisfaction of a human need through consumption of larger quantities of a particular good, the motivation for further consumption of the same good starts gradually to vanish, which implies that consumer wants to satiate at some point. This alternative theory of the consumer choice tackles the motivational basis of consumer behaviour from which depends the evolution and satiation of the consumer wants. In this way, the theory of Ulrich Witt (2001) directly relates the consumer behaviour and choice with the ability of the consumer preferences to

change throughout time. Hence, the motivational-based theory of consumer choice succeeds to depart from two of the axioms in the neoclassical theory of consumer choice which assume that consumer preferences are stable and cannot satiate.

The motivation-based theory of consumer choice suggested by Ulrich Witt (2001) maintains some basic concepts drawn from motivational psychology that need deprivation and reinforcement are important principles driving the consumer behaviour and choice. Within the motivation-based theory of consumer choice, a need is defined as a behavioral disposition resulting from a state of deprivation in an individual, i.e. a deficiency, imbalance, or psychic or physic strain impeding the maintenance of basic metabolic processes, and thus threatening the well-being and eventually the survival of the individual (Ulrich Witt, 2001). A state of deprivation instinctively motivates the consumer to perform actions that end deficiency and relieve strain. Thereby the satisfaction of a particular consumer want creates a rewarding and pleasant experience which can be defined as a utility. In this sense, the motivation driving an individual to consume larger quantities of a particular good will be present as long as the underlying need is in a state of deprivation, implying that with increasing satiation this motivation vanishes, and the individual will stop consuming further quantities of the particular good. Thus, the consumer wants towards a particular good will naturally be limited by the satiation of the need driving an individual to consume larger quantities of the particular good. And if until a particular moment an individual is constrained by the level of his income which does not allow him to reach a satiation point, once budget constraint is sufficiently lax in the next moment and the individual is able to reach the satiation limit in the consumption of a particular good, further relaxing the budget constraint will not yield additional increases in the consumption of the particular good (Volland, 2012).

So, we can infer that at low levels of income, each successive increases of the income will be accompanied by an increase in the expenditure for the consumption of a particular good. And actually, that is the general concept in the neoclassical theory of consumer choice. However, the alternative motivation-based theory of consumer choice developed by Ulrich Witt (2001) states that once income has reached a level sufficient for consumption to satisfy motivating needs, expenditure levels should dissociate from income levels in a way that further income growth does not lead to further growth in expenditure.

Also, Ulrich Witt (2010) argues that motivating needs and respectively consumer wants to differ in the ease with which a consumer can attain satiation. For example, the physiological needs for caloric intake, which is a central motivation for the purchase of food, can be satiated at comparatively low levels of income. And the further increase of the income will not lead to further increase in the expenditure for the purchase of food because the physiological needs for caloric intake have already been satiated. Instead, there are some psychological needs which deprivation lasts a longer time and respectively the satiation of consumer wants towards the goods and services satisfying these psychological needs takes longer time and requires higher levels of income that will allow an individual to purchase high enough quantities of the goods and services satisfying his psychological needs. Here, under psychological needs, we mean the satisfaction of those needs that cause improvement in the standard of living of an individual. Whereas, the satisfaction of the physiological needs is crucial for the survival of an individual.

3. Theoretical Model

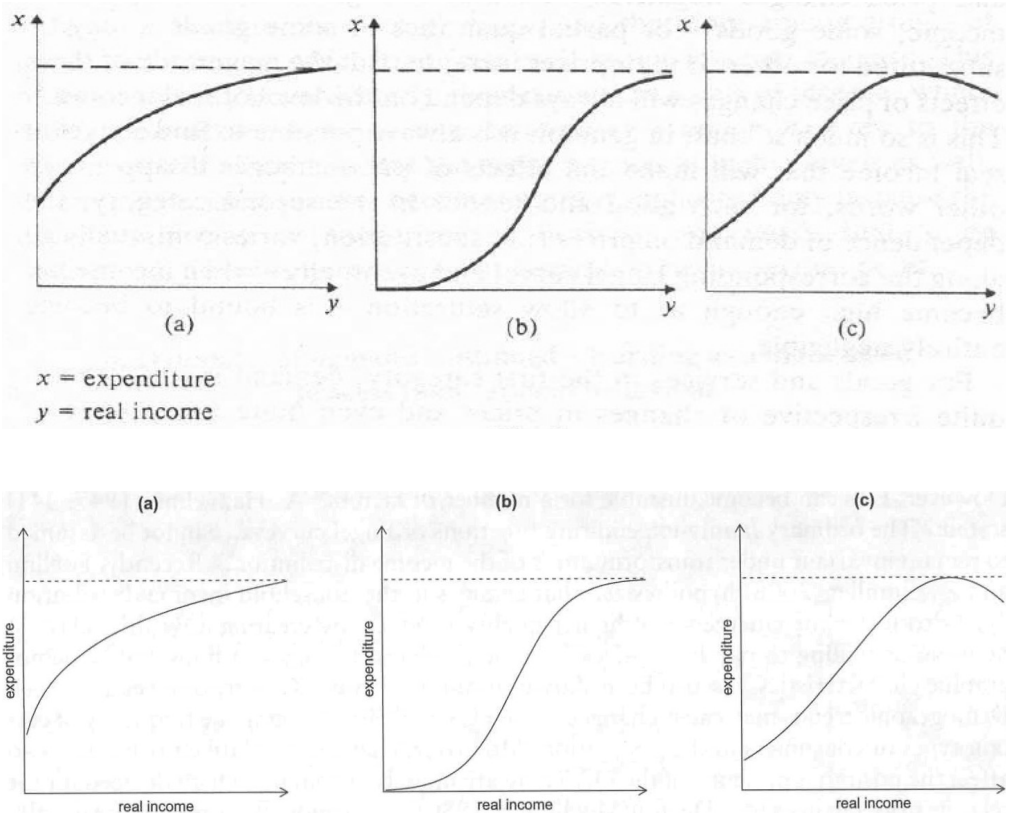
The purpose of this empirical study is to prove that expenditure for the consumption of a particular good or service has a satiation point. That is, there is an upper limit on the amount of expenditure that is allocated by a consumer to any one particular good or service, regardless of how much his income grows. In order to attain this purpose, we decide to build up a theoretical model that is based on the Engel curves presented in Luigi Pasinetti (1981, p. 73). The general concept of the Engel curves in Luigi Pasinetti (1981, p. 73) is that at some point Engel curves satiate. Also, we decide to build up our theoretical model by exploiting the Engel curves in Luigi Pasinetti (1981, p. 73) because the neoclassical consumer choice theory states that an individual maximizes utility by increasing the quantity of the goods and services that he is consuming which occurs as a result of income growth. That is, the neoclassical consumer choice theory assumes that for any normal good there is always a positive relationship between the level of income and the amount of expenditure to that normal good. Consequently, in our theoretical model – the independent variable will be the level of the real disposable income, and the dependent variable will be the amount of expenditure for the consumption of a particular good or service.

We expect in this study to reach to an empirical evidence that Engel curves display satiation of the consumer wants in the form of zero or even negative slope from a certain level of income onwards. Yet in other studies, relatively little has been done to empirically validate how general this property is (Andreas Chai and Alessio Moneta, 2008). But in this study, we examine the extent to which Engel curves across a wide variety of goods and services display satiation of the consumer wants.

Rather than assuming that consumption increases uniformly across all goods and services as income grows what the neoclassical consumer choice theory states, Luigi Pasinetti (1981) recognizes that consumption fundamentally changes as income increases. Specifically, Luigi Pasinetti (1981) argues that there is always an upper limit on how much an individual is willing to spend on any good or service as income increases and above that limit his consumer wants are already satiated, and respectively the individual is unwilling to spend more to the consumption of further quantities of that good or service. In his own words, Pasinetti argues that “there is no commodity for which any individual's consumption can be increased indefinitely. An upper saturation level is inevitable and exists for all types of goods and services although at different levels of real income” (Pasinetti, 1981, p. 77).

In his famous study, Engel (1857) produced empirical evidence that the richer a consumer is, the less percentage of his income will be devoted to food expenditure which today is known as the Engel’s law. The empirical evidence produced in the study of Engel (1857) does not necessarily imply the existence of a satiation point. In his book, Luigi Pasinetti (1981, p. 73) argues that an Engel curve relative to any good or service possess one of the shapes displayed in Figure 3 which display satiation in the form of zero or even negative slope from a certain level of income onwards.

Figure 3



Source: Luigi Pasinetti (1981: 73)

Luigi Pasinetti (1981, p. 73) argues that "curves of type (a) are likely to fit the cases of goods which are absolutely necessary for physiological reasons (e.g. food), and curves of type (b) are likely to fit almost all other cases; while curves of type (c) represents the typical behavior of inferior goods."

Based on this theoretical model suggested in Luigi Pasinetti (1981, p. 73) which includes Engel curves with three different shapes, each displaying satiation in the form of zero or even negative slope from a certain level of income onwards, in our empirical study we expect to reach to the following results – a logarithmic relationship between the independent variable real disposable income and the dependent variable expenditure for the consumption of a necessity good, a logistic (sigmoid) relationship between the independent variable real disposable income and the dependent variable expenditure for the consumption of a normal good other than an absolute necessity, and a quadratic relationship between the independent variable real disposable income and the dependent variable expenditure for the consumption of an inferior good. As the purpose of our empirical study

is to confirm the statistical significance on each of these three kinds of relationships between the two variables.

The theoretical model that we use in this empirical study has the following algebraic expressions –

1. For the necessity goods, there is a logarithmic Engel curve in the form of zero slope from a certain level of income onwards which is converted into the following algebraic expression:

$$x = a * log_b(y) + c \quad (1)$$

2. For all normal goods except the necessity goods, there is a sigmoid Engel curve in the form of zero slope in the initial levels of income, and a zero slope from a certain level of income onwards which is converted into the following algebraic expression:

$$x = \frac{a}{1+\exp(-by+c)} \quad (2)$$

3. And for the inferior goods, there is a quadratic Engel curve in the form of negative slope from a certain level of income onwards which is converted into the following algebraic expression:

$$x = ay - by^2 + c \quad (3)$$

Where in the equations (1), (2), and (3), 'x' represents the amount of the average expenditure per capita for the consumption of good 'X', and 'y' represents the level of the average real disposable income per capita.

4. Limitations of the Study

A very important requirement for increasing the reliability of the results in our empirical study is first to restrict the influence on the consumer behaviour and choice of the factor – low levels of income. As we already mentioned, the general concept of the consumer choice theory states that a consumer maximize utility, if the quantities of the goods and services that he is consuming are increased, assuming that his consumer wants are non-satiated and will never become satiated. This statement is actually true but only to the point that the consumer is significantly constrained by the level of his income. That is, if the level of income is low enough, the consumer wants are impossible to become satiated because the consumer is unable to reach to the optimal quantities of the goods and services that will satiate his consumer wants. Consequently, at low levels of income, increasing the quantities of the goods and services that have been consumed does not lead necessarily to satiation.

But the purpose of our empirical study is to prove exactly the opposite statement that increasing the quantities of the goods and services that have been consumed leads to satiation of the consumer wants. Hence, if this empirical study is conducted among people with low levels of income, the empirical study will not produce reliable enough results

which to confirm our hypothesis because the low levels of income represent a crucial factor that constraints the satiation of the consumer wants. For this reason, it is a very important requirement to restrict the influence of the factor low levels of income, if we want our empirical study to be objective and to produce reliable enough results that will confirm our hypothesis. Thereby, the conduction of our empirical study is applicable only to such nations which experience abundance and high standard of living. And these are the nations in which the average income per capita can afford the average consumer to purchase almost any good in the market in high enough quantities. In order to determine who are those wealthy nations that we can use for the conduction of our empirical study, first we need to find statistical data ranking the all countries in the world by the amount of GDP per capita, converted to international dollars by using purchasing power parity rates.

The top 10 wealthiest countries in the World with the highest standard of living ranked by the indicator GDP per capita, converted to international dollars by using purchasing power parity rates, are presented on Table 1 (according to statistical data provided by the World Bank).

Table 1

Ranking of the countries by GDP per capita, converted to international dollars by using purchasing power parity rates

№	Country	International Dollars
1.	Qatar	141 543
2.	Luxembourg	101 926
3.	Singapore	85 382
4.	Brunei	78 369
5.	Kuwait	74 646
6.	United Arab Emirates	69 971
7.	Ireland	65 144
8.	Norway	61 197
9.	Switzerland	61 086
10.	United States of America	56 116

Source: The World Bank (http://data.worldbank.org/).

Additionally, we need to limit the influence of the factors culture as an informal institution and the institutional organization of the economic system which indirectly influence the consumer behaviour and choice. For example, if our empirical study is conducted in a country with Muslim culture or in a country with a socialistic economic system, the results will not be as objective and reliable as if the empirical study is conducted in a country with a capitalistic free market economy. For this reason, we need to limit the list with potential countries for the conduction of our empirical study only to the following countries – Luxembourg, Ireland, Norway, Switzerland, and the United States of America.

5. Empirical Data

5.1 Data Source

For the purpose of our empirical study, we need to obtain the following three types of data – first, we need data showing information for the amount of the personal consumer spending on wide range of goods and services for a specific time period in one of the five selected countries; second, we need data showing information for the number of population for the same specific time period and for the same country in order to estimate the average consumer spending per capita; and third, we need data showing information for the level of real disposable income for the same specific time period and for the same country in order to analyze the relationship between the amount of expenditure on specific goods and services and the level of real disposable income.

We can extract data for the amount of personal consumer spending on a wide range of goods and services from the following three sources – Eurostat[2], the Organization of Economic Cooperation and Development (OECD)[3], and the U.S. Bureau of Economic Analysis (BEA)[4]. If we use the data provided by Eurostat, we can have information about the consumption expenditure of private households for Luxembourg, Ireland, Norway, and Switzerland in the period between 1988 and 2010. On the other hand, if we use the data provided by the OECD, we can have information about the final consumption expenditures of households for the all five countries Luxembourg, Ireland, Norway, Switzerland, and the United States of America, and furthermore this information covers the period between 1950 and 2016. This means that so far, the data provided by the OECD is preferred rather than the data of Eurostat. However, the problem with the both sources is that the data provides information about the amount of personal consumption expenditure on goods and services which are aggregated into groups, as each group comprises of several different goods or services. But, we need information about the personal consumption expenditure on wide range of goods and services which data to be disaggregated as much as possible to the lowest microeconomic level.

For this reason, for our empirical study we decide to use the data provided by the U.S. Bureau of Economic Analysis (BEA) because their data comprises of information about the amount of personal consumption expenditure on a wide range of goods and services which data is disaggregated to the lowest possible microeconomic level. Furthermore, the range of data covers the period between 1959 and 2016. And this means that our final choice of country for the conduction of this empirical study is the United States of America because for this country we have the best possible data which will produce the most reliable results.

[2] Data comprising information about the consumption expenditure of private households for the countries in the European Union – http://ec.europa.eu/eurostat/web/household-budget-surveys/database.

[3] Data comprising information about the final consumption expenditures of households for the member countries of the OECD – https://stats.oecd.org/Index.aspx?DataSetCode=SNA_TABLE5.

[4] Data comprising information about the personal consumption expenditures only for the United States – https://www.bea.gov/national/consumer_spending.htm.

Second, we decide to use the data giving information about the number of the U.S. population for every single year in the period between 1959 and 2016 that is provided by the OECD because their population statistics is the best structured one in comparison to other potential data sources. We need these data in order to calculate the average consumption expenditure per capita and the average real disposable income per capita.

And third, we decide to use the data giving information about the level of the real disposable income for the United States in chained 2009 U.S. dollars for each single year in the period between 1959 and 2016 that is provided by the U.S. Bureau of Economic Analysis. The reason to choose this data source is because their data is the most accurate, and we used the same data source to extract information about the personal consumption expenditure.

5.2 Data Description

The purpose of our empirical study is to prove that there is an upper limit on the amount of expenditure for the consumption of any particular good or service which represents satiation of the consumer wants. In order to attain this purpose, we decided to examine the relationship of an Engel curve between the level of the real disposable income as an independent variable and the amount of expenditure for the consumption of a particular good or service as an dependent variable. In this model, the Engel curve displays satiation of the consumer wants, if from a certain level of income onwards, the slope becomes zero or negative. The method that we decide to use to attain this purpose is the conduction of nonlinear regression curve fitting analysis on SPSS Statistics. And according to Luigi Pasinetti (1981, p. 73), the Engel curves displaying satiation have three different shapes based on the type of good, whether it is necessity, normal, or inferior. This means that we need to select for our empirical study different types of goods and services which are necessity, normal, and inferior, and then to conduct the nonlinear regression curve fitting analysis between the level of the real disposable income as independent variable and the amount of expenditure as dependent variable for each single good or service considering its type. That is, the curve fitting analysis should produce logarithmic relationships for the necessity goods and services, logistic (sigmoid) relationships for the normal goods and services, and quadratic relationships for the inferior goods and services.

For our empirical study, we decide to use the following variety of goods and services:

1. Necessity goods – poultry meat; cosmetics, perfumery, and bath preparations.
2. Normal goods – televisions; video equipment (VHS players and DVD players); video cassettes and discs; audio equipment (audio players, CD players, and MP3 players); major household appliances; and motorcycles.
3. Inferior goods – pork meat as an inferior unhealthy alternative to the poultry meat; newspapers and magazines as an inferior alternative to the Internet sites; and land-line telephone services as an inferior alternative to the cellular telephone services.

Table 2 provides macroeconomic data (in brief version) on the aggregate amount of expenditure in million U.S. dollars for the consumption of the selected goods and services in the USA for the period between 1959 and 2016. Then, the same macroeconomic data in detailed version is provided by the figures 4-7.

Table 2

Aggregate amount of expenditure in million U.S. dollars for the consumption of selected goods and services in the USA for the period 1959-2016 (brief version) (USD)

Goods and Services:	1959	1969	1979	1989	1999	2009	2016
Major household appliances	4,113	5,923	12,464	21,671	27,600	36,135	41,729
Televisions	1,577	4,040	6,465	12,530	14,139	36,562	37,533
Video equipment (VHS players and DVD players)	453	1,133	3,560	8,324	13,404	18,297	21,129
Audio equipment (audio players, CD players, and MP3 players)	626	1,564	4,470	9,203	16,277	18,179	20,028
Video cassettes and discs	.....	.....	687	5,930	10,636	13,120	12,712
Motorcycles	75	516	2,936	2,049	6,329	9,269	13,333
Pork meat	2,581	4,149	9,841	15,971	18,219	25,799	29,950
Poultry meat	1,695	2,865	7,858	16,330	30,724	43,263	50,225
Cosmetics, perfumery, and bath preparations	1,477	3,351	9,710	20,073	26,171	39,587	54,089
Newspapers and Magazines	2,133	3,692	10,881	20,056	32,981	35,429	68,017
Land-line telephones services	2,151	4,773	13,218	28,313	48,632	40,447	28,380

Source: U.S. Bureau of Economic Analysis, "Table 2.4.5U. Personal Consumption Expenditures by Type of Product", https://www.bea.gov/iTable/iTable.cfm?reqid=12&step=1&acrdn=2#reqid=12&step=3&isuri=1&1204=1959&1203=2017&1206=a&1205=1000&1210=x&1211=0.

Figure 4

Aggregate amount of expenditure for the consumption of the following goods and services

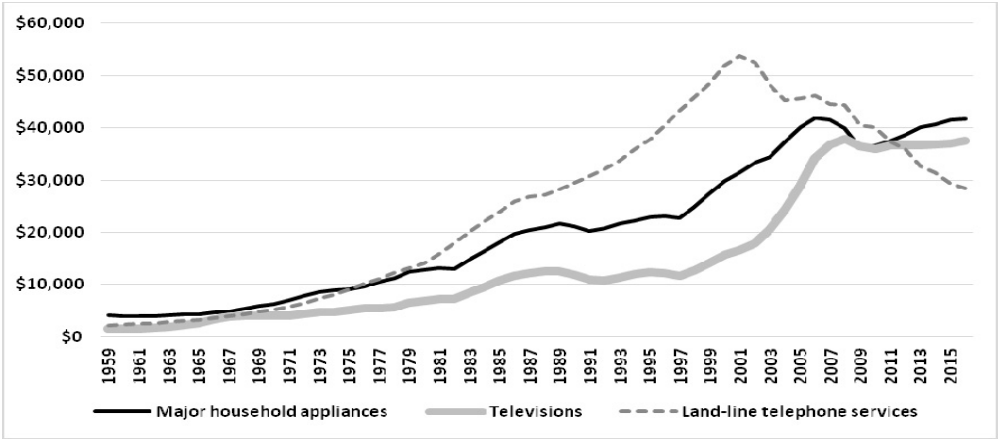


Figure 5

Aggregate amount of expenditure for the consumption of the following goods

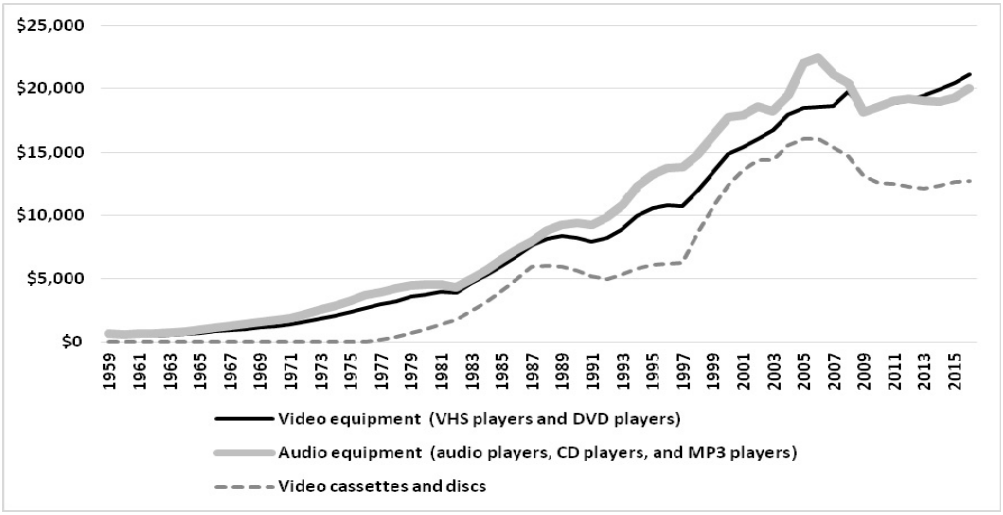


Figure 6

Aggregate amount of expenditure for the consumption of the following goods

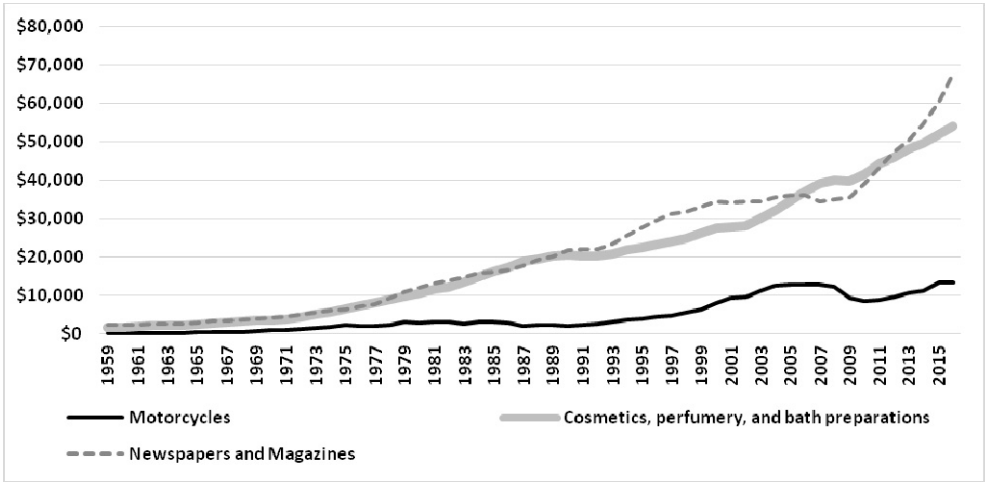
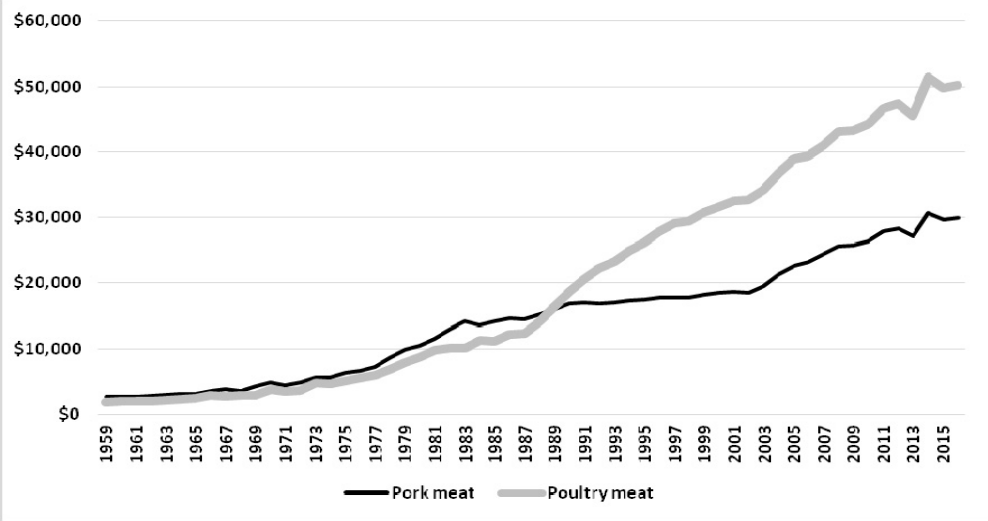


Figure 7

Aggregate amount of expenditure for the consumption of the following goods



Figures 4-7 illustrates that the amount of expenditure for the consumption of some goods and services increases while the amount of expenditure for the consumption of other goods and services decreases during the chosen period. But at a macroeconomic level, these observed changes in the aggregate amount of expenditure can be caused by the factor population growth. And for the purpose of our empirical study, we need to convert these macroeconomic data into microeconomic data by estimating the average amount of expenditure per capita for the consumption of the selected goods and services for every single year of the whole period. In this way, we isolate one of the factors which affect the change in the amount of expenditure, the rate of population growth.

Table 3

Number of the U.S. Population for each single year between 1959 and 2016

Year	Number	Year	Number	Year	Number	Year	Number	Year	Number	Year	Number
1959	177,829,600	1969	202,677,000	1979	225,055,500	1989	246,819,200	1999	279,040,200	2009	306,771,500
1960	180,671,200	1970	205,052,200	1980	227,224,700	1990	249,622,800	2000	282,162,400	2010	309,347,100
1961	183,691,500	1971	207,660,700	1981	229,465,700	1991	252,980,900	2001	284,969,000	2011	311,721,600
1962	186,537,700	1972	209,896,000	1982	231,664,500	1992	256,514,200	2002	287,625,200	2012	314,112,100
1963	189,241,800	1973	211,908,800	1983	233,792,000	1993	259,918,600	2003	290,107,900	2013	316,497,500
1964	191,888,800	1974	213,853,900	1984	235,824,900	1994	263,125,800	2004	292,805,300	2014	318,857,100
1965	194,303,000	1975	215,973,200	1985	237,923,800	1995	266,278,400	2005	295,516,600	2015	321,362,800
1966	196,560,300	1976	218,035,200	1986	240,132,900	1996	269,394,300	2006	298,379,900	2016	323,848,700
1967	198,712,100	1977	220,239,400	1987	242,288,900	1997	272,646,900	2007	301,231,200		
1968	200,706,000	1978	222,584,500	1988	244,499,000	1998	275,854,100	2008	304,094,000		

Source: Organization of Economic Cooperation and Development (OECD), https://stats.oecd.org/Index.aspx?DataSetCode=SNA_TABLE5.

Table 3 provides statistical data for the number of the U.S. population for the same time period for which we already have data about the aggregate amount of expenditure for the consumption of our selected goods and services. Having these statistical data, we can already estimate the average amount of expenditure per capita for the consumption of the selected goods and services. We need this further estimation for two reasons. First, we need to isolate the factor population because we already mentioned that the aggregate consumption can increase or decrease as a result of changes in the number of the population. By estimating the average amount of expenditure per capita for each single year of the whole period, we keep the factor population as a constant value which already is impossible to affect the results of our empirical study. But the second and more important reason to estimate the average amount of expenditure per capita is to obtain information for the average consumption at individual level because that is the main object of this empirical study.

Table 4

Average amount of expenditure per capita for the consumption of selected goods and services in the USA for the period 1959-2016 (brief version) (USD)

Goods and Services	1959	1969	1979	1989	1999	2009	2016
Major household appliances	23.13	29.22	55.38	87.80	98.91	117.79	128.85
Televisions	8.87	19.93	28.73	50.77	50.67	119.18	115.90
Video equipment (VHS players and DVD players)	2.55	5.59	15.82	33.73	48.04	59.64	65.24
Audio equipment (audio players, CD players, and MP3 players)	3.52	7.72	19.86	37.29	58.33	59.26	61.84
Video cassettes and discs	.....	.....	3.05	24.03	38.12	42.77	39.25
Motorcycles	0.42	2.55	13.05	8.30	22.68	30.21	41.17
Pork meat	14.51	20.47	43.73	64.71	65.29	84.10	92.48
Poultry meat	9.53	14.14	34.92	66.16	110.11	141.03	155.09
Cosmetics, perfumery, and bath preparations	8.31	16.53	43.14	81.33	93.79	129.04	167.02
Newspapers and Magazines	11.99	18.22	48.35	81.26	118.19	115.49	210.03
Land-line telephones services	12.10	23.55	58.73	114.71	174.28	131.85	87.63

Source: Author's calculations based on the data–U.S. Bureau of Economic Analysis, "Table 2.4.5U. Personal Consumption Expenditures by Type of Product", https://www.bea.gov/iTable/iTable.cfm?reqid=12&step=1&acrdn=2#reqid=12&step=3&isuri=1&1204=1959&1203=2017&1206=a&1205=1000&1210=x&1211=0.

Figure 8
Average amount of expenditure per capita for the consumption of the following goods and services

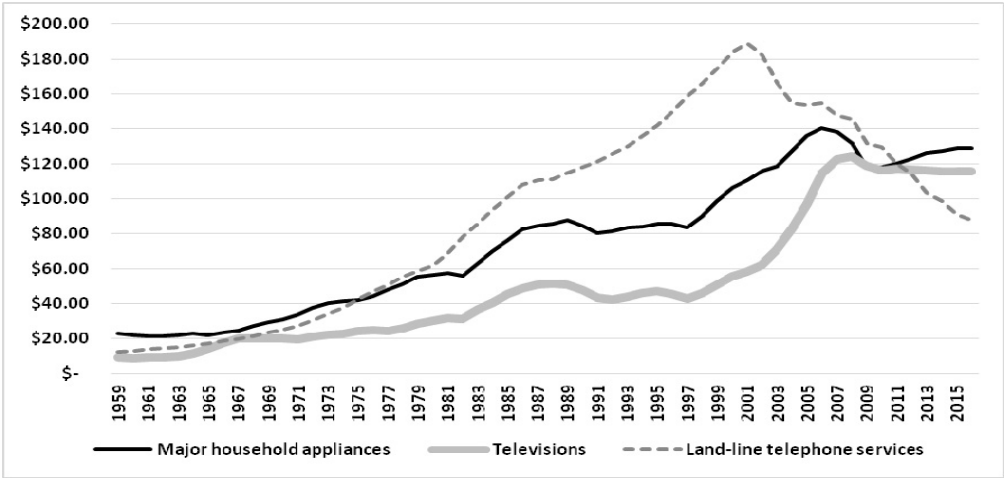


Figure 9
Average amount of expenditure per capita for the consumption of the following goods

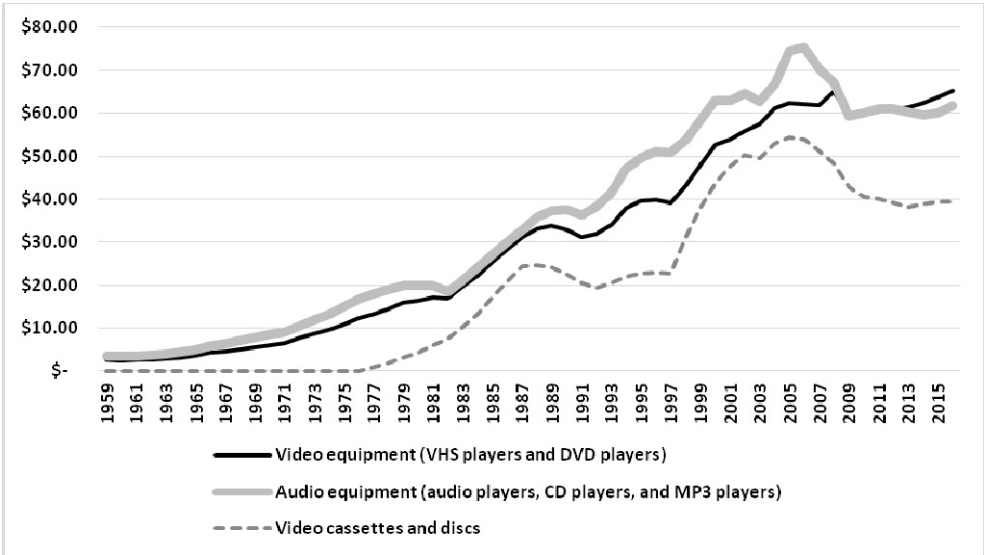


Figure 10

Average amount of expenditure per capita for the consumption of the following goods

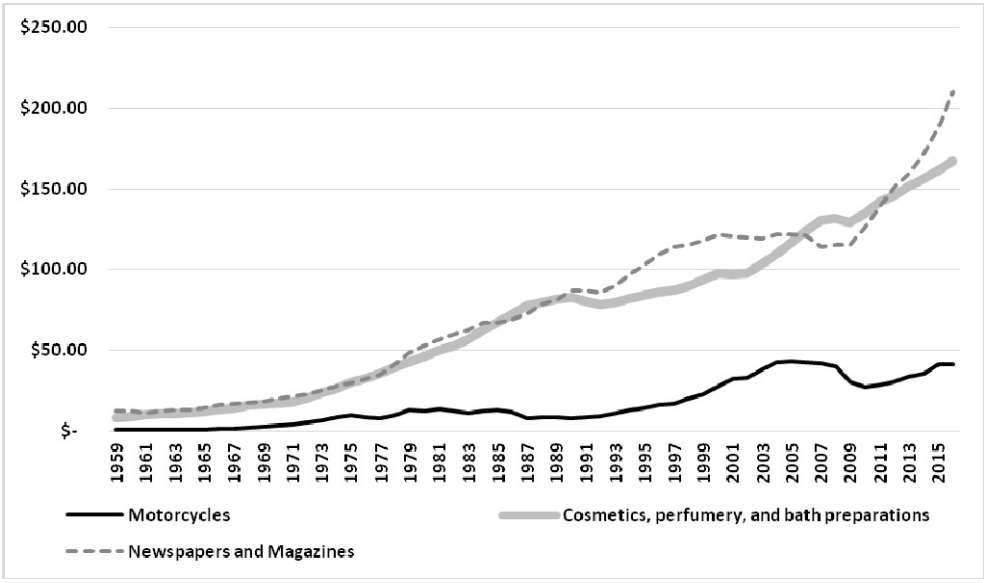
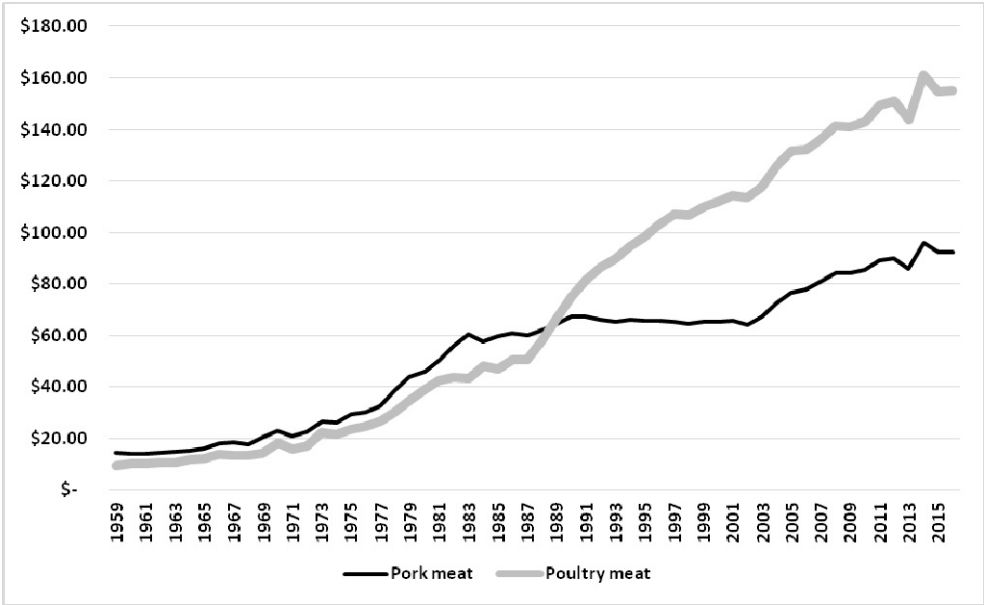


Figure 11

Average amount of expenditure per capita for the consumption of the following goods



What is clearly seen on Figures 8-11 is that on microeconomic level, the average amount of expenditure per capita for the consumption of major household appliances, televisions, land-line telephone services, VHS players and DVD players, audio players, CD players, and MP3 players, video cassettes and discs, motorcycles, and pork meat either decrease or at least remain constant after some point of the whole period between 1959 and 2016. Of course, it is not excluded the observed stagnations and decreases in the consumption of these goods and services to be as a result of the factor income. That is, the level of income may also have undergone the same reduction periods as those in which we observe reduction or stagnation in the consumption of the several goods and services illustrated on Figures 8-11. However, if we want to prove that the observed reduction or stagnation in the consumption is caused by satiation of the consumer wants, we have to examine only those intervals in which the level of income is continuously increasing.

Table 5

Real Gross Disposable Income (after-tax) in chained 2009 U.S. dollars

Year	Income	Year	Income	Year	Income
1959	2,092,100,000,000	1979	4,557,800,000,000	1999	8,477,700,000,000
1960	2,146,900,000,000	1980	4,590,500,000,000	2000	8,902,200,000,000
1961	2,222,700,000,000	1981	4,705,600,000,000	2001	9,148,700,000,000
1962	2,328,900,000,000	1982	4,803,300,000,000	2002	9,431,600,000,000
1963	2,416,500,000,000	1983	4,971,000,000,000	2003	9,690,100,000,000
1964	2,588,100,000,000	1984	5,314,000,000,000	2004	10,035,700,000,000
1965	2,748,900,000,000	1985	5,476,200,000,000	2005	10,189,400,000,000
1966	2,895,000,000,000	1986	5,687,800,000,000	2006	10,595,400,000,000
1967	3,020,600,000,000	1987	5,811,000,000,000	2007	10,820,600,000,000
1968	3,157,400,000,000	1988	6,083,900,000,000	2008	10,987,300,000,000
1969	3,264,400,000,000	1989	6,268,700,000,000	2009	10,942,500,000,000
1970	3,413,200,000,000	1990	6,393,500,000,000	2010	11,055,100,000,000
1971	3,570,400,000,000	1991	6,438,400,000,000	2011	11,331,200,000,000
1972	3,741,200,000,000	1992	6,714,200,000,000	2012	11,688,300,000,000
1973	3,968,600,000,000	1993	6,823,600,000,000	2013	11,527,600,000,000
1974	3,923,600,000,000	1994	7,010,700,000,000	2014	11,931,000,000,000
1975	4,020,000,000,000	1995	7,245,800,000,000	2015	12,343,300,000,000
1976	4,144,000,000,000	1996	7,476,100,000,000	2016	12,677,400,000,000
1977	4,274,800,000,000	1997	7,751,300,000,000		
1978	4,470,500,000,000	1998	8,208,100,000,000		

Source: U.S. Bureau of Economic Analysis, "Table 1.17.6. Real Gross Domestic Income, Real Disposable Personal Income in chained 2009 U.S. Dollars", https://www.bea.gov/iTable/iTable.cfm?reqid=9&step=1&acrdn=2#reqid=9&step=3&isuri=1&904=1959&903=318&906=a&905=1000&910=x&911=0.

Table 6

Real Average Disposable Personal Income (after-tax) per capita in chained 2009 U.S. dollars

Year	Income	Year	Income	Year	Income	Year	Income	Year	Income	Year	Income
1959	11,765	1969	16,106	1979	20,252	1989	25,398	1999	30,382	2009	35,670
1960	11,883	1970	16,646	1980	20,202	1990	25,613	2000	31,550	2010	35,737
1961	12,100	1971	17,193	1981	20,507	1991	25,450	2001	32,104	2011	36,350
1962	12,485	1972	17,824	1982	20,734	1992	26,175	2002	32,791	2012	37,211
1963	12,769	1973	18,728	1983	21,262	1993	26,253	2003	33,402	2013	36,422
1964	13,487	1974	18,347	1984	22,534	1994	26,644	2004	34,274	2014	37,418
1965	14,147	1975	18,613	1985	23,017	1995	27,211	2005	34,480	2015	38,409
1966	14,728	1976	19,006	1986	23,686	1996	27,752	2006	35,510	2016	39,146
1967	15,201	1977	19,410	1987	23,984	1997	28,430	2007	35,921		
1968	15,731	1978	20,085	1988	24,883	1998	29,755	2008	36,131		

Source: Author's calculations based on the data–U.S. Bureau of Economic Analysis, "Table 1.17.6. Real Gross Domestic Income, Real Disposable Personal Income in chained 2009 U.S. Dollars", https://www.bea.gov/iTable/iTable.cfm?reqid=9&step=1&acrdn=2#reqid=9&step=3&isuri=1&904=1959&903=318&906=a&905=1000&910=x&911=0

Table 7

Annual Growth of the Real Average Disposable Personal Income (after-tax) per capita in chained 2009 U.S. dollars

Year	Growth	Year	Growth	Year	Growth	Year	Growth	Year	Growth	Year	Growth
1959	0	1969	375	1979	167	1989	515	1999	626	2009	-461
1960	118	1970	539	1980	-49	1990	215	2000	1,168	2010	67
1961	217	1971	548	1981	304	1991	-163	2001	554	2011	614
1962	385	1972	631	1982	227	1992	725	2002	687	2012	860
1963	285	1973	904	1983	529	1993	78	2003	610	2013	-788
1964	718	1974	-381	1984	1,271	1994	391	2004	873	2014	996
1965	660	1975	266	1985	483	1995	567	2005	206	2015	991
1966	581	1976	393	1986	669	1996	540	2006	1,030	2016	737
1967	473	1977	404	1987	298	1997	678	2007	411		
1968	531	1978	675	1988	899	1998	1,325	2008	210		

Source: Author's calculations based on the data–U.S. Bureau of Economic Analysis, "Table 1.17.6. Real Gross Domestic Income, Real Disposable Personal Income in chained 2009 U.S. Dollars", https://www.bea.gov/iTable/iTable.cfm?reqid=9&step=1&acrdn=2#reqid=9&step=3&isuri=1&904=1959&903=318&906=a&905=1000&910=x&911=0

Table 8

Years with negative income growth

Years with negative income growth				
1974	1980	1991	2009	2013

Intervals with continuously increasing level of income

Intervals with continuously increasing level of income			
№	since	to	duration
1.	1959	1973	15 years
2.	1975	1979	5 years
3.	1981	1990	10 years
4.	1992	2008	17 years
5.	2010	2012	3 years
6.	2014	2016	3 years

Table 5 provides statistical data for the real gross disposable income (after-tax) in chained 2009 U.S. dollars for the whole period since 1959 through 2016. And having already access to the statistical data in Table 3 for the number of the U.S. population for the same period between 1959 and 2016, in Table 6 we calculate the real average disposable personal income (after-tax) per capita in chained 2009 U.S. dollars. Based on the derived data for the real average disposable personal income (after-tax) per capita in chained 2009 U.S. dollars, we calculate in Table 7 the annual growth of the income which gives us information for the intervals with continuously increasing level of income in Table 8. And exactly these are the separate intervals that we need in order to conduct appropriately our empirical study.

The purpose of this study is to examine among a wide range of goods and services whether the Engel curve displays satiation of the consumer wants in the form of zero or even negative slope from a certain level of income onwards. To achieve this purpose in our empirical study, we decide to conduct a non-linear regression curve fitting analysis between the independent variable real disposable income and the dependent variable amount of expenditure for the consumption of a particular good or service. As the results of the study should confirm the statistical significance of a logarithmic, logistic (sigmoid), or quadratic relationship between the two variables depending on whether the good is respectively either a necessity, normal, or an inferior good. And exactly these three kinds of non-linear relationships between the two variables reproduce Engel curves displaying satiation of the consumer wants in the form of zero or negative slope from a certain level of income onwards. The non-linear regression curve fitting analysis between the independent variable real disposable income and the dependent variable amount of expenditure for the consumption of a particular good or service will be conducted only for those intervals with continuously increasing level of income.

According to the law of demand however, the quantity demanded for a particular good or service is determined by the factor price. That is, a change in the factor price causes a change in the quantity demanded, all other things equal. This means, that if we want in our empirical study to examine the relationship between the factor income and the demand for a particular good or service at each price, first we need to isolate the factor price as a

constant. For example, if we conduct regression analysis between the independent variable income and the dependent variable nominal amount of expenditure for the consumption of a particular good or service, this study will not produce reliable results because the change in the nominal amount of expenditure for the consumption of any good or service can be caused not only by the factor income but also by the factor price of that good or service. For this reason, in order to isolate the factor price as constant, it is required in our empirical study to conduct the non-linear regression curve fitting analysis between the level of the real disposable income per capita in chained dollars and the inflation-adjusted amount of expenditure for the consumption of the particular good or service in the same chained dollars. We already have statistical data with the real average disposable personal income (after-tax) per capita in chained 2009 U.S. dollars, and now we need only to calculate and the inflation-adjusted amount of expenditure for the consumption of our selected goods and services in chained 2009 U.S. dollars for each single year since 1959 through 2016.

Table 9

Price Indexes for personal consumption expenditures of selected goods and services in the USA for the period 1959-2016 (brief version), Index Numbers: 2009 = 100

Goods and Services	1959	1969	1979	1989	1999	2009	2016
Major household appliances	60.911	55.927	83.307	99.850	96.123	100.000	81.386
Televisions	1,268.737	1,000.867	1,034.472	754.490	521.893	100.000	25.876
Video equipment (VHS players and DVD players)	1,351.102	1,351.102	1,358.674	896.999	430.138	100.000	55.188
Audio equipment (audio players, CD players, and MP3 players)	240.985	187.351	210.779	201.367	166.820	100.000	69.762
Video cassettes and discs	.....	.....	431.842	285.077	155.421	100.000	69.886
Motorcycles	26.571	26.192	41.661	64.649	94.438	100.000	111.078
Pork meat	20.499	27.201	53.127	66.208	80.486	100.000	116.033
Poultry meat	29.480	30.538	50.134	68.916	77.291	100.000	113.012
Cosmetics, perfumery, and bath preparations	23.966	26.095	45.280	71.462	90.027	100.000	102.826
Newspapers and Magazines	10.528	15.834	30.332	52.604	78.311	100.000	124.566
Land-line telephones services	22.449	22.688	29.705	62.012	71.337	100.000	115.775

Source: U.S. Bureau of Economic Analysis, "Table 2.4.4U. Price Indexes for Personal Consumption Expenditures by Type of Product", https://www.bea.gov/iTable/iTable.cfm?reqid=12&step=1&acrdn=2#reqid=12&step=3&isuri=1&1204=1959&1203=2016&1206=a&1205=1000&1210=x&1211=0.

Table 10

Average inflation-adjusted amount of expenditure per capita for the consumption of selected goods and services in the USA for the period 1959-2016 (brief version) (USD)

Goods and Services	1959	1969	1979	1989	1999	2009	2016
Major household appliances	37.97	52.25	66.48	87.93	102.90	117.79	158.32
Televisions	0.70	1.99	2.78	6.73	9.71	119.18	447.89
Video equipment (VHS players and DVD players)	0.19	0.41	1.16	3.76	11.17	59.64	118.22
Audio equipment (audio players, CD players, and MP3 players)	1.46	4.12	9.42	18.52	34.97	59.26	88.65
Video cassettes and discs	.....	.....	0.71	8.43	24.52	42.77	56.17
Motorcycles	1.59	9.72	31.31	12.84	24.02	30.21	37.06
Pork meat	70.80	75.26	82.31	97.73	81.12	84.10	79.70
Poultry meat	32.33	46.29	69.65	96.00	142.46	141.03	137.23
Cosmetics, perfumery, and bath preparations	34.66	63.36	95.28	113.80	104.18	129.04	162.43
Newspapers and Magazines	113.93	115.04	159.40	154.47	150.93	115.49	168.61
Land-line telephones services	53.88	103.80	197.72	184.98	244.31	131.85	75.69

Source: Author's calculations based on the data in Table 4 and Table 9.

Now, we already have the all necessary statistical data for the conduction of the non-linear regression curve fitting analysis between the independent variable real average disposable personal income (after-tax) per capita in chained 2009 U.S. dollars in Table 6 and the dependent variable inflation-adjusted average amount of expenditure per capita for the consumption of the selected goods and services in chained 2009 U.S. dollars in Table 10. As we expect the results of this empirical study to confirm the statistical significance of a logarithmic, logistic (sigmoid), or quadratic relationship between the two variables depending on whether the good is respectively either necessity, normal, or inferior. And these three kinds of relationships between the two variables reproduce Engel curves displaying satiation of the consumer wants in the form of zero or negative slope from a certain level of income onwards.

6. Empirical Results

We conduct the non-linear regression curve fitting analysis between the independent variable real disposable income per capita and the dependent variable inflation-adjusted average amount of expenditure per capita for the consumption of the selected goods and services by using the assistance of the software IBM SPSS Statistics 24.0. And to interpret the results from this analysis, we are using the following indicators.

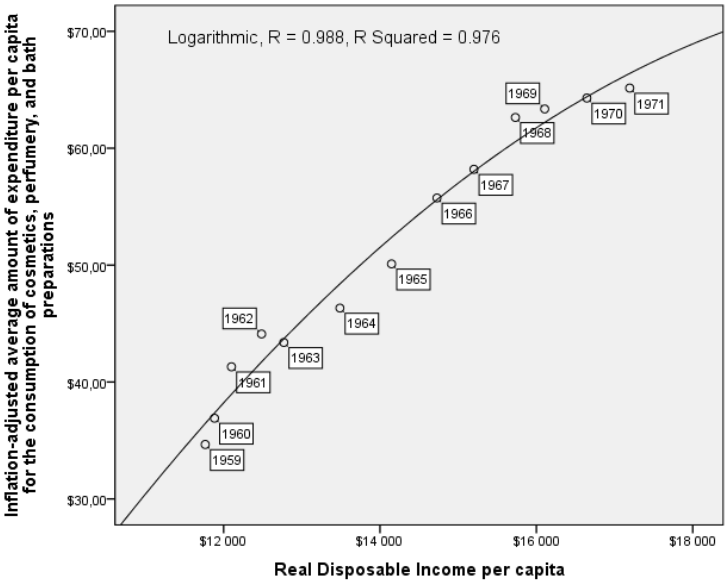
First, the value of the correlation coefficient r explains the strength of the relationship between the two variables examined. When the absolute value of the correlation coefficient r is in the range between 0 and 0.3, it is assumed that the relationship between the two variables is weak, between 0.3 and 0.7 – the relationship is average, and in the range between 0.7 and 1 – the relationship is strong. Second, the value of the determination

coefficient r^2 (R Squared) shows what percentage of the scattering of the dependent variable is the result of the action of the independent variable. As in our case, the dependent variable is the average amount of expenditure per capita for the consumption of good 'X', and the independent variable is the real disposable income per capita. Third, the significance level of the F criterion denoted as Sig. F indicates whether the examined model is statistically adequate or inadequate. When the significance level of the F criterion denoted as Sig. F has a value less than the error $\alpha = 0.05$, it is assumed that the model satisfactorily represents the relationship between the two variables and therefore we can assume that the examined model is statistically adequate.

In our empirical study, the confirmation of a logarithmic, logistic (sigmoid), or quadratic relationship between the two variables depending on whether the good is respectively either a necessity, normal, or an inferior good, would be statistically adequate provided that the values of the correlation coefficient r and the determination coefficient r^2 (R Squared) are closer to 1, and also the significance level of the F criterion denoted as Sig. F has a value less than the error $\alpha = 0.05$.

1. Necessity goods – for the selected necessity goods, the results in Figures 12-14 show that we have statistical confirmation of a logarithmic relationship between the independent variable real disposable income per capita and the dependent variable inflation-adjusted average amount of expenditure per capita for the consumption of poultry meat during the interval 1962-1973, and for the consumption of cosmetics, perfumery, and bath preparations during two separate intervals, respectively 1959-1971, and 1982-1990.

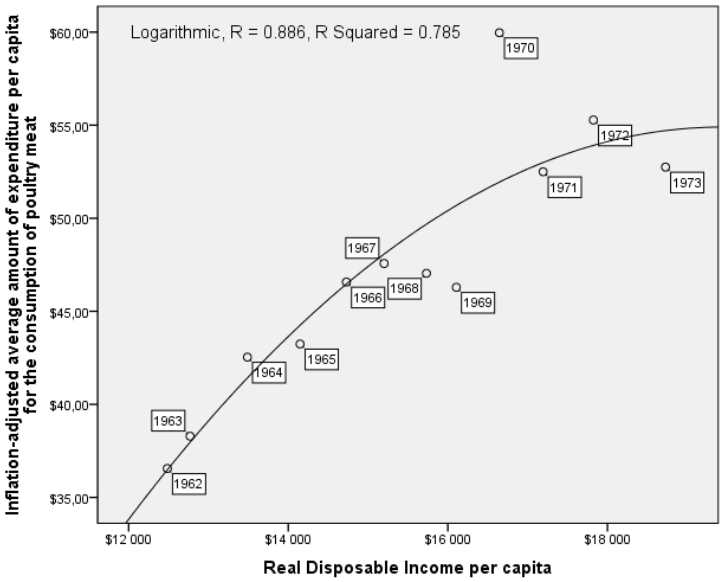
Figure 12
Consumption of cosmetics, perfumery, and bath preparations during the interval 1959-1971



The logarithmic relationship is statically adequate when the correlation coefficient r and the determination coefficient r^2 (R Squared) are closer to 1.000.

Figure 13

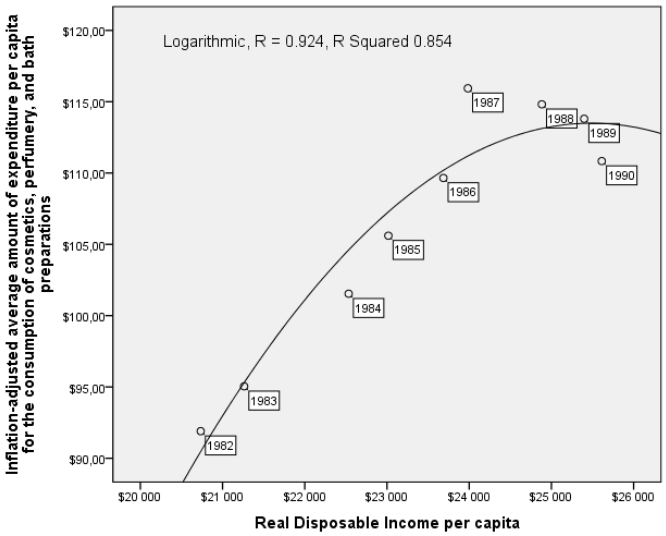
Consumption of poultry meat during the interval 1962-1973



The logarithmic relationship is statically adequate when the correlation coefficient r and the determination coefficient r^2 (R Squared) are closer to 1.000.

Figure 14

Consumption of cosmetics, perfumery, and bath preparations during the interval 1982-1990

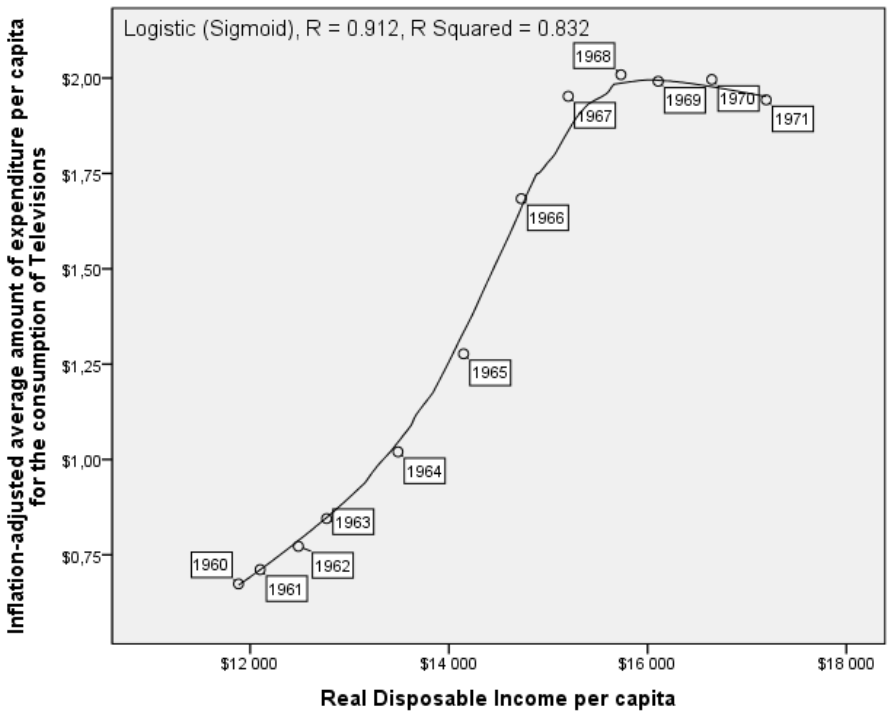


The logarithmic relationship is statically adequate when the correlation coefficient r and the determination coefficient r^2 (R Squared) are closer to 1.000.

2. Normal goods – for the selected normal goods, the results in Figures 15-23 show that we have statistical confirmation of a logistic (sigmoid) relationship between the independent variable real disposable income per capita and the dependent variable inflation-adjusted average amount of expenditure per capita for the consumption of televisions during two separate intervals, respectively 1960-1971, and 1981-1990, for the consumption of VHS players during the interval 1981-1990, for the consumption of video cassettes during the same interval 1981-1990, for the consumption of audio players during the interval 1982-1990, for the consumption of major household appliances during two separate intervals, respectively 1982-1990, and 1992-2008, for the consumption of video cassettes and discs during the interval 1992-2007, and for the consumption of motorcycles during the interval 1992-2008.

Figure 15

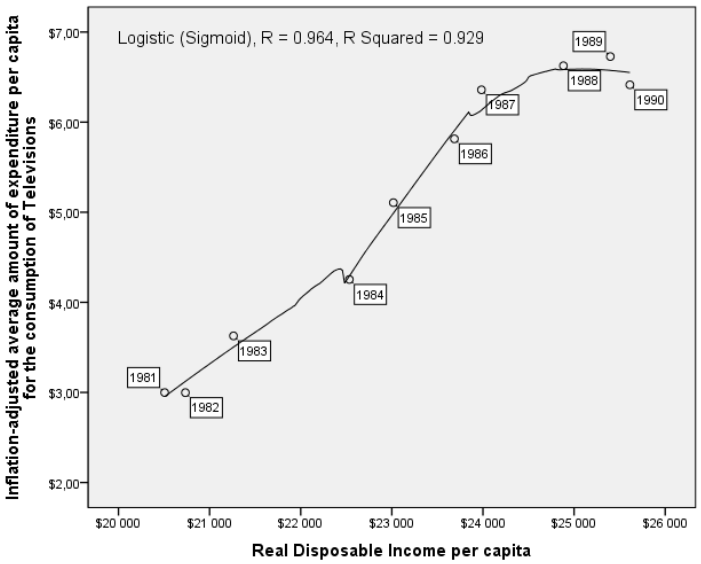
Consumption of televisions during the interval 1960-1971



The sigmoid relationship is statically adequate when the correlation coefficient r and the determination coefficient r^2 (R Squared) are closer to 1.000.

Figure 16

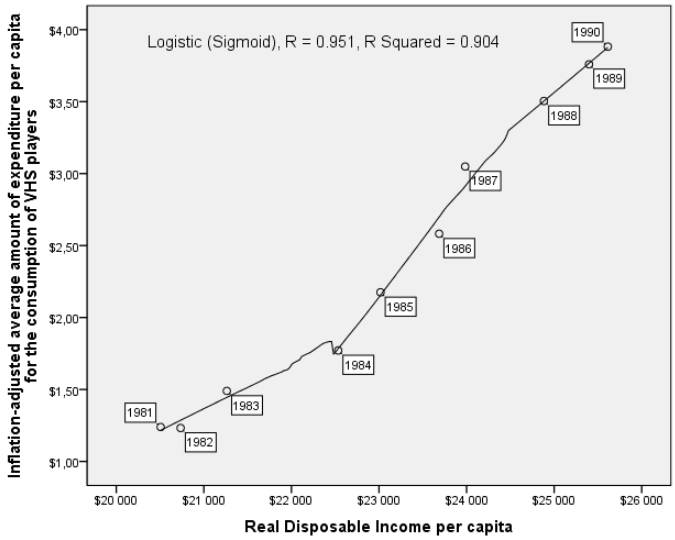
Consumption of televisions during the interval 1981-1990



The sigmoid relationship is statically adequate when the correlation coefficient r and the determination coefficient r^2 (R Squared) are closer to 1.000.

Figure 17

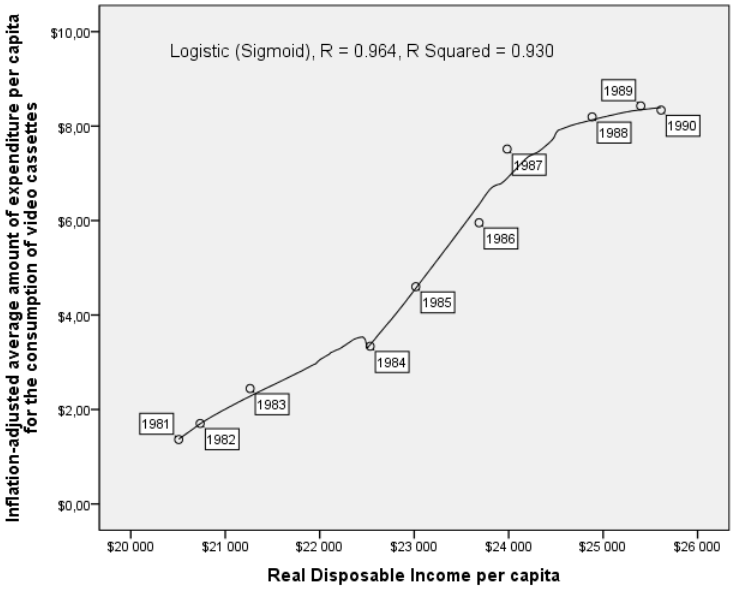
Consumption of VHS players during the interval 1981-1990



The sigmoid relationship is statically adequate when the correlation coefficient r and the determination coefficient r^2 (R Squared) are closer to 1.000.

Figure 18

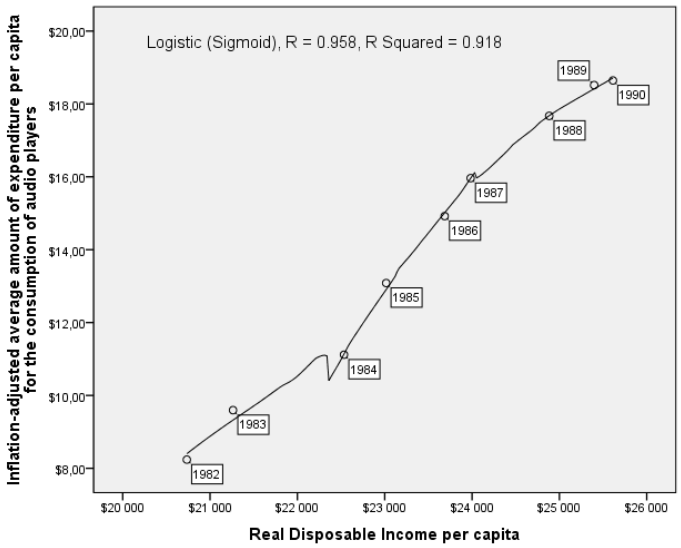
Consumption of video cassettes during the interval 1981-1990



The sigmoid relationship is statically adequate when the correlation coefficient r and the determination coefficient r^2 (R Squared) are closer to 1.000.

Figure 19

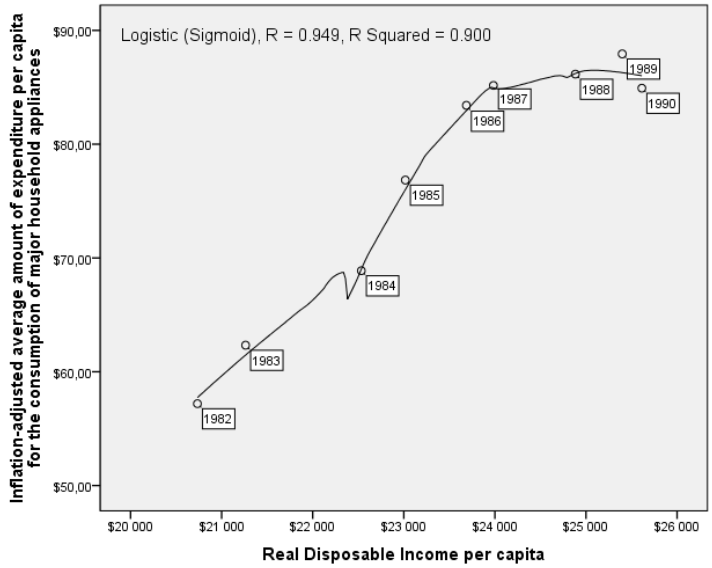
Consumption of audio players during the interval 1982-1990



The sigmoid relationship is statically adequate when the correlation coefficient r and the determination coefficient r^2 (R Squared) are closer to 1.000.

Figure 20

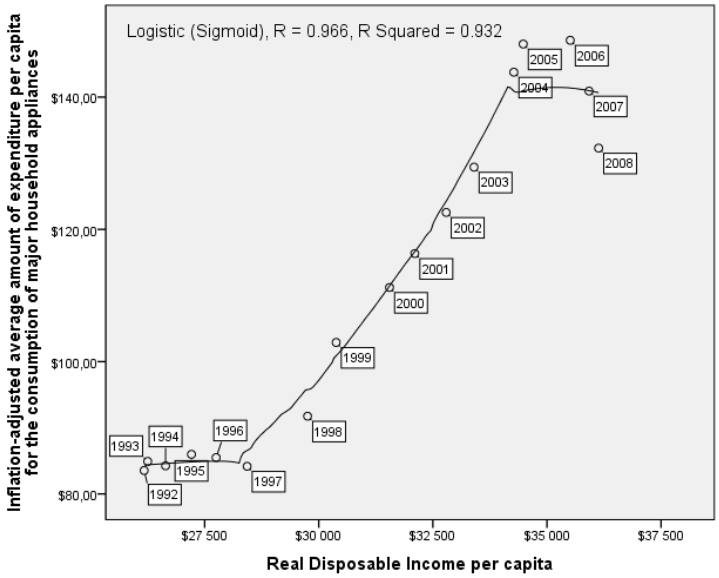
Consumption of major household appliances during the interval 1982-1990



The sigmoid relationship is statically adequate when the correlation coefficient r and the determination coefficient r^2 (R Squared) are closer to 1.000.

Figure 21

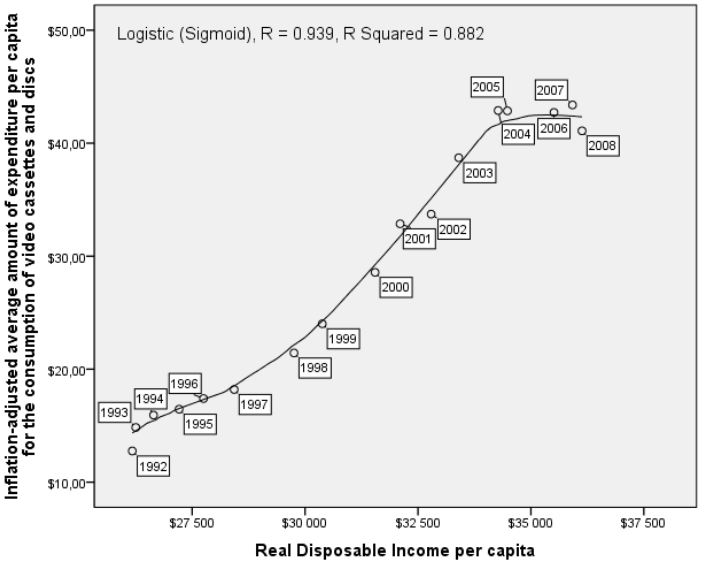
Consumption of major household appliances during the interval 1992-2008



The sigmoid relationship is statically adequate when the correlation coefficient r and the determination coefficient r^2 (R Squared) are closer to 1.000.

Figure 22

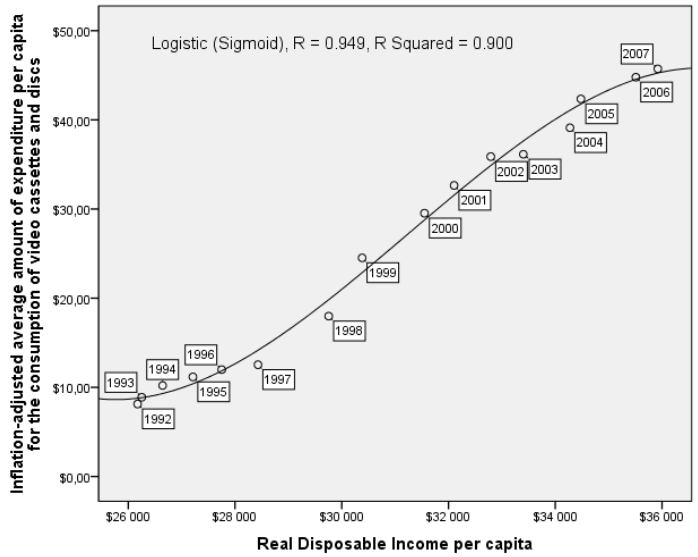
Consumption of motorcycles during the interval 1992-2008



The sigmoid relationship is statically adequate when the correlation coefficient r and the determination coefficient r^2 (R Squared) are closer to 1.000.

Figure 23

Consumption of video cassettes and discs during the interval 1992-2007

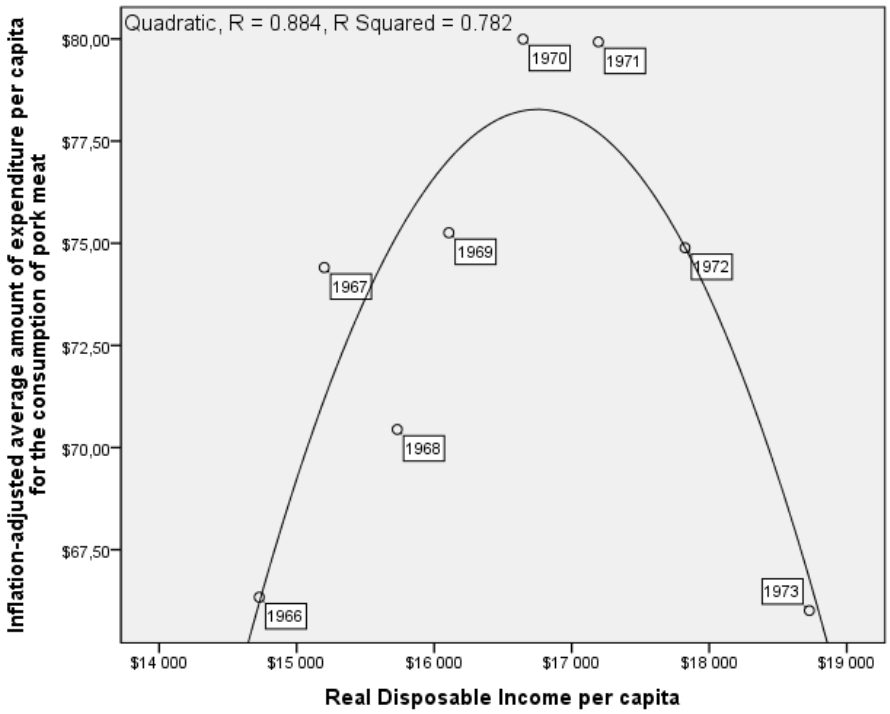


The sigmoid relationship is statically adequate when the correlation coefficient r and the determination coefficient r^2 (R Squared) are closer to 1.000.

3. Inferior goods – for the selected inferior goods, the results in Figures 24-26 show that we have statistical confirmation of a quadratic relationship between the independent variable real disposable income per capita and the dependent variable inflation-adjusted average amount of expenditure per capita for the consumption of pork meat during the interval 1966 – 1973, for the consumption of newspapers and magazines during the interval 1992 – 2008, and for the consumption of land-line telephone services during the same interval 1992 – 2008.

Figure 24

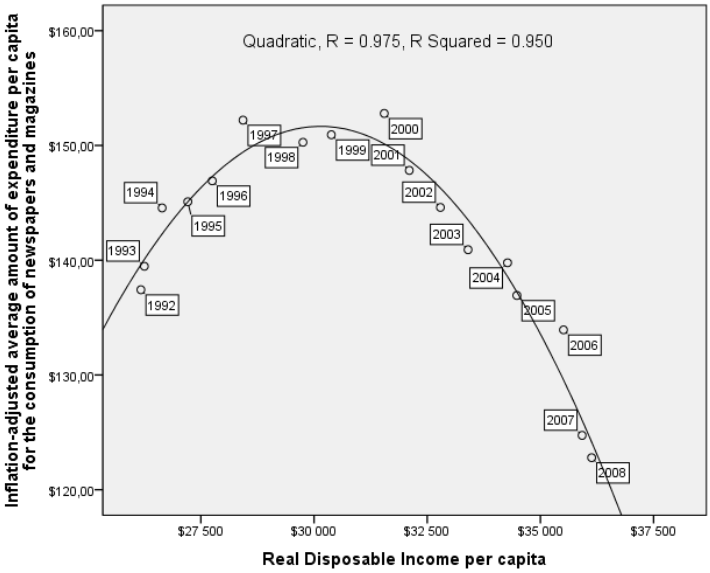
Consumption of pork meat during the interval 1966-1973



The quadratic relationship is statically adequate when the correlation coefficient r and the determination coefficient r^2 (R Squared) are closer to 1.000.

Figure 25

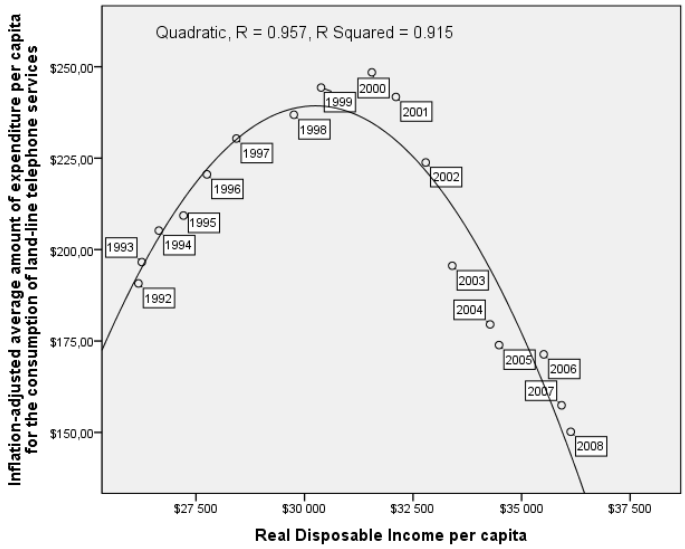
Consumption of newspapers and magazines during the interval 1992-2008



The quadratic relationship is statically adequate when the correlation coefficient r and the determination coefficient r^2 (R Squared) are closer to 1.000.

Figure 26

Consumption of land-line telephone services during the interval 1992-2008



The quadratic relationship is statically adequate when the correlation coefficient r and the determination coefficient r^2 (R Squared) are closer to 1.000.

7. Conclusion

The results from the conducted study empirically confirm that there is indeed satiation of the consumer wants represented by the Engel curves theoretically described in Luigi Pasinetti (1981: 73) which display an upper limit on the average amount of expenditure per capita that is allocated by a consumer to any one of the selected goods and services in our study, regardless of how much his income grows. And furthermore, our empirical results confirm that there is satiation of the consumer wants for all three types of goods, as their Engel curves display satiation of the consumer wants in the form of zero slope for the necessities and normal goods and in the form of negative slope for the inferior goods from a certain level of income onwards.

First, our analysis on the obtained results from the empirical study starts with the selected necessity goods. The observed slowdown in the consumption of poultry meat during the examined 1962 – 1973 interval actually reproduces the empirical evidence of the Engel (1857) study which empirically confirmed that the richer a consumer becomes, he will spend less percentage of his income on food. While a good explanation for the slowdown in the consumption of cosmetics, perfumery, and bath preparations during the two separate intervals, respectively 1959 – 1971, and 1982 – 1990, could be explained with the fact that the richer a consumer becomes, he will prefer to spend greater proportion of his income not on necessities but on other normal goods which are luxuries.

Then, our analysis on the obtained results from the empirical study continues with the selected normal goods. The analysis shows that while the income of the consumer was growing permanently during the two intervals 1960 – 1971, and 1981 – 1990, we observe in our empirical study that at some point there is a slowdown in the consumption of televisions. The former slowdown in the consumption of televisions can be explained with the fact that until the end of the 1960 – 1971 interval a vast majority of the consumers had already possessed black-and-white televisions, and only a small percentage of them wanted to replace their old black-and-white televisions for new black-and-white televisions. But after, the advent of the coloured televisions in the early 1980s, we observe a new rapid growth in the purchase of new televisions, this time coloured televisions, which growth was again followed by a slowdown in the consumption of televisions until the end of the 1981 – 1990 interval. And, again this slowdown in the consumption of televisions can be explained for the same reasons like the first slowdown that the vast majority of the consumers had already possessed coloured televisions and there was no further need to replace them. Also, we can use exactly the same reasons in order to explain the slowdown in the consumption of such normal goods as VHS players and their complementary goods video cassettes during the interval 1981 – 1990, audio players and major household appliances during the interval 1982 – 1990. Actually, all these normal goods that we listed so far are the perfect examples that there is always a satiation of the consumer wants when a product enters the maturity stage of its life cycle.

And finally, our analysis on the obtained results from the empirical study ends with the selected inferior goods. In our empirical study, we observe that while the income of the consumers was continuously growing during the interval 1966 – 1973, at the same time there was a decline in the consumption of pork meat which can be explained with the fact

that in terms of healthy food, the pork meat is an inferior substitute to the poultry meat which consumption was growing during the same interval. The decline in the consumption of newspapers and magazines, and land-line telephone services during the 1992 – 2008 interval when the income of the consumers was also continuously growing can be explained with the advent of the electronic media on Internet which caused decline in the consumption of newspapers and magazines, and with the advent of the mobile telephone services which caused decline in the consumption of land-line telephone services.

Based on the results from this empirical study, we reach to the conclusion that the validity of the non-satiation axiom in the neoclassical consumer choice theory is being rejected.

References

Barten, A. P. and Böhm, V. (1982). Consumer Theory. – Handbook of Mathematical Economics, Vol. 2, p. 381-429.

Bishop, R. L. (1946). Professor Knight and the Theory of Demand. – Journal of Political Economy, Vol. 54, N 2 (April 1946), pp. 141-169.

Chai, A. and Moneta, A. (2008). Satiation, Escaping Satiation, and Structural Change: Some Evidence from the Evolution of Engel Curves. Papers on Economics and Evolution, Evolutionary Economics Group, Max Planck Institute of Economics, Jena.

Deaton, A. S. and Muellbauer, J. (1980). Economic Theory and Consumer Behavior. Cambridge, Cambridge University Press.

Engel, E. (1857). Die Productions und Consumtionsverhältnisse des Königreichs Sachsen. – Zeitschrift des statistischen Bureaus des Königlich Sächsischen Ministerium des Inneren. N 8-9, pp. 28-29.

Hicks, J. and Allen, R. (1934). A reconsideration of the theory of value. – Economica, Vol. 1, N 1, Part I: pp. 52-76, Part II: pp. 196-219.

Houthakker, H. S. (1957). An international comparison of household expenditure patterns, commemorating the centenary of Engel's law. – Econometrica, Vol. 25, pp. 532-551.

Johnson, W. E. (1913). The pure theory of utility curves. – Economic Journal, Vol. 23, pp. 483-513.

Knight, F. H. (1944). Realism and Relevance in the Theory of Demand. – Journal of Political Economy, Vol. 52, N 4 (December 1944), pp. 289-318.

Lebergott, S. (1993). Pursuing happiness – American consumers in the Twentieth Century. Princeton University Press, Princeton.

Pareto, V. **(**1906). Manual of Political Economy. Edited by Ann S. Schwier and Alfred N. Page. Translated by Ann S. Schwier. New York: A.M. Kelley.

Pasinetti, L. (1981). Structural Change and Economic Growth. Cambridge, Cambridge University Press.

Slutsky, E. (1915). Sulla teoria del bilancio del consumatore. – Giornale degli Economisti, Vol. 51, pp. 1-26.

Volland, B. (2012). Differential Satiation and Habit Persistence in Consumer Demand. Papers on Economics and Evolution, Evolutionary Economics Group, Max Planck Institute of Economics, Jena.

Witt, U. (2001). Learning to consume – a theory of wants and the growth of demand. – Journal of Evolutionary Economics, Vol. 11, pp. 23-36.

Witt, U. (2010). Symbolic Consumption and the Social Construction of Product Characteristics. – Structural Change and Economic Dynamics, Vol. 25, N 1, pp. 17-25.

ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
ECONOMIC STUDIES

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Yanica Dimitrova[1]

THE CULTURE OF INNOVATION MODEL

The article examines the possibility of creating, implementing and managing a culture of innovation in modern business organizations. The author did a brief review of innovation landscape included theories on unique resources and core competencies, the creation and dissemination of organizational knowledge, learning organization and organizational learning, the types of innovation and the emphasis on the concept of open innovation. Researchers have not fully elucidated the search for a link between corporate culture and innovation. For this study, the relationship between some of the main components of the organization – leadership, structure, strategy – is outlined to feature the main characteristics of the innovation culture domain, according to the views of the author. By previous theoretical and empirical studies, the author draws the main dimensions of the culture of innovation and emphasizing the trinity strategy-structure-culture and has created a model of the culture of innovation with concrete indicators. The conclusions are related to the complexity and varied manifestations of the impact of corporate culture on innovation in the company as well as on the complexity of defining a certain and very specific typology of the culture of innovation. The essence of the model represents the interrelationship between strategy and corporate culture, but with the appropriate structure, as well as leaders, for understanding the overall positive importance of the culture of innovation.

The guiding principle for managing the culture of innovation in the discovery of specific features to encourage members of the specific organization for framing, sharing and act by the values that support the realization of innovation and implementation of innovative processes.

One of the most important features of the culture of innovation identifies it as associated with change and perception, and as a set of possibilities. The culture of innovation is in line with the realization of experiments, risk-taking, the redefinition of parameters from the work activities. It is an interaction – amongst all the stakeholder groups, the conditions of maximum transparency, ensuring distribution, sharing, generating knowledge, like trust, as a construct that brings together the members of the organization in the realization of its future.

JEL: O30; M14

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The only sure thing in today's business reality is the uncertainty surrounding the environment. Modern companies must work in a context of constant change, embrace the idea of constant dynamics, and not rely on yesterday's logic. Achieving competitiveness and sustainability in such environments is possible by adopting and acting in line with good practices in the relevant sphere as well as creating and implementing strategies that are proactive against the environment's trends to minimize threats and positively exploit opportunities, some of which are related to improving companies' innovative capabilities.

The economic reality is determined by Industry 4.0, which is characterized by the presence of many start-ups, mergers, and takeovers. Start-up companies are becoming more and more creative and innovative, and they are constantly imposing new conditions on markets that others need not only to comply with but also to strive to overcome by creating even more innovative products, services, solutions.

In nowadays we observed the emergence of the so-called business ecosystems, which are groups of companies that provide complex products and related services to meet consumer demands and requirements. Their innovation is generated by collaboration, collective action to generate and evaluate alternatives, communications, and information flow within and between organizations, the exchange of knowledge, interactions through multiple and complementary platforms. Business platform models are seen as the most serious transformations in the global macroeconomic environment since the Industrial Revolution.

There are also specific debates related to the concept of Industry 4.0 (Шваб, 2016), which completely changes the organization of global value chains, which we can now define as value networks. In the context of Industry 4.0, we are talking about creating "intelligent factories" in which "smart" digital devices are connected and communicated with and about incoming resources, products, machines, tools, robots, and people. It is ensuring flexible cooperation in global level between virtual and real systems to create entirely new patterns of production (Шваб, 2016: 21).

Among the trends of the modern business environment is creating a new way of cooperation with partners, and even competitors /coopetition /, the basement of which is on the exchange of knowledge and information to offer additional value, which owns a network character.

The above requires a change in corporate culture to help companies respond to emerging trends in the environment and maximize the benefits of changing conditions. Such culture is the culture of innovation, about which management is necessary to provide optimal conditions for the members of the company to build skills, to communicate transparently – both with each other and with the external stakeholders. It is necessary to share knowledge, to generate ideas and create innovations to help collaborate between technological innovations and employees who manage them.

The means mentioned above are realizing a diagonal communication in the organization, minimizing the organizational hierarchy, encouraging experiments and diversity, respecting intuitive decisions, encouraging the existence of the organization as a learning (Senge, 1990), it's functioning as an ambidextrous, encouraging the existence of empowered teams. Organizational policies that help the organization to exist and compete on the brink of

chaos edge (Brown and Eisenhardt, 1997) (Димитрова, 2017) are also essential for the introduction and realization of innovation.

Corporate culture and organizational behavior are essential prerequisites for embracing the culture of innovation. The culture of innovation helps organizations rediscover their self in new dimensions and thus maintains the constant pursuit of new products and services. Helps to seek the real opportunity for the employees to adapt to the company, to quickly acquire new skills and ways to act and take solutions in the context of the turbulence of the environment. The main focus is on creativity and experiment, in the long run, the ultimate goal of which is to create value for all groups associated with the organization.

Corporate culture is inextricably linked to the strategy and the structure of the organization – the adoption of a culture of innovation, and the harmonization of other elements in line with its parameters.

Strategy and Culture of Innovation. Unique resources, core competencies, organizational knowledge. Learning organization and organizational learning.

One of the most fundamental questions to be answered by each organization is how to acquire and maintain a better competitive advantage than others in the industry (Crook et al., 2006, Teece et al., 1997). Part of the answer to this question is found in the strategies created by the companies. The strategy is understood as "a set of business management techniques and approaches that aim at achieving a competitive advantage" (Thompson et al., 2010).

The strategy of the company is also related to the strategic decisions, whose main direction is found in their complex nature, in the conditions of uncertainty and dynamics of the environment, with the presumption of an integrated management approach. It depends on the dynamic sustainability of the networks and the relations in which the organization participates and supports, in ensuring continuity in the conditions of constant change. Strategic priorities are determined depending on the context in which the organization operates.

The strategy, considered as a set of different ideas, is associated with the perception and implementation of innovations (Johnson and Scholes, 2005: 69). Innovation in an organization and the perception of its meaning is multifaceted – depending on its size and structure, its governance, the specifics of the sector, the degree of empowerment, the diversity of specific human capital, etc.

The more the organization is understood as a "boundaryless organization," the easier it is to bring innovations, because organizations that are involved in different networks and strategic partnerships are much more innovative than those, which are more limited than interactions. The strategy is also associated with the existence of unique resources that represent the resources that support competitive performance and which other companies cannot easily imitate or acquire /an example of such a resource is the corporate culture that is unique to each organization/.

The strategy is also associated with the concept of so-called core competencies created by Hamel and Prahalad in the 1990s. Core competencies are defined as the actions and processes by which resources are channeled to support competitive performance in a way that is impossible imitated or acquired. Core competencies are keys to the sustainability of the company's competitive performance. They are considered as a result of the processes of collective learning and their transformation into business processes and actions, they are found in communication, engagement, commitment to action and beyond the boundaries of the organization (Gupta et al., 2009, Prahalad and Hamel, 1990).

The classification of core competencies requires that they meet the following conditions: to create value for the customer to distinguish the company from its competitors on the market to be widely applicable to various products and services (Hamel and Prahalad, 1990). Their three dimensions are seen as shared vision, interaction, empowerment (Sanchez, 2004).

Therefore, not only to survive but to reach a new level of competitiveness, the organization must identify and implement in its business activities its unique resources and core competencies that make it distinctive and unique to its key stakeholders.

One of the most significant strategic resources of the organization that assists in its competitive performance is organizational knowledge (Grant, 1996; Marsh and Stock, 2006). It corresponds directly to the trust that exists in the organization (Димитрова, 2013) and is a major component of perception and action in line with the culture of innovation.

Managing knowledge in the organization is a prerequisite for innovation (Darroch and McNaughton, 2002) and is interrelated with organizational learning. Organizational learning encourages the creation of knowledge by members of the organization and transformation into a system of organizational knowledge. The process of organizational learning is interactive and takes place through the interactions of individuals in the organization, representing the constant dynamics between a tactic and explicit knowledge (Nonaka and Takeuchi, 1995).

Knowledge management is associated with the processes of perception, storage distribution, application and actions associated with the strategies and the existing corporate culture. Organizational knowledge is also acquired through the interactions and communications carried out with the external organizational environment. It is the creation of new knowledge and new opportunities which enhances the organization's organizational learning capacity. The latter requires a cognitive and behavioural change. The inability to learn is the cause of the failure and bankruptcy of many organizations (Argyris and Schön, 1996; Senge, 1990).

Organizational learning is also an essential strategic tool that assists long-term competitive advantage and organizational success (Argote, 2013). Various studies reveal the positive correlation between organizational learning and innovation in the organization (Calantone et al., 2002; Tushman and Nadler, 1986). Organizational learning supports the organization's adaptation to changing market conditions, namely through generative learning, which is understood to be a major component in generating radical innovations, and thus the organization can also change the market (Senge, 1990). Organizational learning is a core element of the learning organization.

Learning organizations are significantly more flexible than others, allowing them to quickly redirect their resources to new marketing opportunities. This type of organization is capable of long-term regeneration through the variety of knowledge, experience, and skills possessed by its members. Mentioned requires the existence and management of a culture that promotes the freedom of communication, the acceptance of the challenges and the unity around the common vision

Sharing organizational knowledge and creativity is an essential priority for learning organizations. The mentioned process requires adopting an understanding of organizations such as social networks, which are becoming a free space for exchanging ideas, opinions, generating innovative solutions.

The learning organization can change and promote and support organizational learning. The pluralism of opinions and the open debate of emerging ideas are tolerated in the learning organization. Experiments are the norm, introducing ideas into action are part of the learning process. Any organization can become a learner regardless of the field in which it operates, the specifics and characteristics of the industry if it is learning oriented, and whether it has a corporate culture that facilitates and supports the processes associated with it.

The potential of the organization to accumulate and generate knowledge is essential to the creation of value. This potential is called organizational learning capacity and allows the organization to learn and encourage organizational learning processes. It promotes its better competitive performance as well as a component that is fundamental to its sustainability (Jiménez- Jiménez and Sanz-Valle, 2011). The greater the capacity to implement organizational learning, the more the organization will be able to adapt because it can acquire information and use it in the most effective way possible.

The internalization of organizational learning has to become an element of corporate culture because it can avoid strategic deviations. Thus, the organization will continually rediscover itself in identifying new opportunities and in creating and implementing new business models because learning and experimentation are an essential element in building its future (Brown and Eisenhardt, 1997).

There is also the so-called a process of unlearning, in which members of the organization and the companies themselves remove old logic and replace it with fundamentally new postulates (Baker and Sinkula, 2002). Ability to learn is one of the most critical competencies that supports the processes of using patterns of thinking and stereotyping that are essential barriers to innovation (in its understanding of "destructive"). Learning is defined as the basis of higher order learning processes – the ability to apply generative and challenging assumptions (Argyris, 2000). The ability to anticipate when a trial is about to take place is of paramount importance, usually due to trends and influences of the external environment – companies remove old logic and replace it with a fundamentally new one.

Organizational learning is also understood as a dynamic opportunity and has a significant link in the introduction of strategies that require adaptation to continual changes in the environment. Organizational learning enables the company to offer its products and services for an extended period on the market by effectively meeting its requirements.

Organizational learning helps the company to achieve a competitive advantage by improving information acquisition activities allowing for flexible adaptation to changes in market conditions much faster than competitors.

Organizational structure

The organizational structure is defined as the distribution of official roles and administrative mechanisms supporting the implementation of organizational actions, their coordination and control, and the movement of resources. It includes organizational configuration, which represents the structures, processes, and relationships that the organization exists.

Part of it is the structural design describing the roles that members of the organization perform, their responsibilities, and the rules of formal communication. Structural design is essential to the organization's competitiveness (with the presumption that it is not sufficient to achieve it) because it correlates with the effective process of managing organizational knowledge. The unsuccessful structural design leads to the impossibility of implementing the strategies. The organizational structure is also determined by the specialization of the work (formalization), the separation of departments (department), the chain of command, the idea of the unity of orders, the scope of control and centralization (Димитрова, 2015). The organizational structure also determines internal communication – information exchange, mutual understanding, management – personnel relations.

Structure processes occurring within and outside the boundaries as long as they are conditional to the organization are associated with successful implementation of strategy failure because they indicate the definition, monitoring, and control when creating and implementing strategies by managers as well as the ways of interacting employees in their realization. The relationships and relationships between the various groups of stakeholder organizations and their members are regarded as such between the different departments, units, locations of the organization itself, as well as outside it – outsourcing, strategic alliances.

Johnson and Schoeles (2005) highlight several major challenges faced by modern organizations regarding structures, processes, and relationships: the uncertainty and volatility of the business environment, the constant nature of change, which requires the organization to have a flexible design, and skills for reorganization.

The essential importance of generating knowledge and sharing it is at the heart of strategic success. It is also necessary that the organizational design/structure promotes the enhancement of the expertise of each of the members of the organization, as well as to support the sharing of their knowledge. Serious challenges also pose the processes of globalization that require a change in the character and realization of communications, diversity management, interactions between different cultures, etc., which are critical issues for the development of the modern organization.

Organizational structures are subdivided into: functional, divisional (also called multidisciplinary), matrix, holding, transnational structure, unlimited organization, downsizing, informal organization.

Organizational structures can be summarized in the following organizational models:

- A *mechanical model* is one that has a structure characterized by the expanded department, highly formalized procedures, limited information network, centralization.
- An *organic model* is featuring non-hierarchical structure, with the presence of cross-functional and cross-hierarchical teams less formalized procedures, free-flowing information, co-participation in decision-making.

The research literature describes the intra-corporate structures that facilitate innovation. The structure of the organization is a component that is essential for innovation. Decentralized (Cohendet & Simon, 2007; Jung et al., 2008), less complex structures (Damanpour & Schneider, 2006) and harmonization and weakness support innovation.

The factors of the internal organization – for example, normative /values and norms in the organization established rules and procedures/ as well as the cultural /cognitive/ expressions in the shared systems of meanings between the members of the organization (Vermeulen, Van den Bosch, & Volberda, 2007). Organizational and innovation strategies are essential to the realization of organizational innovation.

The most common structures for supporting innovation is characterized by decentralization and the lack of hard rules for the implementation of the work activity, a variety of duties and lack of formal restrictions. It is believed that such a structure empowers employees and does not burden them with routine duties (Damanpour, 1991; Troy, Szymanski, and Varadarajan, 2001). To be able to innovate, the organizational design must be tailored to the specifics of the organization and the nature of its activity.

The organizational structure follows the organization's strategy. Changing the strategy also changes the structure. The strategy and structure of each organization are inextricably linked to corporate culture.

Corporate Culture

Theorists and practitioners dealing with issues of corporate culture cannot agree on a single definition of its nature, which in turn again leads us to the diversity of the construct and the effects that have to organizational nature.

One of the most popular and commonly accepted definitions of corporate culture is given by Schein (1985) and defines it as „a pattern of shared basic assumptions learned by a group as it solved its problems of external adaptation and internal integration, which has worked well enough to be considered valid and therefore be to be taught to new members as the correct way to perceive, think and feel in relation to those problems". The challenge for members of the organization is to achieve internal integration and the possibilities for external adaptation.

Corporate culture is seen as a set of values, norms, basic assumptions that are accepted and in unison with which members of the organization carry out their daily activities (Schein, 1992; Miron et al., 2004). It represents the "shared social knowledge" in the organization that affects the attitudes and behaviour of employees through rules, values, and norms (Colquitt et al., 2009).

The values adopted in the organization are defined as the performance standards associated with the work, as well as with the organizational reality that guides the employees in their day-to-day activities. They also determine the specific norms or expected behaviour within the organization. Standards are the shared, legitimate, organization standards that predetermine and subsequently assess the organization's behaviour – what is permissible and what is sanctioned.

They affect interactions between members of the organization, problem-solving, decision-making processes. Standards are informal rules in the organization and shape employee behaviour to a much greater extent than the monetary remuneration or organizational environment in its physical dimensions (Chatman and Cha, 2003).

Effective culture is related to strategy and company structure. Culture cannot be shaped until the organization has formulated its strategy. One of the main criteria for the effectiveness of culture is that it is relevant to the strategy (Chatman and Cha, 2003).

Corporate culture should be perceived as a guiding principle in everyday organizational activity to become an invisible infrastructure, functioning alongside the visible organizational infrastructure.

In the context of the above, we can point to one of the definitions of corporate culture presented by Johnson et al. (2011), which states that its essence is the taken-for-granted assumptions and behaviours that make sense of the people's organizational context (2011: 168). This view of culture is associated with networking, with an understanding of culture as an interaction between members of the organization.

The complexity of the construct of corporate culture is revealed by the multidimensional approaches and paradigms of evolution and its study presented in the research literature (Smircich, 1983; Martin, 1992; Martin and Frost., 2011). Various models and more than 400 typologies have been developed to explain the multifaceted nature and character of the construct as well as its manifestations in various organizations operating in a variety of business areas. Part of the typologies and patterns are those of Schein, 1992; Cameron and Quinn, 1999, 2011; Denison, 1984; Denison and Mishra, 1995; Fey and Denison, 2003; Denison et al., 2004, 2006, 2012; Johnson and Schoeles, 1999, etc. The variety of theoretical concepts and the empirical studies based on them show us the different dimensions of corporate culture and the necessity for studying and measuring it.

Corporate culture is also seen as strong, weak and adaptable (Димитрова, 2012). According to Kotter and Heskett (1992), the most suitable for the successful development of the company is the adaptive corporate culture that promotes and strengthens innovation that assists its competitive performance in a dynamic business environment. This type of culture can also be defined as "learning" because it helps the organization to create and implement mechanisms that help it to scan the changes that occur in the business

environment and their adaptation to advantages that bring it to new levels of competitiveness and resistance. Adaptive culture requires the availability of communication, lightened by the hierarchical constraints of the structure of the organization, allowing for continuous interactions between the organizers' stakeholder groups and between the organization and its key stakeholder groups.

Among the most explored aspects of corporate culture is its impact on the competitiveness of the organization. Kotter and Heskett (2011) emphasize that corporate culture has a significant impact that accumulates its impact on enhancing the competitive advantages of companies. According to them, corporate culture is one of the most important factors that will predict the rise or fall of companies over the next decade. Corporate culture, which promotes long-lasting competitive advantage, is not imaginative, and the creation and management of this culture require the availability of intelligent and intelligent employees. The ability to adopt the idea of changing corporate cultures will lead to an increase in organizations' capacity to positively influence their competitive performance. Some corporate cultures can be adaptive, while others – less.

Adaptability should be encouraged to maintain long-term positive financial performance. The critical factor for a successful change in corporate culture is the perception by the company's top management of the importance of corporate culture for its overall successful development.

Corporate culture is an essential driver of organizational change. No organizational change is possible without a change in corporate culture and vice versa. In general terms, organizational change is the change of corporate culture. We can note that not every organizational change necessarily requires innovation, but the introduction of any innovation is a condition for change. In the context of the idea of adopting and managing a culture that supports constant change and innovation, it is necessary to note that a change in the essence of a construct of corporate culture is required. The corporate culture construct must become more fluid by creating an environment, which helps to increase organizational flexibility and adaptability, supports multiple organizational formats that exist in the organization and its networking. Corporate culture should shape an environment that ensures maximum ting human potential – supporting interaction, decision-making and free exchange of information.

Corporate culture needs to be embodied in every action, solution, communication in the company to bring together the people working for the organization. This process cannot be defined as a one-time act of a rapid implementation is expected. The complexity of change stems from the multi-layered nature of corporate culture. Its construct has a "double" nature – on the one hand, there is a tendency towards maintaining the status quo that maintains stability, but on the other – the tendency towards change that supports adaptation the organization associated with the dynamics of the surrounding environment.

In line with modern trends, culture must always be "chronically unfrozen" (Weick, 1977). The “unfrozen” culture facilitates the fluidity and flexibility that the organization must possess to adapt, to overcome borders, and to exist as "Learning organization" (Senge, 1990). It might exist as an organization that some authors even define as a "total learning

organization" (Vaill 1996). The most important thing in the context of continuous change is precisely the promotion of organizational learning processes.

The change of corporate culture is directly related to the change of the corporate strategy and the change of the organizational structure.

For this study, we will present the typologies of corporate cultures mentioned above one of Denison et al. /link to him/ (2006; 2012) and of Cameron and Quinn (1999), confirming the dual nature of corporate culture, which expresses the stability and the change in its construct. This duality guarantees the opportunity of the corporate culture to support the survival and the successful development of the organization because in the process of change it not only creates and acquires new meanings and helps create an environment conducive to innovation.

Concerning the Dennison et al. (2006, 2012) we can state that the four main features introduced in the previous models created by the same author: integration, consistency, adaptability and adaptability and mission) are not unique. Other researchers who have made a significant contribution to the study of the corporate culture construct also accentuate them (Kotter & Heskett,1992; Gordon & DiTomaso, 1992; Sorensen, 2002, etc.).

In the study of Denison et al. the four main features are confirmed by 12 indexes introduced for their measurement and confirmation of the theoretical model. According to the authors, the model serves to integrate previous qualitative and quantitative research to "create a set of valid metrics to be subsequently used as a basis for diagnosis processes" of the corporate relationship culture – competitiveness (Denison et al., 2006: 10).

Corporate culture can balance the interaction between the organizational environment and the surrounding (external) organization environment in the following four ways:

- *Internally focused on Flexibility and Discretion*

Clan Culture (Cameron & Quinn,1999) links the organization with a family-type formation. It is characterized by concern for staff, the cohesion of the members of the organization, emphasis on teamwork, sharing, and coherence. In this type of culture, loyalty and the sense of belonging to tradition are strong. Leaders are perceived as mentors and even as parents

Involvement (Denison et al., 2006). Such companies focus on the human factor, the freedom to develop and grow employees, the team principal of work is tolerated. The members of the organization are committed to their work. Employees of all levels have a sense of ownership in organizational decisions, which makes them feel that their work is directly related to organizational goals. The essence of organizations of this type is an informal, voluntary system with implicit control.

The indexes are Empowerment, which identifies the right of self-government and self-government to help increase the responsibility for the company and the achievement of its goals. Team Orientation – Encouraging teamwork, sharing responsibilities, and achieving the company's overall goals, with eco-performance and efficiency being an indicator of the

company's progress. Capability Development – Continuous investing in enhancing employee knowledge and skills to improve their competitiveness in response to changing business environment conditions.

- *Externally Focused on Flexibility and Discretion;*

Adhocracy Culture (Cameron & Quinn, 1999). In this type of culture, both leaders and employees rely on innovation, risk-taking, creativity. The dedication to experimentation and different thinking unites the members of organization Such a type of organization strives to always be on the wave crest. In the long run, they rely on the development and attraction of new resources. They promote individual initiative and freedom of action. Their success is measured by progress, uniqueness, the introduction of new products and services.

Adaptability (Denison et al., 2006). Adaptive organizations can transform the requirements of the environment into action. They take the risk; they are not afraid of the mistakes, they learn from them. In this type of organization, there is the possibility of making a change. They value clients, create systems of values and norms that help organize the capture and understanding of environmental signals and thus enhance survival and development. The consequence of this is the expansion of the market niche and the high sales growth.

Indexes: Create Change – the organization can orient itself in the business environment, react as quickly as possible to current trends and respond to changes. Customer Focus – the organization, understands and responds to the needs of its customers. Organizational Learning – the organization captures, relies on and understands what is happening in the business environment, thus creating the conditions for innovation, acquisition of knowledge and new opportunities.

- *Internally focused on Stability and Control;*

Hierarchy Culture (Cameron & Quinn, 1999) is determined by the high structure and formality of the work environment. The behaviour is governed by rules and procedures. The leaders aspire to be good coordinators, organizers, and a rationalizing spirit. Emphasis is placed on the smooth running of organizational processes. Formal procedures support the integrity of the organization. The long-term goals are stability, efficiency, and experience. Success is defined by secure deliveries, clear plans, and low costs. Management insists on security and predictability.

Consistency (Denison et al. 2006). Such organizations are based on consensus. Their organizational processes are well coordinated and strongly interconnected. They bet on the system of implicit control. Employees are highly devoted to their work, raising into the hierarchy of service becomes "from within". Consistency and internal integration are key resources for the success of these organizations.

Indexes: Core Values – The members of the organization share common values that create a sense of identity and common expectations. Agreement – the members of the

organization, can reach agreement on the resolution of significant company problems. Coordination and Integration (Coordination and Integration) – the organization does not place constraints on the joint activities of different teams and entire departments of the organization to achieve common goals.

- *Externally focused on Stability and Control*

Market Culture (Cameron & Quinn, 1999) is highly focused and focuses on the competition. Competitiveness and orientation towards goals determine the behaviour of workers. Leaders are creatively oriented, looking for new directions, stubbornly working. The striving for victory brings together the members of the organization. Long-term aspirations focus on competitiveness and achievement of objectives and tasks. The expansion of the market niche is a sign of success. Positive reputation and success are the commitment of all employees of the organization. Being market leaders is essential.

The mission statement (Denison et al., 2006) in combination with the organization's control can be very successful. They have a clear vision of their future development through their goals and strategies to reach them. The ability of team members to identify themselves with the company's mission contributes to the dedication to the organization's goals for its future development. Indexes: Strategic Direction and Intent: Strategic direction and intent outlined, enabling each member of the team to contribute to their achievement. Goals and Objectives – set a clear direction for the company's employees. Vision – a Shared vision of the organization's desired future embodied in the core values and moving members of the organization towards its achievement.

As Cameron and Quinn (1999) emphasize, none of the types of corporate culture can be defined as "the best." Depending on the company's goals, a particular corporate culture is created and functioning. In keeping with changing environmental conditions, the organization itself and its corporate culture are changing to ensure not only the survival of the organization but also its successful adaptation and enhancement of its competitive performance.

Consequently, any corporate culture could create an appropriate environment and support innovation (or implement imitation strategies), as we will see the following statement /the organization, albeit to varying degrees according to its specificity, the scope of activity, with the peculiarities of the industry, the micro, and the macro environment/.

Innovation

Innovations and their management are becoming an essential part of the vision and strategy of the organization that seeks to maintain and enhance its competitiveness, as well as to ensure a certain degree of sustainability at the "edge of chaos". About innovation, any company that perceives it as an essential element for its successful development must define what it means – its definition is dependent on the subject matter, the relationships with the key stakeholders, their current and future needs and claims.

The goal of each company is the creation of value creation, and the essence of innovation lies in the renewal of companies' businesses to maintain and positively exploit the competitive advantage as well as to increase the value creation potential (Hax and Wilde, 2003). In general, innovation is defined as the introduction of inventions and inventions, as well as processes generating new results (Gloet and Terziovski, 2004).

Lack of innovation can lead to the loss of uniqueness of the product and corporate brands, which corresponds to a decline in performance. The most important opportunity for innovation is to create a competitive advantage for the company.

According to Michael Porter (1990) "…innovation is the only way to maintain a competitive advantage" /. He believes that innovation is the result of much more organizational learning rather than formal research and development, i.e., of the continuous improvement that is at its core.

The choice of an organization's innovation strategy is influenced by internal and external factors. The internal ones consist of the organizational capabilities, the technological advantages, the financial resources, the vision of the top management and the successful operation of the business model applied to the present. External factors are found in the structure of the business, competition, the speed of technological change, opportunities provided by networks created jointly with other organizations (Dodgson, Gann and Salter, 2008).

In the OECD's Oslo Manual (2005) states that there is no need innovation to be something significant new market and be a minimum of new or significantly affected by the organization improvement.

Innovation is "the implementation of a new or significantly improved product (good or service) or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations..." (OECD, 2005:46). Mentioned is consistent with the incremental and radical aspects of innovation.

In the concept of innovation can be distinguished two main categories – process and product innovation, which are divided into four areas – product, process, marketing and organizational innovation, according to the Oslo Handbook (OECD, 2005). Innovation, perceived as a major source of competitive advantage, is defined as a product, process, marketing, strategic and behavioural (Wang and Ahmed, 2004).

Essential for the introduction and implementation of innovations have innovation capabilities, and organizational competencies are activities in which the organization is presented as well (Warren, 2002). The more innovative competence is an organization, the abler it is to create and use distinctive resources compared to other organizations, such as those competencies stem from the attitude of organizational learning and innovation strategies (Winter, 2003).

In studying innovation, the distinction between exploitation and exploration is essential, (Benner and Tushman, 2003). The introduction of innovation requires openness and readiness to interact with the key stakeholders of the company, which indicates the close link between innovation and corporate culture, also defined as a culture of innovation

(Damanpour and Evan, 1984). Behavioral innovation is found precisely in the perception of the culture of innovation and its introduction at the level of individuals, teams and the organization as a whole.

Increasingly relevant regarding turbulence and uncertainty in the business environment that and require constant application of new approaches to adaptation and competitiveness of the organization through active interactions with customers, suppliers, users, research organizations, competitors, is the concept of open innovation. Open innovation is expressed in the ability of organizations to overcome their limitations and to embrace knowledge and technology of their environment (Chesbrough, 2003; 2006). The expanded definition of open innovation defines it as a process of distributed innovation based on purposefully managed knowledge flows that do not depend on the boundaries of the organization, use monetary and non-monetary mechanisms and align with the organizational business model (Chesbrough and Bogers, 2014). The reason for applying the concept of open innovation is the constant change in the dynamics of the environment and the inability of companies to carry out internal research and development with the same success they would have in using external knowledge.

Companies that rely on open innovation are more open to communication, and to the various relationships, they engage with their external stakeholder – customers, competitors, suppliers, etc. They can then innovate more to meet market trends, respond to customer needs and, in many cases, rephrase them. These companies also build more serious systems that provide them with interactions and information and knowledge sharing.

The mechanisms supporting open innovation processes are strategic alliances and joint ventures, open source platforms, participation in various specialized, professional communities as well as communities of interest. In the process of selecting partner organizations, companies must look for ones that have the capabilities to generate and share knowledge, technical capacity, and innovation potential.

Open innovation is also associated with the implementation of an open strategy, which consists of creating and implementing a strategy as a result of the interaction between internal and external expertise.

There are barriers to innovation in companies that are related to factors such as cost factors, knowledge-related factors, markets, regulatory factors (D'Este et al., 2013). To overcome mentioned it is necessary to audit several major areas and consequently to take appropriate corrective strategies. These areas are the corporate culture and the values surrounding the members of the organization, the leadership and management practices, the employees and their skills, the efforts towards the positive development of each of these areas, which is a necessary condition for fostering the existence of a culture of innovation.

Modern research indicates corporate culture as one of the main challenges open innovation because the corporate culture is a factor supporting the process of adapting to the constant changes in the environment surrounding the organization while promoting the processes of integration in the internal environment. When the culture of the organization is not consistent with its strategy, it is also an obstacle to innovation (Carbone et al., 2010).

Therefore, innovation culture must become an integral part of the corporate culture of the company.

We can summarize that innovation is an essential condition for the survival and successful development of long-term organizations and for generating competitive advantages for those who introduce and implement it (Goplakrishnan and Damanpour, 1997). Understanding the leadership of companies for the essence, importance, and management of innovation, favoured by the availability of a culture of innovation, is critical to the positive development of companies' innovation potential.

Leadership

Leaders have an essential role in the adoption and successful management culture of innovation. They are called upon to assist members of the organization in their efforts to achieve the goals and to take action that contribute to the best possible representation of the organization, and the correlation between successful leadership, corporate culture and increasing the competitive advantages of the organization is positive.

The development of leadership theories indicates that the paradigm of leadership is increasingly transformed from individual to collective (Димитрова, 2015).

Leaders are perceived as creators of context for innovation regarding uncertainty and insecurity of the environment and empowering innovators in the organization as discoverers of future leaders in organizations through early identification and development of leadership skills among members of the organization.

In contemporary organizations, the innovative leadership that builds on the concept of transformational leadership is increasingly important. Organizations seeking sustainable competitive performance must create, promote and manage a culture that values creativity and innovation. Innovative leaders are the ones who support this type of culture. They are called upon to recreate different roles to support the overall process of innovation in the organization, which adds value to it. According to Porter-O'Grady and Malloch (2010), innovative leadership is associated with anticipating, analyzing, synthesizing ongoing changes within and outside the organization, turning them into opportunities to positively compete. This type of leadership is best suited to organizations that are flexible and adaptable to innovate to meet the changing requirements of the environment. Innovative leaders are associated with the initiation of innovative strategies and the implementation of an innovative management approach. They support the processes of creating an organizational reality in which innovation can be realized; structures that contribute to effective decision-making, partnerships, networks, spaces that support innovative thinking (Porter-O'Grady & Malloch, 2010). Innovative leadership is also associated with the strategic leadership of the innovation portfolio of the organization, thereby achieving a significant competitive advantage. About this, leadership behaviour aimed at increasing motivation and specific attention to the attitudes of each employee stems from the values of leaders and their vision and promotes corporate culture in support of innovation processes (Elenkov and Manev, 2005). Kanter /2000/ states that it is important that corporate

executives can use the postulates of corporate culture to mobilize and motivate members of the organization to be creative and innovative to create new products, generating concepts and services.

Determined by the innovative leadership culture is understood as based on open, clear communication. This kind of culture is encouraging creativity and the exchange of ideas, setting strategic focus towards innovation, inspiration and motivation, empowerment, training, and development, creating joint activities of various cross-functional teams creating an atmosphere tolerant of making mistakes, seen as gaining experience.

Interaction with stakeholders is an essential element shaping innovative leadership. The role of leaders as "cosmopolitans" and "boundary spanners" is essential and its meaning is described in the research literature (Димитрова, 2012).

Innovative leadership is becoming increasingly important in the context of the growing complexity of the environment in which the organization is essential to be innovative through the maintenance and management of an innovation-oriented corporate culture and the relevant strategy that empowers employees to carry them out, by creating conditions for maintaining a high degree of trust.

Innovative leadership also corresponds to "adaptive leadership" that is associated with "unexpected change" (Uhl-Bien et al., 2007) and is realized in the context of organization theory as Complex Adaptive System (Димитрова, 2013). This type of leadership encourages the processes of learning, creativity, and adaptation. Business environment conditions that are related to the pressure of chaos and unexpected change require creativity and flexibility to cope with emerging situations. Typical for organizations considered in the context of the complex adaptive system theory are precisely the decentralized structure, the empowered teams and the networks of information existing in them and through them. In these organizations, there are formal and informal networks for the realization of interactions between leaders, teams, and departments. This kind of networks create more channels for sharing information and knowledge, and enhances organizational learning, changing and generating innovations by effectively maintaining the relationships between the different departments within the company and by making full use of communication between its members.

We can summarize that the changed pattern of leadership includes the concepts of innovation, growth – regarding skills, professional expertise, career; teamwork, collaboration, understanding of the essential importance of communications and communication competence.

Communication for innovation

Corporate culture, communications, and links between different processes in the organization have a significant impact on innovation in companies (Ayers, Dohlstrom & Skinner, 1997). Communications are in essence of an organization without their existence is impossible. Corporate culture is the one that determines the way communications are

made in the organization and the extent to which importance is attached to their role in the effective development of the company. Communications support the overall management of corporate culture in the organization – from its creation until retransmission and its maintenance, and its change management.

The communications of the organization are subdivided into internal and external, including the management practices of communication (Welch and Jackson, 2007, Димитрова, 2013). Contemporary trends in communications science development and related research emphasize the importance of organizational integration of the organization, requiring harmony in the messages sent inside and outside the boundaries of the organization – the separation between internal and external communications no longer exists (Christensen and Cheney, 2001; Quirke, 2012, Димитрова, 2016).

About innovation, communication should present the company's ability to create value. The value of innovation must be clear to all groups of stakeholders in the organization. Communication to internal stakeholders needs to focus on enhancing the understanding of the nature and importance of innovation, promoting its support, and positively promoting the pursuit of innovation, as well as motivating the sustainability of attitudes towards innovation.

As far as external stakeholders are concerned, communication about innovation should present the innovative image of the company, and its innovative discoveries are perceived as useful to clients, suppliers, partners, and society as a whole. In organizations, projects related to innovation include uncertainty, risks, positives, assumptions, and assumptions. Therefore, communication on innovative projects needs to be carefully planned to encourage the process and to support adaptability and minimization of resistance.

Internal communication is essential for innovation, because of the organizational reality, purposeful innovation requires a motivated staff, committed to the development of innovative ideas (Monge et al., 1992). It is believed that the culture of innovation is achieved through internal communication at every stage of its implementation (Linke and Zarfass, 2011). Last but not least, internal communication supports boosting confidence. Poor communication policy, about innovation projects, may increase stress, resistance to change that will occur in connection with the implementation and subsequent implementation of innovation, and reduce competitiveness. In the context of this, communication about innovation requires interactivity in the context of continuous feedback.

Effective internal communication related to innovation helps to foster competitive performance by increasing satisfaction, enhancing the processes of involvement in the affairs of the organization and strengthening the commitment to it because they are prerequisites for identifying with organization and stability of organizational identity.

An increasing number of organizations apply the so-called Unified Communications as a Service, which involves the integration of audio and video conferencing into communication between members of the organization. It helps interactions and between organizations and other stack group groups via web-based applications – chats, messaging, another web 2.0 applications, mobile phones, etc., which are increasingly switching to

cloud technologies. Innovation in web-based technologies also offers members of the organization and other stakeholders a variety of channels for communication – traditional and through the social media toolkit – to increase communication efficiency, reduce the time for information exchange, simplify management of knowledge and overall communication effectiveness is positive, which facilitates the processes of realizing open innovation.

Various models for communication of innovation and creation and co-creation of value have been developed and tested (Ye et al., 2015; Prahalad and Ramaswamy, 2004a).

Culture of Innovation

Organizations are under constant pressure to compete more successfully, and innovation is fostering them in this endeavour. Innovation is a critical factor for the success of the organization because it is an essential condition for responding to the ever-changing needs of customers, acting in tune with the development of technology and the opportunity for successful performance in a highly competitive business environment. It is seen as the driving force of change, and corporate culture is an essential factor in the existence and promotion of innovation in the organization, i.e., corporate culture is at the heart of innovation (Tushman and O'Reilly, 1997; Ahmed, 1998:31). More R. M. Kanter /Kanter, 1988/ emphasizes the importance of the so-called pro-innovational culture for the overall successful development of the company. Tushman and O 'Reilly, who studied in depth management approaches culture of innovation, indicating that it is management culture is the most neglected and simultaneously the most appreciated tool to facilitate innovation and change (Tushman and O'Reilly, 1997).

Research, literature presented results of theoretical and empirical studies that highlighted serious evidence of a positive relationship between corporate culture and innovativeness of the company (Deshpande, Farley, & Webster, 1993; Hernández-Mogollón, Cepeda-Carrión, Cegarra-Navarro, & Leal-Millan, 2010). Corporate culture, in this case, is considered to be primarily supportive of the speed and flexibility of innovation processes.

Corporate culture and the company's overall performance correlate positively with each other, and therefore the culture of innovation is also becoming a prerequisite for achieving a competitive advantage. Stated above means that adopting the idea of continuous innovation is necessary so that companies can not only maintain but also increase their competitiveness.

The main elements of corporate culture that influence innovation in the organization are the practices that help socialize new employees and the values, norms and basic assumptions that serve to guide the behaviour of members of the organization within its reality (Dobni, 2008; Martins and Terblanche, 2003). Indeed, an innovation-supporting culture supports the motivation and sustainability of the interactive process of sharing the knowledge, skills, technologies necessary for successful innovation (Russell, 1989).

The modern companies to be successful, need to internalize innovation as a core value by creating an enabling environment for ideas that give "freedom to their innovators". (Hamel & Getz 2004).

The empowerment of employees in the organization through open communication and sharing of information, their participation in decision-making, shared vision and common goals are essential elements of the process supporting innovation in the organization (Ahmed, 1998). Innovative processes depend directly on the creative abilities of employees, on professionalism, on the specialized knowledge they possess, acquire and apply, and on their dedication to the realization of plans whose realization leads to the creation of value. Therefore, the organization gains a significant competitive advantage thanks to its employees, and this requires support and promotion of the opportunities for raising and developing their knowledge, skills, and talents.

A corporate culture that supports innovation in the organization should be sensitive in the understanding of innovation as an integral part of the constant change; innovation must be embedded in its "invisible levels" – the basic assumptions and values. As a result, the innovative behavior is the result of organizational norms that support the exchange of information about changed approaches to "doing things" in organizational reality (Amabile, 1988).

The culture of innovation must encourage the processes of creating and adopting new ideas that originate within or outside the organization. The presumption is the need to adapt to the ever-changing requirements of the environment and the ability to gain a competitive edge that indicates the essential link between innovation and change.

The culture of an organization is among the most important factors for the realization of organizational learning. Organizational learning and the creation and dissemination of knowledge among members of the organization are an integrative component of the values, norms and basic assumptions determined by corporate culture. The corporate culture promotes the dynamic capacity of the organization and guides the positive change and organizational innovation (Hislop, 2013), and promotes the positivity of the degree of innovation, which reflects the increase of its competitive performance (Dewar and Dutton, 1986; Dasgupta and Gupta, 2009).

Innovation, increasing competitiveness, cannot be determined as a result of skilful management of the flexibility and control in the modern organization. More innovative firms are therefore more adaptable and more flexible than emerging changes and show a higher level of competitiveness (Calantone et al., 2002). Therefore, for the successful survival of the company and the sustainability of its competitive advantage, it is necessary to adopt and manage an innovation culture.

Corporate culture supports innovation by creating a climate in the organization that favours its implementation and which sets it up as one of the important activities for the successful development of the organization. The culture of innovation can be defined as perception, a way of thinking and behaviour that creates, enriches and establishes values and attitudes in the organization. It helps the organization to accept and sustain the ideas and the changes that are necessary for the efficient and effective process of all processes in the company,

and they are inconsistent with conventional assumptions and traditional organizational behaviour.

The culture of innovation has different definitions, some of which are reviewed by Clavier and others. (1998). One of them is proposed by AECA and states: Innovative culture is a way of thinking and behaving that creates, develops and establishes values and attitudes within a firm, which may, in turn, raise, accept and support ideas and changes involving an improvement in the functioning and efficiency of the firm, even though such changes may mean a conflict with conventional and traditional behavior. For innovative culture to succeed, certain requirements must be met, involving four kinds of attitudes:

- Corporate management is willing to take risks.
- The participation of all members of the firm is requested.
- Creativity is stimulated.
- There is shared responsibility (AECA's (1995: 32) cited in Claver et al., 1998:10).

Again, we emphasize that culture is the most important determinant of innovation and its characteristics, which support the realization of the related processes, are a necessary condition for the perception and introduction of innovations in the organization.

Some studies explore the nature of the relationship between corporate culture and radical innovation. Values that relate to the future orientation and risk tolerance are leading to radical innovation (Tellis et al., 2009). One of them, "willingness to cannibalize", is an indicator of a culture that promotes innovation as a prerequisite for radical innovation in the company (Chandy and Tellis,1998; Tellis et al., 2009). Shortest “willingness to cannibalize” can be defined as values and beliefs on investment in next-generation technologies and is seen as positive for the introduction of radical innovation.

In light of the preceding, the culture of innovation is constituted by the tendency to "cannibalize" outdated technologies, orientation to the future and tolerance for risk-taking. The research literature also introduces the term "open innovation culture" (Herzog, 2011), which is associated with the simultaneous promotion of internal integration and external adaptation (Denison and Mishra, 1995).

In analyzing the relationship between corporate culture and innovation in the research literature, the Cameron and Quinn model (1999 / Competitive Values Framework) is often applied. The model is one of the most comprehensive and popular tools for describing the corporate culture and is used in various empirical studies (Deshpande´ et al., 1993; Obenchain and Johnson, 2004; Igo and Skitmore, 2006). It is believed that certain types of corporate cultures in greater support innovation in companies. According to Cameron and Quinn (1999), this kind is the adhocracy culture, characterized by the flexibility and the orientation towards the external environment of the organization. In Dennison et al. /2006, 2012/ this is the culture of adaptation /Димитрова, 2012/. Adhocratic and clan types of culture are defined as organic, and market and hierarchical – as mechanical cultures (Slevin and Covin, 1997). Organic cultures are suited to faster adaptation and flexibility to changes occurring in the surrounding environment, while mechanics support companies in a more predictable business environment. Both forms of corporate culture are effective for

companies that carry out their business in different business realities and through different processes (Slevin and Covin, 1997). We can confirm the conclusion that every company can introduce and successfully manage innovation culture. This statement also corresponds to the results of an empirical study of the impact of corporate culture on the processes of innovation or imitation in the organization carried out by Naranjo-Valencia, Jimenez-Jimenez and Sanz-Valle /2011/. They confirm that adhocratic culture supports innovation orientation during hierarchical – the orientation towards imitation. The findings Naranjo-Valencia and colleagues are in line with the theoretical studies of other authors such as Burns and Stalker, 1994; Detert et al., 2000; Menzel et al., 2007, etc. (Naranjo-Valencia, Jimenez- Jimenez and Sanz-Valle, 2011: 63).

Their research is fundamental because it reveals which of the elements of culture influences the organization's propensity for innovation. They also find that the impact of corporate culture on innovation is much more complicated than previously proven.

After an in-depth study of various scientific publications related to the study of the corporate culture and innovation link by the author of this article, the following main dimensions of the corporate culture are presented which support the processes of innovation in the organization (Димитрова, 2107: 98-100).

Table 1

Dimensions of the culture of innovation

Dimensions	Authors
Autonomy in the organization; freedom in the organization; Self-determination of employees' duties	Tushman and Nadler /1986/; authors, cited in Wolf and Brennan/2014/, Barbosa /2014/; Yesil and Kaya /2012/; Brown and Eisenhardt /1997; 1998/
Employee freedom of action and empowerment; Employee involvement; Empowered teams; Teamwork; Cross-functional teams	Ahmed /1998/; Dervesiotis /2010/; Marcoulides and Heck /2013/; Dombrowski et al. /2007/; Yesil and Kaya /2012/;
Support and interaction; an environment that provides freedom to innovators and stimulates creativity	Hurley and Hult /1998/; Hamel and Getz /2004/; Marcoulides and Heck /2013/; Dombrowski et al. /2007/; Claver et al. /1998/
Shared power and participation decision-making	Hurley and Hult /1998/
Undertaking and promoting risk and non-penalizing errors; Promoting experimentation, different problem-solving thinking; Tolerance to uncertainty; tolerance for failure to uncertainty; to constructive conflicts	Tushman and Nadler /1986/; Martins and Terblanche /2003/; Parveen et al. /2015/, authors, cited in Hogan and Coote /2013/; Wolf and Brennan /2014/; Barbosa /2014/; Claver et al. /1998/; Tellis et al. /2009/ Chandy and Tellis /1998/; Marcoulides and Heck /2013/; Martins and Martins /2002/; Leavy /2005/; Barbosa /2014/; Marcoulides and Heck /2013/; Marcoulides and Heck /2013/; Hurley and Hult /1998/

Dimensions	Authors
Orientation towards creativity and different thinking	Dombrowski et al. /2007/
Shared vision and common goals; Innovation-oriented mission and vision; Strategy, goals; Values	Ahmed /1998/; Dombrowski et al. /2007/ Martins and Martins /2002/; Barbosa /2014/
Employee Involvement; identification with the organization	Prather and Turrell /2002/; Tushman and Nadler /1986/;
Development / Career and Professional Growth of Employees included and innovation training	Tushman and Nadler /1986/; Marcoulides and Heck /2013/; Barbosa /2014/; /Peicheva, 2016/
Orientation towards technology development	Slater et al. /2014/; Russell /1989/
„Willingness to cannibalize."	Chandi and Tellis /2009/; Slater et al. /2014/
Flexibility and orientation towards the external environment; adaptability; Market orientation	Dombrowski et al. /2007/; Slater et al. /2014/; Hogan and Coote /2013/; Calantone et al. /2002/; Hurley and Hult /1998/
Creating technologies that meet the needs of customers; Customer and supplier orientation to competitors; proactive actions; mission and vision-oriented towards them	Tushman and Nadler /1986/; Dervesiotis /2010/; Slater et al. /2014/; Narver et al. /2004/; Martins and Terblanche /2003/
Constant interactions with the environment; The community around the company; the role of the external environment.	Dombrowski et al. /2007/ Leavy /2005/;
Creating products and services that exceed customer needs; knowledge of their needs, introduction of new and differentiated products and services; achieving total customer satisfaction	Barbosa /2014/
Organizational effectiveness; performance standards for the organization; Organizational success; evaluation; Total Quality Management /TQM/	Tushman and Nadler /1986/; Parveen et al. /2015/; Authors cited in Hogan and Coote /2013/; Barbosa /2014/

Dimensions	Authors
Leadership; Top management Strategy; Management practices; Participative leadership style; Management support; Management commitment to innovation improvement.	Dervesiotis /2010/; Dombrowski et al. /2007/; Martins and Terblanche /2003/ Claver et al. /1998/; Barbosa /2014/; Yesil and Kaya /2012/
Communication and information sharing; Open communication; Lateral communication; Internal communication Interpersonal communication and cooperation; A collaborative and shared communication environment	Ahmed /1998/; Martins and Martins /2002/; Martins and Terblanche /2003/; Brown and Eisenhardt /1997; 1998/; Dombrowski et al. /2007/; Hogan and Coote /2013/; Hurley and Hult /1998/; Parveen et al. /2015/ Barbosa /2014/
Company knowledge sharing capabilities; Knowledge-based company; Knowledge management	Gupta and Dasgupta /2009/; Marcoulides and Heck /2013/; Russell /1989/; Dewar and Dutton /1986/; Leavy /2005/; Gupta and Dasgupta /2009/;
Learning and development; A culture of continuous learning and change	Hurley and Hult /1998/; Slater et al. /2014/; Martins and Martins /2002/; Barbosa /2014/
Trust; Openness; Transparency	Gupta and Dasgupta /2009/; Leavy /2005/; Wolf and Brennan /2014/; Hogan and Coote /2013/;
Organizational climate that is nurturing innovation	Rao and Weintraub /2013/; Marcoulidis and Heck /2003/
Responsibility; Shared responsibility; priorities;	Parveen et al. /2015/; Hogan and Coote /2013/; Marcoulidis and Heck 2013/; Claver et al. /1998/; Brown and Eisenhardt /1997; 1998/
Organizational structure Flexible structure and information technologies; Non-hierarchical structure	Martins and Terblanche /2003/; Vincent et al. /2004/; Barbosa /2014/; Martins and Martins /2002/; Barbosa /2014/; Dombrowski et al. /2007/
Support Change; Cultural adaptation; Continuous improvement; Orientation to the future.	Wolf and Brennan /2014/; Barbosa /2014/; Chandy and Tellis /1998/

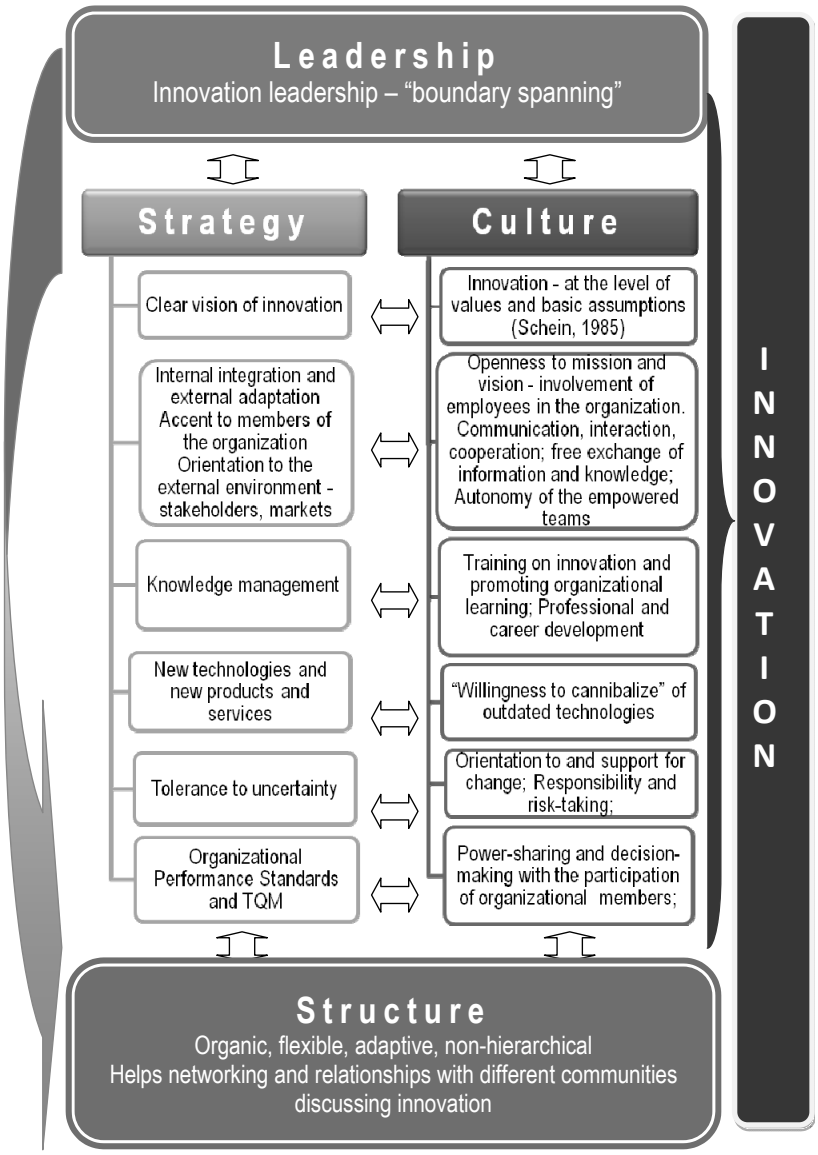
Source: own selection of the author

The Culture of Innovation Model

The author created, by the above dimensions, a model of the culture of innovation.

Figure 1

The Culture of Innovation Model



Source: The author.

The definition of a certain typology of the culture of innovation is practically impossible because the determination of several specific parameters is not a sufficient condition for the existence of one. Innovation and its implementation are also related to the conditions in which the organization operates, its sphere of activity, its size, a form of governance, innovative capabilities. The main regarding the existence of a culture of innovation is the discovery of the specific characteristics that may promote the perception and actions of members of the organization for the realization of innovation.

An essential feature of the culture of innovation is change – the implementation of experiments, the redefinition of business performance parameters, the risk-taking attitude, the perception of change as a set of opportunities as a continuous improvement rather than a threat.

The culture of innovation is also a culture of interaction – both between the members of the organization and between them and the external stakeholder. The basement of this culture is open communication, the freedom to share knowledge, unrestricted by the organizational hierarchy, the trust that exists in the organization and what is generated by the organization.

Adoption, implementation, and management of the culture of innovation require an understanding of its importance for the competitiveness of the organization's leaders. This culture is also related to the implementation of innovative strategies that also require an appropriate organizational structure that tolerates an environment for motivation and inspiration for members of the organization

References

AECA (1995) cited in Claver, E., Llopis, J., Garcia, D., Molina, H. (1998). Organizational Culture for Innovation and New Technological Behavior. *The Journal of High Technology Management Research*, *9* (1), 55-58.

Ahmed, P. K. (1998). Culture and Climate for Innovation. *European Journal of Innovation Management* 1(1): 30-43.

Amabile, T. M. (1988). A model of creativity and innovation in organizations. In: B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior, Vol. 10*, 123-167. Greenwich, CT: JAI Press.

Argote, L. (2013), *Organizational Learning, Creating, Retaining and Transfering Knowledge*, Springer, 2nd edition.

Argyris, C and Schön, D. A. (1996) *Organizational Learning II: Theory, Method and Practice*. Reading, Mass.: Addison-Wesley.

Argyris, C. (2000). *Flawed Advice and the Management Trap: How Managers Can Know When They're Getting Good Advice and When They're Not*. Oxford and New York: Oxford University Press.

Argyris, C., Schön, D.A. (1978). *Organizational Learning: a Theory of Action Perspective*. Reading, Mass.: Addison-Wesley. Armstrong, M. Competition in two-sided markets, *The RAND Journal of Economics* Volume 37, Issue 3 September 2006, pp. 668-691.

Ayers Doug, Robert Dahlstrom, Steven J. Skinner, (1997), An Exploratory Investigation of Organizational Antecedents to New Product Success, Journal of Marketing Research, Vol. 34, No. 1, Special Issue on Innovation and New Products (Feb., 1997), pp. 107-116.

Baker, W. E. and J. M. Sinkula (2002), Market Orientation, Learning Orientation and Product Innovation: Delving into the Organization's Black Box, *Journal of Market-Focused Management*, 5, 5-23.

Barbosa, E. (2014) *Organizational culture* oriented for *innovation*: Influencing variables, *The Małopolska School of Economics in Tarnów Research Papers Collection* issue 2(25), p. 37-45.

Benner, Mary J. and Tushman, Michael L. (2003). Exploitation, exploration and process management: The productivity dilemma revisited. *Academy of Management Review,* 28: 238-256.

Brown, S. L. and K.M. Eisenhardt,(1997), The art of continuous change: Linking complexity theory and time-paced evolution in relentlessly shifting organizations." *Administrative Science Quarterly*, 42: 1-34.

Chatman, J., & Cha, S. (2003). Leading by leveraging culture. *California Management Review, 45*(4), 20-34.

Chesbrough, H. V. (2003) Open Innovation: The New Imperative for Creating and Profiting from Technology Harvard Business Press.

Chesbrough, H. V. et al, (2006), *Open Business Models: How to Thrive in the New Innovation Landscape. HBS Press. 2006.*

Chesbrough, H., & Bogers, M. (2014). Explicating open innovation: clarifying an emerging paradigm for understanding innovation. In H. Chesbrough, W. Vanhaverbeke & J. West (Eds.), *New Frontiers in Open Innovation*. Oxford, UK: Oxford University Press.

Christensen, L. and Cheney, G. (2001) Organizational Identity: Linkages between "internal" and "external" in Putnam, L and Jablin, Fr. The New Handbook of Organizational Communication: Advances in Theory, Research and Method, Sage Publication , pp. 231-269.

Claver, E., Llopis, J., Garcia, D., Molina, H. (1998). Organizational Culture for Innovation and New Technological Behavior. *The Journal of High Technology Management Research*, *9* (1), 55–58.

Cohendet, P., & Simon, L. (2007). Playing across the Playground: Paradoxes of Knowledge Creation in the Video-Game Firm. *Journal of Organizational Behaviour,* 28(5): 587-605.

Colquitt, A.C., Lepine, J.A., & Wesson, M.J. (2009). Organizational Behavior: Improving Performance and Commitment in the Workplace, McGraw-Hill, New York, NY.

Crook, T. R., Ketchen, D. J., Jr., Combs, J. G., & Todd, S. Y. (2008). Strategic resources and performance: A meta-analysis. *Strategic Management Journal, 29,* 1141-1154.

Damanpour, F. (1991). "Organizational innovation: A Meta-Analysis of effect of Determinants and Moderators". *Academy of Management Journal*, vol. 34, nº 3, pp. 555-590.

Damanpour, F., & Evan, W. M. (1984). Organizational innovation and performance: The problem of "organizational lag". *Administrative Science Quarterly*, 29(3): 392-409.

Damanpour, F., & Schneider, M. (2006). Phases of the Adoption of Innovation in Organizations: Effects of Environment, Organization and Top Managers. *British Journal of Management*, 17(3): 215-236.

Darroch, J., & McNaughton, R. (2002), Examining the link between knowledge management practices and types of innovation. *Journal of intellectual capital*, *3*(3), 210-222.

Dasgupta, M. & Gupta, R. K. (2009),. Innovation in organizations: A review of the role of organizational learning and knowledge management. *Global Business Review*, 10(2), 203-224.

Denison et al., (2012), *Leading Culture Change in Global Organizations: Aligning Culture and Strategy* (2012), Jossey-Bass.

Denison, D and Mishra, A. (1995) Toward a theory of organizational culture and effectiveness. – *Organization Science*, 6, 1995, № 2, 204-223

Denison, D.(1984) Corporate Culture and Organizational Effectiveness, *Organizational Science,* 6, 1984, N 2, pp. 204-223

Denison, D., J. Janovics, J. Young, H. J. Cho. (2006) *Diagnosing Organizational Cultures: Validating a Model and Method* International Institute for Management Development. Lausanne.

Dervitsiotis, K. N. (2010). A Framework for the Assessment of an Organisation's Innovation Excellence. *Total Quality Management* 21 (9): 903-918.

Deshpandé, R., J. U. Farley, Fr. E. Webster, Jr. (1993) *Corporate Culture, Customer Orientation, and Innovativeness in Japanese Firms: A Quadrad Analysis*. – The Journal of Marketing, 57, № 1, 23-37.

D'Este P. Guy F. Iammarino S. (2013), ' Shaping the Formation of University-Industry Research Collaborations: What Type of Proximity Does Really Matter?, Journal of Economic Geography , 13/ 4: 537-58.

Detert, J.R., Schroeder, R.G. & Mauriel*, J.J.* (2000). A framework for linking culture and improvement initiatives in organizations. The Academy of Management Review, 25(4), 850-863.

Dewar, R. D., & Dutton, J. E. (1986) The adoption of radical and incremental innovations: An empirical analysis. *Management Science*, 32(11): 1422-1433.

Dimitrova, Y., Importance of Corporate Communications for Successful Development of Contemporary Bulgarian Enterprises, available at: http://www.newmedia21.eu/analizi/importance-of-corporate-communications-for-successful-development-of-contemporary-bulgarian-enterprises/p 10.06. 2016.

Dobni, C.B., (2008). The DNA of Innovation, *Journal of Business Strategy*, 29, No. 2, 43-50.

Dodgson, M., Gann, D. and Salter, A. (2008) *The Management of Technological Innovation: Strategy and Practice.* Oxford University Press, Oxford.

Dombrowski, C., Kim, J.Y., Desouza, K.C., Braganza, A., Sridhar, P. (2007) Elements of innovative cultures, *Knowledge and Process Management*, 14, 3, 190-202.

Droge, C..,Calantone, R.and Harmancioglu, N. (2008). New product success: Is it really controllable by managers in highly turbulent environments? *Journal of Product Innovation Management*. 25, 272-286.

Elenkov, D. S., & Manev, I. M. (2005). Top management leadership and influence on innovation: The role of socio-cultural context. *Journal of Management*, 31: 381-402.

Fey, C., & Denison, D. R. (2003). Organizational culture and effectiveness: Can American theory be applied in Russia? Organization Science, 14(6): 686-706.

Gloet, M. and Terziovski, M. (2004),'Exploring the Relationship between Knowledge Management Practices and Innovation Performance,' *Journal of Manufacturing Technology Management*, 15 (5), 402-409.

Gopalakrishnan, S. and Damanpour, F. (1997). A Review of Innovation Research in Economics, *Sociology and Technology Management.* Omega. Vol. 25. Nº 1. pp. 15-28

Gordon, G. & N. DiTomaso. (1992) *Predicting Corporate Performance from Organizational Culture*. – Journal of Management Studies, 29, № 6, 783-798.

Grant, R. M. (1996) Toward a knowledge-based theory of the firm , *Strategic Management Journal*, Volume 17, Issue S2, Winter 1996, pp. 109-122.

Gupta, S., Woodside, A., Dubelaar, C., and Bradmore, D. (2009). Diffusing knowledge-based core competencies for leveraging innovation strategies: Modeling outsourcing to knowledge process organizations (KPOs) in pharmaceutical networks. *Industrial Marketing Management*, 38, 219-227.

Hamel, G and Prahalad, C.K. (1990). The core competence of the corporation. *Harvard Business Review*, Vol. 68 No. 3: 79-92.

Hamel, Gary & Gary Getz. (2004) Funding Growth in an Age of Austerity. Harvard *Business Review*, 82(7,8): 76.

Hax, A. & Wilde, D. (2003), The Delta Model – a New Framework of Strategy, *Journal of Strategic Management Education,* Senate Hall Academic Publishing. 21 pp.

Hernandez-Mogollón, R.; Cepeda-Carrión, G.; Cegarra-Navarro, J.G. and Leal-Millan, A. (2010), "The role of cultural Barriers in the relationship between open-mindedness and Organizational innovation", *Journal of Organizational Change Management,* Vol. 23 No 4, pp. 360-376.

Herzog, P. (2011). *Open and Closed Innovation, Different Cultures for Different Strategies* (2nd ed.). Heidelberg, Germany: Gabler.

Hislop, D. (2013). *Knowledge management in organisations: A critical introduction*. 3rd Ed. UK: Oxford University Press.

Hogan, Suellen J. and Coote, Leonard V. (2013) Organizational culture, innovation, and performance: a test of Schein's Model. *Journal of Business Research*, *67* 8: 1609-1621.

Hurley, R. and Hult, T. (1998), ``Innovation, market orientation and organizational learning: an integration and empirical examination'', *Journal of Marketing*, Vol. 62, July, pp. 42-54.

Jiménez-Jiménez, D. and Sanz-Valle, R. (2007), 'Managing human resources in order to promote knowledge management and technical innovation', *Management Research*, vol. 5, no. 2, pp. 83-100.

Johnson G. and Scholes, K., Whittington, R. (2005) Exploring Corporate Strategy Financial Times Prentice Hall, Business & Economics.

Johnson, G., Whittington, R., Scholes, K., & Pyle, S. (2011). *Exploring strategy: text & cases*. Financial Times Prentice Hall.

Kanter, R. M. (2000). A culture of innovation. *Executive Excellence*, *17* (8), 10-11.

Kanter, R.M. (1988). When a thousand flowers bloom: Structural, collective and social conditions for innovation in organizations. In B. M. Straw & L. L. Cummings (Eds.), *Research in Organizational Behavior*, *10*, 123-167.

Kotter, J. P. & J. L. Heskett. (1992), *Corporate Culture and Performance*. New York, The Free Press.

Kotter, J. P. & J. L. Heskett. (2011), *Corporate Culture and Performance*. 2 nd ed. New York, The Free Press.

Leavy, B, (2005) "A leader's guide to creating an innovation culture", *Strategy & Leadership*, Vol. 33 Iss: 4, pp. 38-45

Linke, A. and Zarfass, A. (2011) "Internal communication and innovation culture: developing a change framework", *Journal of Communication Management*, Vol. 15 Iss: 4, pp. 332-348.

Marcoulides, G. and Heck, R.H. (2013). Organizational Culture and Performance: Proposing and Testing a Model‖, *Organizational Science.* Vol. 4(2).

Marsh, S. J. and G. Stock, (2006) Creating Dynamic Capability: The Role of Intertemporal Integration, Knowledge Retention, and Interpretation, *The Journal of Product Innovation Management,* Volume 23, Issue 5, September 2006, pp. 422-436.

Martins E.C. and Terblanche F. (2003), "Building Organisational Culture that stimulates Creativity and Innovation", *European Journal of Innovation Management*, Vol.6, N 1, pp. 64-74.

Martins, E.C. & Martins, N. (2002). An organizational culture model to promote creativity and innovation. Special Edition: SA Journal of Industrial Psychology, 28(4), 58-65.

Monge, P. et al., (1992) Communication and Motivational Predictors of the Dynamics of Organizational Innovation, *Organization Science,* Vol. 3, N2, pp. 250-274.

OECD Oslo Manual (2005). *Guidelines for Collecting and Interpreting Innovation Data*. (3rd ed.) OECD.

Parveen, Sh, Aslan Amat Senin, Arslan Umar (2015) Organization Culture and Open Innovation: A Quadruple Helix Open Innovation Model Approach, *International Journal of Economics and Financial Issues*, 2015, 5(Special Issue) 335-342.

Peicheva, M. (2016) NEEDS AND REALITIES OF INNOVATIVE FORMS OF LEARNING IN HIGHER EDUCATION in: *Social Education Project of Improving Knowledge in Economics, SEPIKE*, pp. 21-31.

Porter, M. E. (1990) *The Competitive Advantage of Nations*. New York: Free Press, 1990.

Porter-O'Grady, Timothy, and Kathy *Malloch*. *(2010*) Innovation leadership: creating the landscape of health care. Sudbury, MA: Jones and Bartlett Publishers.

Prahalad, C.K., & Ramaswamy, V. (2004a) Co-creating unique value with customers," *Strategy. Leadersh.*,vol. 32, no. 3, pp. 4-9.

Prather, C. W., & Turrell, M. C. (2002). Involve everyone in the innovation process. *Research Technology Management*, *45*, 13-16.

Quirke, Bill (2012) *Making the Connections: Using Communications to Turn Strategy into Action*, MPG Books Ltd. Bodmin, Cornwall, Third edition.

Russell, 1989 cited in: Olori, W. O. (2013) Organizational Culture and Corporate Innovation, An International *Multidisciplinary Journal, Ethiopia Vol. 7 (4), Serial No. 31, September, 2013:49-65.*

Sanchez, Ron. (2004). Understanding competence-based management Identifying and managing five modes of competence. *Journal of Business Research*, Vol. 57: 518-532.

Schein (1985) Schein, Ed. *Organizational Culture and Leadership*. 1992, Second ed. San Francisco, Jossey-Bass Publishers.

Senge, P. M. (1990). *The fifth discipline: The age and practice of the learning organization.* London: Century Business.

Slater, S. F., Mohr, J. J. and Sengupta, S. (2014). Radical Product Innovation Capability: Literature Review, Synthesis, and Illustrative Research Propositions. *Journal of Product Innovation Management, 31*(3), 552-556.

Slevin, D and J. Covin (1997) Strategy Formation Patterns, Performance and Significance of Context, *Journal of Management,* Vol.23, Iss. 2.

Tellis, G. J., Prabhu, J. C., & Chandy, R. K. (2009). Radical innovation across nations: The preeminence of corporate culture. Journal of Marketing, 73(1), 3-23.

Tushman, M.L. and Nadler, D. (1986) Organizing for innovation. *California Management Review* 74-92.

Tushman, Michael L. and O'Reilly, Charles A. (1997). The ambidextrous organization: managing evolutionary and revolutionary change. *California Management Review,* 38: 1-23.

Uhl-Bien, M., Marion, R., & McKelvey, B. (2007). Complexity Leadership Theory: Shifting leadership from the industrial age to the knowledge era". The Leadership Quarterly, 18(4), 298-318.

Vaill, P., (1996) *Learning as a Way of Being: Strategies for Survival in Permanent White Water*, San Francisco, Jossey-Bass.

Vermeulen, P. A. M., Van Den Bosch, F. A. J., & Volberda, H. W. (2007). Complex incremental product innovation in established service firms: A micro institutional perspective. *Organization Studies*, *28*, 1523-1546.

Wang, C. L., and P. K. Ahmed. (2004) The development and validation of the organisational innovativeness construct using confirmatory factor analysis. *European Journal of Innovation Management* 7 (4): 303-13.

Warren, Kim (2002). *Competitive Strategy Dynamics*. West Sussex, UK: John Wiley & Sons.

Weick, K. 1977 'Enactment processes in organizations' in *New directions in organizational behavior.* B. M. Staw and G. Salancik (eds). New York: St. Clair.

Welch ,M. and Jackson, P., (2007) Rethinking Internal Communication: a Stakeholder Approach, Corporate Communication: *An International Journal* Vol 12, 2, pp. 177-198.

Winter, S. (2003) Understanding dynamic capabilities, *Strategic Management Journal*, Volume 24, Issue 10, October 2003, pp. 991-995.

Wolf,F. and L. Brennan: Framing the Impact of Organizational Culture on Innovation Irish Academy of Management Conference (Doctoral Colloquium) September 2014 https://www.linkedin.com/in/fraukewolf, 13.08.2016.

Ye, Ch., S. Jha, K. C. Desouza (2015) Communicating the Business Value of Innovation, *International Journal of Innovation Science,* Vol. 7, Iss.1, pp. 1-12.

Yeşil, S., & Kaya, A. (2012). Exploring the link between innovation capability and financial performance. *International Journal of Information Technology and Business Management*, 6(1), 11-25.

Димитрова, Я. (2013), *Организационната идентичност – „невидимата ценност" на съвременната организация*, АИ „Проф. Марин Дринов", София.

Димитрова, Я. (2017) *Култура на иновацията,* Издателски комплекс на УНСС, С.

Димитрова, Я. , (2012), *Корпоративната култура като конкурентно предимство,* АИ „Проф. Марин Дринов", София.

Димитрова, Я., Корпоративният имидж – оценяван или пренебрегван от фирмите в България? Електронно научно списание NewMedia21.eu, 16.12.2015, достъпно на http://www.newmedia21.eu/izsledvaniq/korporativniyat-imidzh-otsenyavan-ili-prenebregvan-ot-firmite-v-balgariya.

Шваб, К. (2016), *Четвъртата индустриална революция,* ИК Хермес, София.

ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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POLITICAL ECONOMY OF ROBOTIZATION

This article is about robotization and its consequences that are to become a precondition for serious social conflicts and contradictions. To prove this thesis, I first examine the process of robotization during past decades and especially during the past few years in order to illustrate the scale of the problem, which is on its earlier stage today, but is expected to change the economic and political reality of all societies in the years to come. After that, I examine two main views about the contradictions and conflicts that robotization brings. Firstly, attention is paid to the vision of techno-optimists, which corresponds mainly to the theories of neoliberalism and neoclassic. After that, the view of techno-pessimists is examined, related mainly to realistic and Marxist tradition in political economy. Several aspects of the contemporary discussion about the overcoming of the contradictions of robotization are addressed – mainly through reduced working hours, unconditional basic income and taxing robots instead of humans. The idea is that replacing people with robots will raise growing problems to all human societies, so steps must be taken to overcome the emerging contradictions. The important thing here is the need to address the education, innovativeness and the ability of the modern man for a fast reaction to the quickly changing economic and social environment. Everything now is about adjusting economies for the rising "Industry 4.0", which brings the question about the need of a new political economy to mitigate the contradictions of the transition from the Third to the Fourth industrial revolution.
JEL: H2; I3; O3; L5

The introduction of robots and the automation of production in the past few years is becoming today one of the central topics in the discussions about the perspectives of contemporary economics. In one degree or another, the robotization is seen as one of the biggest challenges the countries and their policies face today. As every fundamental technological change during the past industrial revolutions, this one demands today for new policies to make the necessary change, to acquire new competitive advantages, to compensate the problems and contradictions it brings. In this article I dare to analyze this change by examining the tendencies of robotization, the problems and discussions it brings, the politics of contemporary state to face the new challenges.

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1. Robotization – a main direction of the Fourth Industrial Revolution

The first robot was created in 1961 and used in a General Motors plant. This is how the beginning of the first generation of robots emerged. They were used mainly on the traditional conveyors where cars, washing machines and other material goods were created. For almost half a century, however, the robotization was not a technology able to bring a qualitative leap of production, although it was a national priority in some countries like Japan for example.

In 1987 the International Federation of Robotics was created to become a professional institution that could help and protect the robotization industry. It collects, summarizes and offers information about the development of that industry. Its members are the main manufacturers of robots, as well 12 national organizations of robotics in countries where the robotization is particularly successful. It coordinates and organizes international symposiums of robotization and annually publishes its findings in "World Robotics".

The robots can be humanoids, which means they are able to reproduce some version of the human body and there are quite advanced forms in this respect. But it is not always an imperative. In general, these are devices that can reproduce one or another set of activities related to each other with corresponding algorithms previously performed by humans. In this sense, they can be different versions of automated drones, self-managed cars or software that translates texts from one language into another or gives certain medical diagnoses, but in all cases related with a high degree of automation of certain human activities (Westlake, 2014, p. 6).

When defining the concept of the robot the International Federation of Robotics relies on the definition of the International Organization for Standardization according to which the robot is an automatically controlled, reprogrammable, multi-purpose machine that can be grounded on a fixed place or mobile. It can be reprogrammed and gain new functions without physical intervention. It has a multi-purpose character and can be connected with different applications, including new technical devices. We can change its control systems and its technological characteristics (IFR, 2017, p. 1).

The transition into a second generation of robots is turning possible thanks to the new digital technologies after the crisis of 2008. Since then the robotization has become a new research field of the ongoing Fourth industrial revolution. The wider use of robots is stimulated by the lack of skilled labour, the rising labour cost, the need for greater competitiveness and the decreasing cost of robotic systems. They are rapidly becoming a centre of public discussions, research and scholarship. During the past few years, the blow of the interest about robotization has been grounded on the fact that some of the biggest companies have demonstrated a growing interest about robots. The Thailand Company Foxconn, a manufacturer of Apple products, announced that it planned to deploy 1 million robots in factories in China. After that Amazon bought the Kiva Systems robot company with the idea of robots doing the work in its huge storehouses. On the other hand, Google became an owner of Boston Dynamics – a manufacturer of military robots and started working on the development of commercial versions of self-driving cars without drivers.

What differs the new generation of robots from its previous versions is that now they have access to all kind of information from everywhere, and thanks to cloud technologies they are able to connect with networks of other robots. By doing that they can share information and in some sense are able to learn from each other, without the need of reprogramming. (Schaffer, 2016).

Unlike the first one, the current generation of robots is expected to play a role in all existing industries of the economy and major spheres of society, to interact more directly and personally with people. An important role are taking the robots that can assist in different human activities and interact with each other by using different networks. Increasingly persistent then is the question about the rules they obey – not only technological, but ethical as well. In the context of the creation of self-driving cars without drivers, a discussion emerges about the ethics of this kind of vehicles and how to realize it with appropriate algorithms (Winfield, 2014, p. 38-39).

The new versions of robots are very adaptive to changes, and their structural and functional features are increasingly being constructed by reproducing complex biological structure. The use of new kind of sensors enables robots to understand and adapt more easily to the surrounding environment, to reproduce more and more functions previously done by humans. The development of a new discipline about artificial intelligence is very important for the improvement of robots. This discipline deals with the development of algorithms able to extract information from different kind of images, including three-dimensional ones. That is how the robot is able to acquire adequate information about the surrounding environment and to react when it changes.

The field of activities conducted by robots is expanding, as well as their ability of self-education and autonomy. They are becoming a factor that changes production, exchange, distribution and consumption. Traditionally robots have been used in automobile industry, but today there is a tendency of robotization in many other spheres – electronics, retail, healthcare, logistics, agriculture, services, education, and government. Robots are now actively introduced not only in production, but also in hotels and restaurants. They are increasingly used in large storehouses, replacing low skilled workers that used to work there. Models used for childcare and for old people are manufactured. During the presidency of Obama, the robots took a leading role in American warfare strategy, grounded on the use of drones to pursue terrorist in dozens of countries all over the world.

Surveys show that the investment in robots contributes to 10% GDP per capita growth in OECD countries between 1993 and 2016. This is why the sales of robots are increasing and in 2015 were sold 15% more robots than in 2014. In 2019, according to the International Federation of Robotics, there will be about 2,5 million industrial robots (IFR, 2017, p. 1).

According to the UN Human development report from 2015 around 200,000 new robots are brought into the world every year. Their main consumer is the automobile industry, which is the main export industry in many countries. Despite the financial crisis between 2009 and 2011 the sales of industrial robots jumped with 17%. Moreover, the sales of robots are growing because of the crisis and the need for stronger competitiveness. They were indispensable in activities that involve risks of accidents and harmful effects on workers. It turns out that robots able to carry out routine tasks are much cheaper for the companies than

the use of labour force. Calculations in Germany show that the expenses for robots performing routine tasks are around 5 euro per hour (including technological assistance and the expenses for electricity), while the cost per worker, including salary, medical and pension insurance, is around 40 euro per hour (Human Development Report, 2015, p. 79, 81). This is why for example "Domino" pizza chain in Netherlands and Germany is already using robots to deliver pizzas, drinks and deserts. Because of the growing amount of robot market the forecasts of analytical companies show that the world expenses for them can grow from 71 billion in 2015 to 135,4 billion in 2019 (Gaudin, 2016).

Robots are mainly used in production. In 2013 there were 1.3 million industrial robots, and by the end of 2017, they were expected to reach 2 million (Hagerty, 2015). Their introduction decreases with enormous speed the working places in production. A typical example is the Chinese company Changying Precision Technology, a manufacturer of mobile devices, which had 650 workers, but with the robotization now they are only 60. In the same time, the production volume increased with 250% and the share of defective goods decreased from 25% to 5%. The number of needed staff is expected to decrease to 20 and this is a tendency that will overturn the whole production sphere in the world during the next decade (Monetary Watch, 2017). Companies like Foxconn are also producing about 30,000 robots per year. Global e-shops like Amazon are replacing people with robots in their warehouses, where their goods are located and loaded for the users – until 2016 there were installed about 15,000 robots. It is expected that soon Amazon and Wal-Mart will be able to use drones to deliver goods for their customers.

The robots are also increasingly used in medicine – robots are now operating prostate, they are used in eye surgery and in hundreds of clinics all over the world the four-armed system "Da Vinci" is now used for surgical purposes. The beginning of this tendency was in the 1980s, and in 2015 there were already 3000 working devices. They are produced by the company Intuitive Surgical. One hand of the robot holds a camera that shows an image of the operated part of the body, the other two hands are reproducing the movements of the surgeon, and the fourth hand acts as an assistant of the surgeon. They are used mainly for gynaecological and urological procedures. The procedure itself is controlled by a surgeon who monitors the operated part of the body. In 2012 the "Da Vinci" robots made about 200 operations (The Economist, 2012).

Along with the industry, healthcare and services, an important direction of radical change can be found in domestic work. The number of robots used in households is expected to rise from 3.6 million in 2015 to 31 million in 2019. The trade of robots able to clean homes and swimming pools is expected to rise about 13 billions of dollars only in US. We are witnessing the same tendency in the entertainment industry. In 2015 the total number of toy-robots, remote controlled multimedia robots and robots for entertainment was 1.7 million. According to the predictions of the International Federation of Robotics, the market for such robots is about grow to 11 million by 2019. Among them, the robots that are used as toys for different hobbies are occupying 70% of the market. A great amount is expected with the robots that can be used for old and disadvantaged people. Japan is a leader in this kind of technologies, because there is a great demographic problem, bringing the need for robots. In 2015 there were 4,700 of those robots, but they are expected to grow to 37,500 by 2019 (IFR, 2016).

Robots appear also in some spheres that seem to be very far from technologies – like religion, for example. In 2017 in Wittenberg (Germany) – the city that became famous when Martin Luther gave birth to the Protestant Reformation 500 years ago, a priest robot appeared who was able to read the Bible and to give blessings to the believers. There is a touchscreen on the chests of the robot. When he welcomes the visitors of the church, he offers them to choose a voice and a type of blessing, and then he raises his hands to the sky and says "God bless and protect you". This attracted a great attention even from not religious people. The introduction of this robot was made with the idea of provoking a discussion about the relationship between priests and believers, and about the role of the church in everyday life (Balberov, 2017).

From 2017 on the main metro-station "Prospect for Peace" in Moscow during holidays and special occasions the robot Metrocha – with his blue shining eyes and a touchscreen on his chest – meets the passengers, communicates with them, remembers their names, recognizes them, makes jokes, answers questions, takes pictures and prints them. His artificial intelligence gives him the ability to orientate and to overcome obstacles. Similar phenomena already exist in other parts of the world where robots work on information desks or like museum guides.

The most rapid development of robots for military purposes is already in progress. They are able to autonomously select and attack their targets. The so-called "killer robots" are quickly becoming a reality and are gradually creating the preconditions of wars that are to come with the Fourth Industrial Revolution. These wars will be something quite different from the First and the Second World Wars that were conditioned by the technologies of the Second Industrial Revolution of the mass conscription armies. The technologies of the Third Industrial Revolution brought the replacement of the mass conscription armies with professional ones, and now their role is taken by the autonomous weapon systems. This raises some stressing concerns about the consequences of robotization in this area, because machines are able to make decisions about the life and death of many people. This can lead to very dangerous consequences, people may die and no one will be responsible for their deaths. The concerns are also growing because of the already existing US practice during the presidency of Obama to fight terrorist groups in dozens of countries in the world with robotic drones, leading to a large number of innocently killed civilians. That is why on a UN meeting in Geneva in April 2016 representatives of 94 countries recommended formal discussions to be launched about the "deadly autonomous weapon systems" to see if they should be limited by international treaties (Docherty, 2016).

Robots were used in police bombing operations, and in July 2016 for the first time in Dallas a robot was used to murder a suspected criminal. In the years to come, the tendency is for robots and drones to be used in police operations.

Robotic drones are already part of the armies and engage in military operations. In Russia, they control the condition of oil pipelines. At the same time their prices are falling rapidly and in the beginning of 2016 autonomous, GPS-controlled drones were sold for about 500 dollars on the mass market. Only 10 years earlier they were multimillion facilities, a part of the military complex, and now it is expected that their prices will fall to 50 dollars for much more sophisticated versions, giving permanent computer picture to one project or another, using radar sensors, stereo-picture, voice and conversation records. This is why it is

expected over the next decade a variety of permanent control and supervisory systems to grow sharply with the help of the drones, especially in large cities, in the protection of property and in all risks. They can monitor traffic, crime, borders, to help with disasters. They are expected to solve infrastructure problems, to reduce pollution and traffic, to look for climate change and ecology. For this will also contribute the rapid reduction of their size and the increase of their intelligence, which will decrease on the other side the energy they use and will make them increasingly difficult to detect from a distance. Through them, the entire air-space will be digitalized and they will assume many of the functions so far performed by satellites (Diamandis, 2016).

A leader in the development of robots is China, where there were 900,000 robots in 2016, expected to grow to 160 000 by 2019; followed by South Korea with 40 000 robots that are expected to grow to 46 000 in 2019; on the third place is North America, where US and Canada had 38 000 robots in 2016, and the expectations are that they will grow to 46 000 in 2019. They are followed by Japan and Germany. The largest share of industrial robot workers is in Asia, and this is one of the indicators for the changing balances of power in the world economy (Bryant, He, 2017).

2. The discussion about the contradictions of robotization and the necessary policies of the states

Robotization strategies amongst the companies are a part of the market competition and the need for profit. At the same time, in the long-turn state strategies, they are related with the idea of strengthening the competitive advantages of the states as well as solving demographic problems. Their realization in countries with a rapid ageing of the population, like Japan, for example, is a factor for overcoming the lack of labour force.

In China, the state supports the development of robotics as it is losing its current competitive advantage of low prize labour force, which ensured the huge leap of the country for decades. Today China is losing that competitive advantage, because of the rising incomes and of the straitening of domestic consumption, especially after 2008. To this are added the prognosis about the ageing of the population, because of the long-term one-child policy, and the robots are seen as a factor that will keep production costs low and will be a reaction to demographic problems. It is even suggested that the pension funds should be used for buying stakes in robotic companies and enterprises.

Much sharper anyway are some other problems that bring a global discussion with different suggestions. They are about the different prognosis of job losses, rising unemployment and inequalities, changes of value creation, distribution of public wealth. In many areas, jobs that provided employment to a large proportion of the population during the Second Industrial Revolution, are disappearing. This tendency was typical, for example, for those who were employed on the conveyer, and since the time of Henry Ford have been seen as an expression of employment in the era of Fordism. Their work today is automated in its vast part. Robots increase public wealth and are for public benefit as a whole, but very quickly and in a larger scale than other technologies they seem to divide society of winners

and losers from the change. Winners are those who introduce robots and make a profit from them, as in some degree the consumers, because robots suggest lesser prices of goods and services. But losers can be a large number of people whose jobs are lost and whose income is decreasing, because they are occupied by robots. The main contradiction here is that robots are making our lives easier and prices lower, but at the same time they bring job losses and growing inequalities as a result of the elimination of the human factor in production. According to a report from McKinsey management and consulting company half of the world jobs are now in a risky situation, because of the automation. On average, over 30% of the activities of 60% of all the professions today can be automated immediately with technologies that already exist, and with the strong technology development, this percentage will quickly grow (Chui, Manyika, Miremadi, 2016). This is the case with professions that require physical activity, such as the profession of millions of drivers, which in the next decade is expected to disappear with the rise of self-driving cars and drones. The introduction of robots leads to improvement of the quality of work because they take over dangerous, tedious and dirty jobs that are not possible or safe for humans to perform.

But the intellectual professions are also at risk. A translator profession won't be needed anymore, for example, with the rise of advanced versions of automated machines for translation, which means that large disciplines will disappear in foreign language schools.

So we can conclude that the introduction of robots is becoming a reason for job losses, unemployment, and insecurity, lack of means for existence, growing social inequality and crisis. It is well known that from the first stages of industrial development this has given birth to contradictions and conflicts – for example, the attempts to destroy machines. This was the case in 1769, at the very beginning of the First Industrial Revolution, when the English Parliament adopted a harsh law in which the willful destruction of machinery was made a felony punishable by death (Mokyr, 1990, p. 257).

As we see, robotization brings many concerns about the rising inequalities and the losses of jobs. This leads to the question about the economic mechanism that drives these changes.

The first one is about the creation of value added. It is well known that in the 19th century Karl Marx considered it as unpaid human labour seeing the ability of the workforce to create value beyond its own. This value is appropriated not by the worker, but by the capitalist. For Marx, this is an exploitation category connected with the rising of working hours and lower payment. The rise of robotization changes this, because the work is not implemented by humans, but by the robots. Robot adoption is reducing labour's share in value-added. This is one of the reasons why the labour's share of national income has in recent decade fallen in many nations. This means that after the permanent capital, which today includes robots, is paid all the profit goes in the hands of capitalists and this is one of the possible explanations of the growing inequalities. We can see this tendency in the Oxfam report, announced at the annual meeting of World Economic Forum in Davos held in January 2018. It says that in 2017 82% of the wealth went to the world richest 1%, 18% in the hands of the "better half" of humanity and the poorest half of humanity received nothing. This means that 82% from the profit goes in the hands of capitalists and only 18% is distributed for the labour, and particularly for the highly skilled labour (Oxfam Briefing Paper, 2018, p. 8). This report seems like an indicator of how the new value is distributed at

the macroeconomic level. But if we look at the process at the microeconomic level, we will probably see the same tendency with a great amount of value distributed for capitalists and almost nothing for the labour. The main losers are the low skilled workers that are being replaced by robots. This means that a new workforce must be created to meet the needs of "Industry 4.0" and that the educational systems must concentrate their forces into this area. Otherwise, the countries will meet the consequences the low skilled labour, lower competitiveness, great poverty and inequalities with all the contradictions and social conflicts they bring.

But there is an opposite tendency that might mitigate the contradictions this process brings. It is called "prosumarism". During the Third Industrial Revolution Alvin Toffler formulated the "prosumattor" and "prosumatric economy" where people produce what they use. The concept stresses that with the rise of new technologies man can become producer and consumer of his own goods. This is particularly typical for non-material goods that are created and used by everyone in virtual space. But with the development of 3D robotics like 3D printers, it is expected this concept to become applicable for material objects as well. This means that in the future every human being will be able to produce his own goods and is expected to bring the end of capitalism and a new post-capitalistic era, because there won't be any more capitalists and workers. They will be replaced by prosumers. That is one of the possible trends, developed by the famous scholar Paul Mason in his bestseller „Postcapitalism: a guide to our future". The idea is developed also by Jeremy Rifkin in his book "The zero marginal cost society". There are already millions of prosumers – consumers in the world who create what they consume – producing their own green energy at a zero marginal cost. According to some data, there are around 100,000 people in the world who produce their own goods by using 3D printers at almost zero marginal cost (Rifkin, 2014, p. 9).

At the same time, from the point of view of a Marxist political economy, only human labour can create value. There is both use value and exchange value in every commodity. Capital (the owners) does not create value itself, but it controls the means of production and will only put them into use in order to appropriate value created by human labour. So in a hypothetical all-encompassing robot/AI world, productivity (of use values) would tend to infinity while profitability (surplus value to capital value) would tend to zero. This would be no longer capitalism (Roberts, 2018).

A second mechanism that drives people jobless with the introduction of robots is about the "value chains" – the set of activities that a firm operating in a specific industry performs in order to deliver a valuable product or service for the market. On the one side, there is a process of automation of the management of supply chains. Through robotization one can connect and automate sales, forecasting, replenishment, supply, planning, procurement, manufacturing and distribution activities. This is the way to improve your supply chains by: decreasing long-term costs; providing labour and utilization stability; increasing worker productivity; reducing error rate; reducing frequency of inventory checks; optimizing picking, sorting, and storing times; increasing access to the difficult or dangerous location. Process robotics automates the supply chain from end to end enabling in-tandem management of all different sections (Quasney, Fitzgerald, 2017).

At the same time for different products are possible radical changes in the value chains. During the Third Industrial Revolution, the main characteristic of the value chains was the de-localization – the process of spatial displacement of different elements of production chains in many countries to gain competitive advantage. This was one of the main catalysts for the economic growth in some developing countries, particularly in South-Eastern Asia. In the entrance in the Fourth Industrial Revolution, the tendency is for the competitive advantage to come not from the displacement of different elements of production in different countries, but with the introduction of robots, with automation and digitalization of the working process. In this way, the competitive advantage of the geographical factor is rapidly replaced by the technological advances of robotization. It is expected that in the future the value chains will be created only on a few production sights, mainly domestic and not worldwide. This means that companies would be able to create new value chains and to go back home without losing profit and many of them are doing so. The unfold of such a tendency is expected to limit the processes of globalization, and to replace them with de-globalization, "etatization", protectionism and self-closing, because it would be cheaper for the global corporations to turn their production back home – a tendency that is strengthening in the last few years as a result not only from robotization, but also from many other factors like the crisis, emigration, terrorism, the growing fear and uncertainty. The unfold of such a tendency means that a new political economy would be needed to justify a new relation between market and state in a situation when the regulative opportunities of the state are expected to grow. This also means that with the introduction of robots, the countries that have so far benefited from the low labour cost might lose this competitive advantage, and this is not an accident that countries like China, Japan or South Korea are accelerating the introduction of robots in production to benefit new competitive advantages in the new digital economy.

The more pressing question that stands today is what we should do now. In this aspect, there are opposing prognosis and analysis that give opposing solutions.

The first prognosis it that of techno-optimists. According to them, there may be a temporary employment reduction in some areas, but as in the past technologies are taking away some, but at the same time they are creating other jobs. Examples are given with previous technological revolution when the introduction of new technologies saved human labour and even increased the need of labour force. In 1950, for example, only 25% of married woman worked outside home and others were involved with work at home. In 2000 this percentage raised to 60%, and the assessment is that the half of the rise was because of labour-saving effects from different household appliances. Freed from the need to devote so much attention to domestic work millions of married women go to the labour market and begin to work outside the family, where the need of working force is growing, no matter new machines are constantly introduced (Avent, 2014, p. 16).

Similar forecasts are made for the future. A typical example is the joint research of IDC (International Data Corporation) – an international corporation of research and consultation in the fields of information technologies, telecommunications, consumer technology markets, market intelligence – and Salesforce.com, dealing with systems of client management and the perspectives about introducing artificial intelligence over the coming years. According to this research, conducted amongst managers from leading economies

like US, Germany, Britain, Japan, Canada and Australia, these technologies will create directly over 823,000 and indirectly over 2 million jobs. They will also rise the revenues of business with 1.1 trillion dollars between 2017 and 2021. The forecast is 2018 to become a breakthrough in this respect (Gantz, Murray, Schubmeh,Vesset, Wardley, 2017).

According to the International Federation of Robotics: "The future will be robots and humans working together. Robots substitute labour activities, but do not replace jobs. Less than 10% of jobs are fully automatable. Increasingly, robots are used to complement and augment labour activities; the net impact on jobs and the quality of work is positive. Automation provides the opportunity for humans to focus on higher-skilled, higher-quality and higher-paid tasks… Governments and companies must focus on providing the right skills to current and future workers to ensure a continuation of the positive impact of robots on employment, job quality and wages." (IFR, 2017, p. 2). Automation doesn't take jobs, although some professions may disappear and others to change their character thanks to the robots. That is why it is argued, for example, that the countries with the largest number of robots per employed population, like Germany and South Korea, have some of the lowest levels of unemployment.

According to John Tamny from "Forbes" magazine, "robots will be the biggest job creator in history". He is turning back to history and points out that every technological change has led to the destruction of jobs, but at the same time have created a growing number of new activities and professions. Robots will contribute to the biggest leap in this respect, because people will no longer engage in labour activity to survive, as it was in earlier history. Those activities will be for the robots. This will create a precondition for a growing number of innovations that will create new needs and new activities to satisfy them. Precisely because robots are creating a tendency for such a mass destruction of jobs and create more and more goods, new activities will become possible, that do not exist today. A growing number of entrepreneurs in innovative industries will be the founders of those activities and prospects. Robots will bring a growing profit that will be invested exactly in ideas that invent future with new services, new things, new strategies, new ideas and activities. Labour is not something static and unchangeable, the progress is about replacing old with new forms of labour, and the society creates new activities that haven't existed before. This characterizes all stages of human progress and the acceleration of progress has always been also an acceleration of the creation of new activities, respectively professions and jobs (Tamny, 2015).

This is the most optimistic forecast that expects market solutions to the job problems. From this point of view the main problem isn't about the lack of jobs, but about the rapid change of demand and supply of jobs, and about the measures state and market must take to react more adequately in the redirection, further training and changes in education to overcome the disparity between supply and demand of labour force. Undoubtedly, with such a trend we can expect an increase in the number of jobs in so-called creative industries, understood in a wider sense of the world like art, production of knowledge, innovations. Even now we are witnessing a growing demand for highly skilled workers for the digital economy, and at the same time – lesser demand for workers with low or without any qualification.

The second prognosis is that of techno-pessimists. Their voice is harder in the public sphere and is related to the prospect of a sharp decrease of the need of labour, which

will bring rising unemployment, poverty and inequality. Most of the world researches are showing exactly that perspective and this raises voices that robots bring unemployment and inequality. According to some prognosis in the years to come, the robotization of economies in a global scale will lead to the release of about 100 million jobs (Bria, 2016).

The study of Oxford University "The future of employment", published in 2013, analyzes 702 different professions in US and finds that 47% of them will be computerized during the next 20 years. The first wave will be about the introduction of self-driving vehicles that do not need people, which will remove millions of jobs in transport and its logistics. This, in turn, is expected to have a very hard consequence for the payment of labour force of other jobs, because of the great number of people who will be looking for jobs. In this situation, the institutions of power will have to look for a solution to the problem about the large imbalances in profits and losses from the technological development (Frey, Osborne, 2013).

According to a research of the National Bureau of Economic Research, any additional robot in the American economy is cutting the employment of 5.6 workers. At the same time, it is recognized that the relation between automation and employment isn't always direct. One of the main directions of development is about the growing production of the so-called "collaborative robots" that are smaller and more adaptive, created to work along with people. According to some prospects, their number will increase 10 times between 2016 and 2020 (The Economist, 2013).

The past experience from periods of technological changes associated with the extinction of traditional jobs from the era of Luddites in the late 18th and the beginning of 19th century shows that this leads to more riots, strikes, protest movements, conflicts, crimes, a growing number of homeless people, stress, aggression, violence and fear. Under the conditions of the liberal democracy today we can see the first symptoms of this in the two most advanced countries that had a global hegemony in the last two centuries – Britain with its "Brexit", and the conflicts related to the election of Donald Trump in US. It can be expected that this is just the beginning. So there is the question what must be done?

The big problem is that different surveys, based on expert assessments and made by managers and specialists, show that there are very big variations in the forecasts of job losses as a result of automation. Nevertheless, the question about the reaction of different states stands as they must meet the challenges of robotization. The most common suggestions are about taxing robots, the introduction of the ideas of unconditional basic income and the reduction of working hours, as was the case with previous industrial revolutions.

The first suggestion is connected with the transition from taxing people to taxing robots. It was made by Bill Gates and challenged a big discussion. Right now, he says, the human worker does $50,000 worth of work in a factory, that income is taxed and you get income tax, social security tax, all those things. If a robot comes in to do the same thing, you'd think that we'd tax the robot at a similar level. Gates even suggests slowing of automation process so there will be enough time to react adequately to the emerging contradictions (Delaney, 2017). Nevertheless, the idea of Bill Gates meets strong opponents. They stress on the argument that in this way the interest will diminish and the policies of introducing robots will not happen, because the taxation will make this process more expensive and the

country that introduces robots – a losing one. On the one hand, under these conditions, the companies will export their production abroad where the taxation isn't that big and job losses will happen nevertheless. On the other hand, foreign companies in countries where that taxation do not exist will start offering the goods and services at a much lower price, which will lead to the bankrupt of domestic companies. Under those conditions, this will mean a new closure of national markets, because otherwise the taxation of robots will be senseless. In the same time, this idea has its ground and the owners of robotized and automated jobs will be interested with it, because the robots will produce a growing number of production, which will not have enough consumers if the number of unemployed and poor people rises.

The second suggestion is about the introducing of unconditional basic income for everyone to solve the problems with poverty and the lack of consumption. This idea gains popularity among different scholars and economists with different ideological and theoretical orientations, as it is increasingly perceived that social networks are not able to cope with the new challenges and changes of labour. This idea meats strong support from other prominent representatives of the digital economy like the inventor of Facebook Mark Zuckerberg or Ellen Musk, who is a head of digital giants like Tesla and SpaceX. According to Musk we won't have a choice. "I think it's going to be necessary. There will be fewer and fewer jobs that a robot cannot do better" (Galeon, 2017). However, the pressing problem about the rising of funds for this universal basic income stands and there are radically opposing views about that. Liberal and market-orientated authors believe that the universal basic income for every citizen, even for jobless ones, will be cheaper than the current social system that requires a huge state and municipal administration to function. For example, Charles Murrey thinks that a 10,000 dollars annual income for every American can successfully replace the current security system, social services programs, agriculture funds, health programs, social benefits. All this can further reduce the cost and the administration of the state, which may, however, retain its functions in financing education, transport infrastructure and judicial system, but being a much smaller state (Murrey, 2008). More socially orientated authors view the universal basic income as a tool for modernizing of social security network so it would be able to adapt to the changes associated with the growing temporary, precarious work. This will give the people the necessary flexibility to adapt to the rapid change of jobs and professions. In this case, the basic income shouldn't become a tool for the destruction of the contemporary social state. Those alternatives bring a strong dispute that revolves around two main problems. The first one is about the raising of funds for the universal basic income. And the second one is whether receiving money for doing nothing will not demotivate people to work, educate and develop, which will be harmful for the economy. Currently, the labour-related economic contradictions have not reached such a scale to push the introduction of universal basic income, but there are many expectations that this will happen very quickly with the given circumstances of unprecedented technological and economical changes.

We should have in mind, however, that its introduction is connected with very important consequences. The introduction of universal basic income in any country is expected to boost emigration attempts from the poorest countries, because people from these countries will try to take advantage of it, i.e. its introduction will mean a much more active border closure. These actions, in turn, will be boosted by the fact that putting higher taxes required

by the universal basic income, will require a much stronger control on the revenues of companies and a limitation on their abilities to escape into offshore zones. Companies that have so far looked for the competitive advantage of cheap labour in one region of the world or another, which push them to create global value chains, will no longer need it and may be willing to return home where they can find more consumers for their production. This is expected to be, however, one of the mightiest technological factors that can create preconditions for the de-globalization of contemporary economics.

The third suggestion stresses on the need for a sharp reduction of working hours, and here we are turning back to the Keynesian idea for 15-hour working week. The problem is that in the past few decades there has been unregulated growth of working hours in areas that are difficult to be automated and robotized, because they are related to heuristics and creativity. Therefore, in practice, the relevant social groups work harder, not lesser. Automation reflects firstly professions and activities that are associated with the traditional regulation of working hours, which means that working hours in those activities will diminish, but in high payed and innovative professions the tendency is expected to be the opposite. And this is not accidental, because those who are routinely employed are less motivated comparing to those who are engaged in creative activities and self-realization. This is why the creative workers are tended to work more than others, i.e. it can be suggested that in the degree that low-skilled and routine jobs are reduced, at the expense of high-skilled, creative, innovative and unconventional ones, the people would like to involve more in the second kind of labour. This is also due to the fact that in most cases the characteristics of this work do not require a presence in the office or another concrete place in the standard working hours from 9 to 17, or within strictly defined age limit, 65 years for example, because work can be realized from home and in any time thanks to the social networks. For those workers not the fixed, but the flexible working hours become a leading standard as they can assess for themselves how much and when to be engaged. Age and physical abilities will not matter anymore at the expense of high-qualification, creativity and the ability to create something new and different. One can be physically very healthy, but if he lacks a qualification, digital skills and heuristics, he won't have any perspectives. The robotization will increase the role, place and importance of the human. Stephen Hawking, for example, is a man paralyzed in his home and in his wheelchair, but with the help of the new technologies he can make things that are impossible for millions of others. The distinction between work and leisure will become more blurred for more people, not only for painters, musicians, righters, scholars or professors, as it have been so far for the so-called free professions.

3. State strategies for the development of robotics

The emergence of robots, broadly understood as automated systems where different forms of artificial intelligence are integrated, changes the development strategies and aims of countries, the notion of progress. During the First Industrial Revolution, the symbol of entering the modern world was the railway. In one of his famous stories, for example, the Bulgarian writer Ivan Vazov tells a story of an old man who is blind, but nevertheless, he is

happy to “see” the first railway of the new liberated from Ottoman rule Bulgarian country. After that the symbol of the Second Industrial Revolution became electricity. And another Bulgarian writer Elin Pelin wrote in 1945 his famous story „The old water-mill”, where the new and bright future is seen with the electricity that "shines down the field in all villages and cities". It is well known that Lenin has seen electricity as a technological ground of his understanding of communist society. After that, during the 1980s, the symbol of the future became the computer. Today, AI and robots are playing a main role in the strategies of the future.

In the years to come, it is expected the collaboration between robots and humans to become a daily reality, so many countries are readjusting their economies and educational systems to answer the needs of “Industry 4.0” with a clear understanding that their economic power and future are strongly dependent on it. This raises a growing debate about the role of the state in the process, about the consequences for employment and productivity, economic policies that must be conducted by the states in the development of those technologies, and for the reactions that must be made to the contradictions, problems, conflicts they create. Countries tend to aim in their development strategies to go further in the deployment of robots. From a long time, this is a leading priority in Japanese industrial strategy, where robotization has reached a high degree in the automobile industry that gives it a strong competitive advantage. Because of the rapidly growing old population and the slow productivity growth, the Japanese government is aiming to rise twenty times the robots in use in the non-productive sphere and three times in the productive one by 2020 (IFR, 2017, p.5).

During the last few years, the development of robotics has been at the heart of the state strategies in China, South Korea and a number of other countries. China became in 2013 the main market for trade of robots and is expected to become the main manufacturer and consumer of robots. This is an economic necessity, because of the tendency of shortage labour force and the rapidly rising wages. Because of the size of its economy China is already the biggest market for industrial robots in the world, but in 2015 it had 36 robots per 10 000 workers in productive sphere and was still ranked 28th among the automated countries in the world. China is aiming to enter the top ten of automated countries with the mass introduction of robots in its economy, with the idea to introduce 150 robots per 10 000 workers by 2020. For this purpose the annual production of industrial robots there must grow to 100 000, which will be almost twice than in 2015 (Sheahan, 2016). This means that the Chinese companies will have to introduce around 650 new industrial robots between 2016 and 2020, which is 2.5 times more than in the whole world in 2015 (IFR, 2016).

For the implementation of this strategy, the crucial role is played not only by the state, but also by companies that are facing the conditions of the rapidly rising labour cost in China. On March 16, 2016 the Chinese government adopted the next five-year plan for the development of Chinese economy, providing millions for technology improvement, including robots. The creation of many innovative centres in the country is planned for their development. This will reduce the decreasing profit as a result of the growing wages in the country, and will make its products more competitive to the companies in US and EU. For example, the middle wage in Shanghai has grown more than twice for seven years. This is

why company like Cambridge Industries Group, facing the growing competition from the more automated Germany, Japan and US, is aiming to replace two-thirds of its 3 000 workers with robots, and is creating the so-called "dark factory" for this purpose. Given that in 2016 employment in Chinese industrial sector reaches around 100 million of people (compared to 12 million in US) and this sector has given 36% from Chinese GDP. This means that we are facing a great changes and challenges not only there, but also in the whole world economy (Knight, 2016).

Generally, the main problem about the robotization and the decline of employment is that all social systems created in 20th century, especially during the Second Industrial Revolution, are based on the questions how much, how, and what the cost of human labour is. On those questions is based the taxation for social purposes. This is the case, for example, with healthcare. Hundreds of millions of people receive health insurance thanks to their employment, but the loss of their jobs means they will not have the possibility to pay those bills. The question stands in this situation about the politics that must preserve healthcare for people, no matter the employment.

Big changes must be made in education policies as well. The current data in all areas and countries in the world show that the lower education of one person makes it harder for him to find a job and this means that the level of employment is strongly connected with the level of education. People without education or with low education are doomed, compared to those with high education, especially those who are capable to learn fast, who are innovative and capable to orientate versus new spheres. Changes in favour of jobs that require manual and intellectual work are extremely fast, dooming millions of people to a lack of life perspectives. A study of these changes in US between 2001 and 2014 shows that for that time the relative share of jobs requiring non-routine physical labour is up to 32%, and to those requiring non-routine cognitive work – up to 24%. In the same time the jobs requiring non-routine physical labour are 10% down, and those with routine cognitive labour – 8% down (Lieber, Puente, 2016, p. 6).

This means that the education should become a main priority for the states – more important than ever before. The problem is that the educational systems, as they emerge and develop from the modernization to nowadays, bring characteristics that were important on the different stages of human progress, but with the progress and after time they have lost their previous importance. Even today we can see some features from the early stage of this process in school years and vacations, which correspond with the traditional agricultural economy where the kids were working in the field during the summer. There are some characteristics from the era of mass education of the Second Industrial Revolution. It brings characteristics from periods when important was the great division of labour, in correspondence to that – the division of many educational disciplines – and not the convergence, which is the main feature of contemporary technologies. It was focused on the learning of a certain amount of knowledge, but today the main role is on the ability to process the information, to think innovatively and creatively, which suggests some changes in the foundations of education. The technical revolutions so far have made the period of education a basic feature of childhood, adolescence, and youth. After this period "man enters into life" and requires the status of an adult. Now, this is ending in a world where labour is becoming more insecure and no one can expect to find a job after school and to

hold this job until retirement, as it was for the generation after World War Two. The vast majority of people will have to change their jobs and careers many times, which means that they will have to acquire knowledge and skills again and again. Teaching and learning will not be any more a part of human life, they will always be his companion, and there will be perspectives only for those who consider this. Perspectives will be for those countries who can organize their educational systems according to the needs of the changing era.

More than ever the question stands about continuous learning that might give an opportunity for a fast redirection to a new sphere of employment in the conditions of the ongoing disappearance of jobs and professions. Chances to survive and to be robotized have only those jobs, existing today or in the future, which need creativity and emotional intelligence. This means that these characteristics must become central for the educational systems, in parallel with the digital literacy, needed for handling new technologies. To a very high degree today the education must correspond to the realities of the Fourth Industrial Revolution and to include the characteristics of digital societies and economies. This is how the deployment of unseen unemployment must be overcome, as well as the accelerated tendency of divergence between labour demand and supply.

We should also have in mind that in previous history labour was a sphere that gave a basic meaning to human life and there stands the question about preserving those meanings, aims, feelings of self-realization with a particular labour. We shouldn't underestimate the meaning of labour for human dignity. We are talking once more about gaining experience from the times of the growing unemployment from the 1930s when practices were introduced for the state to create employment programs towards some public goods of value for everyone. This can be particularly valid for the transition period when a large number of jobs disappear and when the time is needed to create new spheres of employment.

The robotization will have different consequences for the countries according to their economic development. The less technologically developed a country is, the more bets are on the cheap labour force, and the more disastrous and leading to severe contradictions and conflicts will be the consequences of this process. An important economical consequence from the introduction of robots is the reduction of the need of cheap labour, which creates a tendency where many industries are returning their production home where it is cheaper, unlike during the Third Industrial Revolution when it was cheaper to export those industries in countries with cheap labour. Therefore robotization is expected to have very disastrous consequences for countries, relying on a large amount of cheap labour. This is one of the preconditions for a new distinction between developed and developing countries, which raises new contradictions, especially about migrant waves. They may create a new geopolitical situation of a strong closure of states, tendencies of de-globalization, especially about non-qualified and workforce. If we look at the past, at the different cycles of capitalism, we will see that there were cycles of internationalization (globalization), universalization, free trade and decline of the role of the state, followed by crisis, growing inequalities and contradictions, introduction of new technologies and cycles of self-closure, "etatization", protectionism and increased role of the state brought alive to regulate the emerging contradictions. It seems that with the entrance in the Fourth Industrial Revolution we are at the beginning of a new stage of self-closure. We can see its manifestation all

around us – the Brexit, the election of Trump, the referendum in Catalonia, the rise of nationalistic powers, the building of fences between countries and regions seem to be a part of the same tendency. So the political economy of the Fourth Industrial Revolution is expected to be grounded on those tendencies that give more power to the state over the market. It is not a coincidence in this respect that scholars today are turning back for solutions in Keynesian or Marxist political economy, seeing a tendency very close to its nature to the one a century ago when free trade and internationalization of British global hegemony were replaced by self-closure, protectionism, and multipolar world with struggling for global hegemony new powers, but also with a strong state able to regulate the contradictions. Of course, it will not be the Keynesian or Marxist political economy, because of the different scale and character of the change, but this is a tendency that seems clearer in every passing day.

We can conclude that in the next decade the perspective is to an exponential jump in technologies and the economical tendencies they bring, which makes the politico-economic analysis of what we are witnessing today more and more necessary. Undoubtedly, we will have faster than ever before increase of public wealth, the emergence of new goods and services because of robotization, but meanwhile we will have an increase of all kinds of internal and external contradictions that will require a much stronger state intervention in robotization strategies to solve social problems and contradictions between demand and supply of jobs.

References

Avent, R. (2014). The revolution will be uncomfortable. – In: Westlake, S. (Ed.) Our work here is done: Visions of a robot economy, Nesta.

Balberov, K. (2017). Robot-svyashtennik poyavilsya v Vitenberge, Ruskaya Germania, viewed 09 June 2017, <http://www.rg-rb.de/index.php?option=com_rg&task=item&id=20782&Itemid=13>.

bloomberg.com/gadfly/articles/2017-01-09/the-robot-threat-donald-trump-isn-t-talking-about>.

Bria, F. (2016). The robot economy may already have arrived, In: open Democracy. Viewed 16 June 2017, <https://opendemocracy.net/can-europe-make-it/francesca-bria/robot-economy-full-automation-work-future>.

Bryant, C., He, E. (2017). The Robot Rampage. Viewed 16 June 2017, <https://www.

Chui, M., Manyika, J., Miremadi, M. (2016). Where machines could replace humans – and where they can't (yet). – McKinsey Quarterly, July.

Delaney, K. J. (2017). The robot that takes your job should pay taxes, says Bill Gates. – Qartz Media, viewed 15 June 2017, <https://qz.com/911968/bill-gates-the-robot-that-takes-your-job-should-pay-taxes/>.

Diamandis, P. (2016). Eight 21st Century Emerging Technologies: Part 4. Viewed 16 June 2016, http://www.21stcentech.com/21st-century-emerging-technologies-part-4/.

Docherty, B. (2016). Losing Control: The Dangers of Killer Robots, The Conversation. Viewed 16 June 2016, <https://theconversation.com/losing-control-the-dangers-of-killer-robots-58262>.

Frey, C. B., Osborne, M. A. (2013). The Future of Employment: How Susceptible are Jobs to Computerization. Oxford: Oxford Martin School.

Galeon, D. (2017). Elon Musk: Automation Will Force Governments to Introduce Universal Basic Income. Viewed 14 February 2017, <https://futurism.com/elon-musk-automation-will-force-governments-to-introduce-universal-basic-income/>.

Gantz, J. F., Murray, G., Schubmeh, D., Vesset, D., Wardley, M. (2017). A Trillion-Dollar Boost: The Economic Impact of AI on Customer Relationship Management. IDC. Viewed 10 June 2017<https://www.salesforce.com/content/dam/web/en_us/www/documents/white-papers/the-economic-impact-of-ai.pdf>.

Gaudin, Sh. (2016). Robotization market expected to reach $135 billion in 2019, IDC says. Viewed 25 February 2016, <http://www.cio.com/article/3038723/robotization/new-markets-push-strong-growth-in-robotization-industry.html?sc_cid=70160000000q6CfAAI>.

Hagerty, J. R. (2015). Meet the New Generation of Robots for Manufacturing. – The Wall Street Journal, June 2.

Human Development Report. (2015). Work for Human Development. New York: United Nations Development Programme.

IFR. (2016). 31 million robots in household worldwide by 2019. Viewed 01 February 2017, <https://ifr.org/ifr-press-releases/news/31-million-robots-helping-in-households-worldwide-by-2019>.

IFR. (2017). The Impact of Robots on Productivity, Employment and Jobs 2017. – A positioning paper by the International Federation of Robotization. Viewed 20 June 2017 <https://ifr.org/img/office/IFR_The_Impact_of_Robots_on_Employment.pdf>.

International Federation of Robotization. (2016). IFR Press Release World Robotization Report. Viewed 01 February 2017, <http://www.ifr.org/news/ifr-press-release/world-robotizationreport-2016-832/>.

Knight, W. (2016). China is Building a Robot Army of Model Workers. – MIT Technology Review, May/June.

Lieber, J., Puente, L. (2016). Beyond the Gig Economy: How New Technologies Are Reshaping the Future of Work. Thumbtack.

Mokyr, J. (1990). The lever of riches: Technological creativity and economic progress. Oxford University Press.

Monetary Watch. (2017). Chinese Factory Replaces 90% Of Human Workers With Robots, Sees 250% Production Increase. Viewed 30 January 2017, http://monetarywatch.com/2017/01/chinese-factory-replaces-90-human-workers-robots-sees-250-production-increase/.

Murray, Ch. (2008). Guaranteed Income as a Replacement for the Welfare State. Oxford: The Foundation for Law, Justice and Society.

Oxfam Briefing Paper. (2018). Reward Work, Not Wealth: To end the inequality crisis, we must build an economy for ordinary working people, not the rich and powerful. January 2018, Oxford: Oxfam GB.

Quasney, E., Fitzgerald, J. (2017). Using autonomous robots to drive supply chain innovation. Deloitte Development LLC.

Rifkin, J. (2014). The Zero Marginal Cost Society: The Internet of Things, the Collaborative Commons, and the Eclipse of Capitalism. N. Y.: Palgrave Macmillan.

Roberts, M. (2018). UNAM 3 – the robotic future. Viewed 9 March 2018 https://thenextrecession.wordpress.com/2018/03/09/unam-3-the-robotic-future/.

Schaffer, A. (2016). Robots That Teach Each Other. – 10 Breakthrough Technologies, MIT Technology Review.

Sheahan, M. (2016). China seeks top-10 automation ranking by 2020: robot industry group. Viewed 22 July 2016, http://www.reuters.com/article/us-china-robots-forecast-idUSKCN102104.

Tamny, J. (2015). Why Robots Will Be The Biggest Job Creators In World History. Forbes, March 1.

The Economist. (2012). Surgical Robots: The kindness of strangers. January 18, 2012.

The Economist. (2013). The growth of industrial robots 2013. March 27.

Westlake, S. (ed.). (2014). Our work here is done: Visions of a robot economy. Nesta.

Winfield, A. (2014). The next big thing (s) in robotization. – In: Westlake, S. (ed.). Our work here is done: Visions of a robot economy, Nesta.

ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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THE COMPARISON OF EFFICIENCY AND PERFORMANCE OF PORTUGUESE AND UKRAINIAN ENTERPRISES

This article intends to analyze the performance and the efficiency of companies and to identify the key factors that may explain it. It was selected a sample with 15 enterprises: 7 Portuguese and 8 Ukrainian ones, belonging to several industries. Financial and non-financial data was collected for 6 years, during the period of 2009 to 2014. Research questions that guided this work were: Are the enterprises efficient/profitable? What factors influence enterprises' efficiency/performance? Is there any difference between Ukrainian and Portuguese enterprises' efficiency/performance, which factors have more influence? Which industrial sector is represented by more efficient/profitable enterprises?
The main results showed that in average enterprises were efficient with low level of profitability. According to gained results several indicators were highlighted so that companies would pay more attention to them.
JEL: D21; D24; D29; D 51; F15; F22

Introduction

Nowadays every enterprise set stable development and efficiency as a target to achieve. In order to achieve that use of comprehensive economic and financial analysis considered to be a must. One of the main targets of the research is to compare enterprise efficiency of Portuguese and Ukrainian enterprises while conducting a study of the theoretical basis of enterprise performance and efficiency, factors which influence them, choosing how to conduct comprehensive economic and financial analysis.

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The need for such a comparison is a result of the increasing complexity of companies activity in conditions of high competition at the global level. The environment in which they function is constantly getting more complicated, risks are growing, and access to resources is reducing, which leads to deterioration of economic and financial activity results. Additional threats are created by the absence of needed attention to the issues of economic analysis of enterprises activity, which is used from time to time in the process of managing their activities.

The following tasks were solved during research:

- the essence of the categories "performance", "efficiency" and "effectiveness", was revealed, whose meaning is important for improving the efficiency of enterprise performance;
- existing determinants of the performance were studied;
- methodical approaches of comprehensive economic analysis of enterprise's economic activity were analyzed and on this basis modern and more substantiated method of its implementation was developed;
- the researched methodology was made (objectives, collecting data process, sample, applied methods were chosen);
- comprehensive economic analysis of enterprise was made in order to identify the level of efficiency and performance, identify factors impact and presentation of its results was given.

The practical object of the study was to conduct economic and financial analysis of enterprise efficiency and profitability via linear regression analysis of comprehensive indicators (Asset Turnover Ratio and Return on Assets), identify factors of influence and their impact on dependable variables; use the results to define average efficiency and profitability levels among the sample in general or separately by its country (Portugal or Ukraine) or industry (paper; building materials; building; steel or engineering (automotive)).

The research sample consists of 90 observations in total: 7 enterprises from Portugal and 8 enterprises from Ukraine, which operate in the industrial sector of the economy. The chosen enterprises belong to 5 sectors: paper; building materials; building; steel and engineering (automotive). Each enterprise had been studied during 6 years, for the period of 2009 to 2014.

The Literature Review

Efficiency is one of the main categories of the economy, which is directly linked to the achievement of the final results of the company. The world is constantly changing and is always characterized by continuous progress; also the market economy does not remain constant. All of those require active steps from the enterprises for improving their activity

performance. It obligates development and provision of sustainable performance in order to achieve success.

That is why the pre-research has great importance for continued comparison of Portuguese and Ukrainian enterprises.

Review of determination of efficiency was carried, in particular, by Adzhavenko (2014), who had determined that efficiency can be defined from different angles, as a set of properties and constituent elements: productivity, operability, economy (a measure of the use of system resources), quality, profitability, quality of working life.

As written by Mĺkvа (2013), performance is an economic category which is closely linked to the systemic view of its measurement and evaluation. The system whose performance is to be measured and evaluated corresponds to its internal structure. To measure the performance of the enterprise is, therefore, necessary to know which (and also how) subsystems of its internal structure contribute to the overall performance.

Efficiency as an economic category is the qualitative and quantitative characteristics of performance management (Krivovyazyuk, 2012). It is typical for the whole reproduction process and all its phases separately including (production, distribution, exchange and consumption); describes the activities of any business section and economic systems at all levels (companies or industrial enterprises, households, industries, region, state economy as a whole).

The definition of efficiency found place in a large number of studies, our vision of effectiveness, efficiency and performance according to aspects of economic practice is next:

- Effectiveness is a measure characteristic which shows if everything is going according to made plan and if company achieves set targets;
- Efficiency is a measure which shows the quality of some activity, the ability not only achieve target but do it with less costs spent;
- Performance – characteristic of success connected to a specific activity.

One of the central questions in the economy is why some firms succeed and others fail. Enterprise success is influenced by many factors and variables.

Determining the firm performance using a set of financial measures has been and still is an interesting and challenging problem.

A lot of factors were researched by scientists in the context of a variety of performances' types. Among factors of influence, the literature has established that slack financial resources can play an important role in improving CSP. In particular, Aguilera-Caracuel et al. (2015) analysed whether excess financial resources can lead to better benefits of the multinational enterprises (MNEs) gained from their international cultural diversification and as a result can lead to conducting advanced corporate social responsibility activities, which improve their CSP level (Aguilera-Caracuel et al., 2015).

Vătavu (2014) in order to highlight determinants of profitability made an analysis based on cross-sectional regressions, where performance indicators were based on the rest of variables and performance was considered as a function of financial and non-financial indicators.

Return on Assets (ROA) was set as a performance proxy, the variables (factors) which had influence were debt, asset tangibility, size, liquidity, taxation, risk, inflation and crisis. Regression results indicated that Romanian companies had had higher performance when they have been using limited borrowings. Negative impact on dependent variable had tangibility, business risk and the level of taxation. Though earnings are provided by significant sales turnover, performance is affected by high levels of liquidity. Unstable economic times displayed by high inflation rates and the current financial crisis, which also had a strong negative influence on total corporate performance (Vătavu, 2014).

In order to identify indicators that impact corporate financial performance, Ching and Gerab (2012) used principal component and multiple regression analyses of 16 Brazilian listed companies for the period 2005-2009 (Ching & Gerab, 2012). As the result of first analysis five factors that impact financial performance were extracted from 20 variables and ratios, which ones had been used later in multiple regression analysis. The last analysis was used to confirm indicators influence on corporate profitability and define the influence level. The financial performance of companies was influenced by factors such as firm size (the most predominant accounted for 26.9 % of total variance), working capital management, solvency (liquidity), margin, financial debt (the least important, accounted for 9.1 %).

The influence of several variables on the financial performance in the context of capital structure was made by Banerjee and De (2014). In their work independent variables such as "business risk", "size of the firm (in sales)", "growth rate", "debt service capacity (interest)", "dividend payout", "financial leverage", "degree of operating leverage", "firm's age" and "size of the firm (in assets)" were researched to find out which might have some impact on the profitability of the Indian iron and steel industry. The study showed that "financial leverage", "debt service capacity (interest)" and "size of the firm (in assets)" are significant factors influencing the profitability of the firms (Banerjee & De, 2014).

Another study employed next methodology: the underlying dimensions of the financial ratios were identified by using exploratory factor analysis, which was followed with the discovery of any possible potential relationships between the firm performance and financial ratios using predictive modelling methods (Delen, Kuzey & Uyar, 2013). Results defined next factors: liquidity (the most significant, was explaining 11.48% of the total variance); asset structure (explaining 9.59% of the total variance); asset and equity turnover ratio (9.1%) and showed how efficiently a company used its assets and equity to generate sales revenues; gross profit margin (6.95%); financial debt ratio (6.58%); current assets (5.29%); leverage (4.83%); net profit margin (4.81%); net working capital (NWC) turnover ratio (3.99%); sales & profit growth ratio (3.92%); asset growth ratio (3.89%). In this study decision tree algorithms (like C5.0, Classification and Regression Trees, Chi-squared Automatic Interaction Detector and The Quick, Unbiased, Efficient Statistical Tree) were used to evaluate the financial performance of Turkish companies listed on the Istanbul

Stock Exchange. According to findings of conducted prediction models, two profitability ratios (i.e., EBIT ratio and net profit margin) have the biggest impact on company performance. These ratios indicate the potential ability of a company to control their costs and expenses. The leverage and debt ratios had an impact on the company performance as well and the sales growth and Asset Turnover Ratio (ATR) had indicated the ability of a company to generate sales. For improving its overall performance firm must have high sales performance. Finally, findings corroborated the Dupont analysis, which decomposed Return on Equity (ROE) into the three multiplicative ratios of Profit margin, Asset Turnover, and Leverage.

Kijewska (2016) identified the determinants of ROE using an original and five-factor version of the DuPont formula was analysed on the example of two Polish companies from mining and metallurgy sector. The last method was used in order to analyse in more detail ROE dependence and possible ways to improve return of the firm.

Kotane and Kuzmina-Merlino (2012) for more effective analysis suggested using the system of financial indicators that should have taken into account industry and companies conditions. According to them, the basis for the mentioned system should have included: Current ratio; NWC to Sales ratio; Debt to Equity; Financial cycle; Sales margin; ROE; Maturing. Those financial indicators were optimal and correlated and corresponded to each other. Besides indicators, the financial analysis made by the owner (manager), interpretation of information has great importance. That is why circumstances must be always taken into consideration while calculating financial indicators.

Shliaga and Gal'tsev (2014) describe two approaches for evaluating the effectiveness of the company – monetary and resources. For monetary approach, results and costs are determined in revenues (inflow) and expenditures (outflow) of cash. For resource approach results characterized by the volume of made production and the costs – the amount of various types' resources spent.

In modern conditions of development of Ukraine's businesses in Trokoz and Orlikovsky' (2014) opinion the most promising of latest management concepts for efficiency control is the concept of Business Performance Management (BPM) and Balanced Scorecard (BSC).

BPM – a relatively new concept of governance denotes a holistic, process-oriented approach to management decisions aimed at improving the capacity of enterprises to assess their financial state and manage the performance of its activities at all levels by bringing together owners, managers, staff and external contractors within the overall integrated environment management. And the concept of BSC is a system of strategic management based on the measurement and evaluation of its effectiveness on a set of indicators, selected in such a way that consider all significant (in terms of strategy) aspects of its activities (Trokoz & Orlikovsky, 2014).

Well-known statistical techniques, which can be used in describing the performance and recognizing the influence of which factors are bigger include: regression; descriptive statistics; correlation; analysis of variance; other multivariate methods; other (primarily nonparametric) (Capon et al., 1990).

Enterprise efficiency is complex characteristic, so in order to fully analyze the enterprise activity, make the right conclusions about its condition; the following indicators should be considered (Dudukalo, 2012): Profit margin; Total assets return; Fixed assets return; ROE; Return on investment; Residual Income.

Financial ratios have played an important role in evaluating the enterprise's performance. Almost all existing methods include them. Financial ratios together with financial statements are instruments that help managers to monitor the company's performance and figure the best financial strategies out (Ching & Gerab, 2012).

Although, nowadays the usage of nonfinancial indicators is frequently more promoted, financial indicators are able to evaluate the condition of an enterprise precisely based on its previous development (Kotane, 2015).

Theoretically, financial ratios are divided into 5 groups (Robinson, Greuning, Henry & Broihahn, 2009):

- Activity ratios indicate the efficiency of day-to-day tasks performed by company (for example, a collection of receivables and management of inventory);
- Liquidity ratios show whether the company has the ability to meet its short-term obligations;
- Solvency ratios show company's ability to meet long-term obligations;
- Profitability ratios indicate the ability to generate profitable sales from its resources;
- Valuation ratios measure earnings quantity connected to ownership of a specified claim.

Existing approaches of efficiency estimation of management of enterprise's activity are not allowing consideration of efficiency in a comprehensive way (Dudukalo, 2012). This is due to the fact that each approach ignores the impact of factors of functional subsystems as a whole.

In our opinion, only comprehensive assessment can provide the most useful information for the future decision-making process. For the evaluation of past periods and to develop appropriate strategies for the future, a comprehensive analysis should be carried out by the management of the company, it is so, because managers are better informed on the reasons of indicators' changes and what will be potential opportunities for their improvement.

The comprehensive analysis was used in researches: Krivovyazyuk and Kryvoviaziuk' (2014) article contained comprehensive economic analysis as an instrument for improving efficiency of activity of engineering enterprises of Volyn region; in Kryvoviaziuk' (2014) article the comprehensive approach was used to diagnose innovative engineering companies; it was also used for strategy decision-making purposes for the enterprises after conducted diagnostics of the enterprises (Krivovyazyuk, Kryvoviaziuk & Strilchuk, 2013).

Research Methodology

The researched sample consists of 15 enterprises: 7 enterprises from Portugal and 8 enterprises from Ukraine, which operate in the industrial sector of the economy (paper, pulp and energy; building materials; construction and real estate; steel; automotive industries).

The choice was guided by subsequent requirements: companies should have been listed and had free access of data; they should relate to the industrial sector of the economy of both countries; they are characterized by a similar structure of capital and assets. Economic conditions of the economies of countries are similar from the standpoint of access to resources and methods of state regulation. It allows adequate comparing the efficiency and effectiveness of Ukrainian and Portuguese enterprises.

The multiple linear regression model was used to study the relationship between a dependent variable and one or more independent variables. The model is able to identify the independent effects of a set of variables on the dependent variable (Greene, 2003). The general form of the linear regression model is given in equation 1:

$$y = f(x1, x2, ..., xk) + \varepsilon \quad [1],$$

where y – the dependent variable; xk – the independent variable; ε – a random disturbance of stable relationship; n=1,2,…,k.

The generalized model to be applied in this work is as follows (equation 2):

$$Y_i = \beta_{0,i} + \beta_{1,i} \cdot X_1 + \beta_{2,i} \cdot X_{2,i} + ... + \beta_{k,i} \cdot X_{k,i} \quad [2],$$

where: Y_i is the dependent variable for observation i (for comprehensive efficiency indicator the variable of ATR was used; for performance indicator the variable of ROA was used), with i = 1 to n;

$\beta_{0,i}$ is the constant; $\beta_{1,i}$ to $\beta_{k,i}$ are the coefficients of independent variables $X_{1,i}$ to $X_{k,I}$ for observation i

$X_{1,i}$ to $X_{k,i}$, are the variables that may explain the efficiency or performance like calculated indicators given in Appendix I.

Reliable regression analysis requires fulfilment of certain conditions "classical" assumptions (Greene, 2003):

a) Collinearity; It means that two or more of the independent /explanatory/ variables in a regression have a linear relationship. This causes a problem in the interpretation of the regression results. If the variables have a close linear relationship, then the estimated regression coefficients and T-statistics may not be able to properly isolate the unique effect/role of each variable and the confidence with which we can presume these effects to be true (Gupta, 1999).

Durbin-Watson and collinearity statistics were used. Diagnostic approach to check for multicollinearity after performing regression analysis is to display the Variance Inflation Factor (VIF – a measure of how much the variance of an estimated regression coefficient increases if the explanatory variables are correlated) Higher the value of VIF, greater degree of collinearity. If VIF>10 there is strong evidence that collinearity is affecting the regression coefficients and consequently they are poorly estimated. Another check for collinearity is the Durbin-Watson statistic. Normally its value should lie between 0 and 4. A value close to 2 suggests no correlation; one close to 0 – negative correlation, and a value close to 4 – positive correlation ("Regression diagnostics", 2016, p. 47).

b) Normality; Normal distribution can be checked using quantile-quantile (Q-Q) plots and the Kolmogorov-Smirnov Test (K-S Test). K-S Test is a nonparametric test of the equality of continuous, one-dimensional probability distributions that can be used to compare a sample with a reference probability distribution (one-sample K-S Test), or to compare two samples (two-sample K-S Test). If the p-value (given in results output as Sig.) is less than 0.05 then data cannot be considered as normally distributed.

c) Homoscedasticity is an assumption that Standard Deviations (S.D.) of the error terms are constant and do not depend on the x-value. Consequently, each probability distribution for the dependent variable has the same S.D. regardless of the independent variable value.

Breusch-Pagan and Koenker test is used to test for heteroskedasticity in a linear regression model. It tests whether the estimated variance of the residuals from a regression are dependent on the values of the independent variables. The test assumes that heteroskedasticity is not present. If the resulting p-value of Breusch-Pagan and Koenker is less than significance level of 5 %, the obtained differences in sample variances are occurred based on random sampling from a population with equal variances.

Linear regression implements a statistical model that, when relationships between the independent variables and the dependent variable are almost linear, shows optimal results, but in other case the model is faulty. Another limitation of the linear regression modelling is the complete necessity of assumptions fulfilment in order for obtaining reliable results; it's limitation for predicting numeric output; possible inappropriate use for modelling non-linear relationships; difficulty in explanation what the model actually shows and last but not least it's complexity and labour-intensity.

Comparison of efficiency and performance of Portuguese and Ukrainian enterprises

After taking into consideration of all researched articles, methods and approaches, firstly, conduction of comprehensive financial and economic analysis and determination of enterprise efficiency, using as proxy the Asset Turnover Ratio (ATR) and such indicators as: Quick ratio; Liquidity Ratio (LiqR); Cash ratio and debt ratio; Asset utilization or turnover ratios; Profitability ratios; Growth ratios; Asset structure and solvency ratios as the factors that may explain it was made. Secondly, in order to analyse profitability (company's performance) the ROA was used and among factors that explain it the EBITDA margin; Profit margin; NWC turnover ratio; Fixed asset to total assets; Current asset to total assets;

Net operation expenses to net sales ratio; Sales growth ratio; LR; Debt-to-Equity (as capital structure proxy); Interest coverage ratio.

The descriptive statistics on indicators is exhibited in Appendix II.

According to the table, higher quick ratio' mean of Ukrainian enterprises shows that their ability to cover short-term obligations with liquid assets is slightly better. LiqR ratio is also slightly better in Ukrainian enterprises showing higher ability to pay off its short-term debts obligations with its current assets. In case of the cash ratio shows higher availability of cash and cash equivalents in Portuguese enterprises, also in both countries the level of liquidity in terms of cash is poor.

The receivables turnover mean in both countries has high value, but it is slightly better in Ukrainian enterprises, where they are seemed to have an efficient collection of accounts receivable and companies have more customers that pay off their debts quickly. Inventory turnover ratio mean has a higher level in Ukrainian companies. Despite the fact that Ukrainian enterprises have almost all preconditions for good performance, subsequent indicator – NWC turnover ratio shows negative value, which means their use of working capital to generate sales, is not efficient. On the other hand, Portuguese companies in these terms are efficient.

The ATR mean has similar low meaning implying not enough sum of revenue generated. Equity turnover ratio showing the more efficient use of equity to generate revenue in Portuguese enterprises, which mean is higher and equals to 3.645 (S.D. = 2.478). Ukrainian enterprises utilized investment in fixed assets to generate revenue more effectively (FATR mean is higher).

Both Gross profit margin and Profit margin values in Portuguese companies are higher. EBITDA margin is slightly higher in Ukrainian enterprises and equal to 13.7 %. Both sides of enterprises have low ROA, Portuguese companies 0.1 % and Ukrainian – 0.7 %, which shows the effective but not efficient use of assets to generate earnings. The Operating expense to net sales ratio equals to 1.033 (S.D. = 0.38) in Ukrainian side of firms, which indicates high value of costs. In Portuguese enterprise its value is 0.945 (S.D. = 0.10) showing more positive proportion (sales higher than expenses).

Mean growth rates for assets, net profit and sales better in Ukrainian enterprises indicating the clear trend of increase. Portuguese assets and net profit growth rates have negative meaning and indicate the declining trend.

Researching structure of total assets: average of Current assets to total assets ratio in both sides are around 40%, but Ukrainian companies show more variability in its capital structure (Ukrainian S.D. = 20.4% against 14.5% for Portuguese companies). Long-term assets in average are 59 % of total assets (again, according to S.D., the ratio varies more among Ukrainian companies). Accordingly, average percentage of stocks in current assets is higher in Ukrainian enterprises 42.4 %; average percentage of Cash and cash equivalents is higher in Portuguese enterprises and is 21 %. In those cases better S.D. was presented by Portuguese side.

Analysing the structure of total debt, it may be concluded that in average the short-term financial debt higher in Portuguese enterprises (23 %; S.D. = 11%), but short term in general is higher in Ukrainian firms (61.2 %, S.D. = 29.6%). Total financial debt in total debt higher in Portuguese entities (60.3 %, S.D. = 14.9%).

According to interest coverage ratio, Portuguese entities on the contrast to Ukrainian can pay interest on the outstanding debt (4.78 > -0.661). LR has slightly higher meaning in Portuguese side, where 77 % (S.D. = 15.4%) of capital comes in the form of debt (loans).

During the research the model assumptions were checked; analysis was performed while estimating the model and determining factors of efficiency/performance and measuring the impact of each variable in average in the whole sample and also for each country; the analysis of efficiency/performance was made in the whole sample, for each country and industry.

Results of checking of assumptions for efficiency given in Table 1.

There is no clear collinearity, although while conducting a linear regression analysis, we checked closer collinearity statistic and there were several cases with VIF higher than 10 – which indicated the influence of collinearity on the regression coefficients and consequently they are poorly estimated. After eliminating outliers, the results indicate that there is no collinearity between variables.

Table 1

Results of assumptions check for efficiency model

Test	Indicator	Before crossing out of outliers	After crossing out of outliers
Regression analysis	Adjusted R Square	0,975	0,989
	Durbin-Watson	1,825	1,707
	Number of possible models	12	6
	Predictors	(Constant) including FATR, CATR, LiqR, Quick ratio, Inventory to current assets ratio, Current assets to total assets ratio, ROA, EBITDA margin	(Constant) including FATR, CATR, EBITDA margin, ROA, LiqR, LR
Check of residuals			
Kolmogorov-Smirnov Test	Sample size	90	65
	Asymp. Sig. (2-tailed)	0,058	0,082
Koenker test	(Sig.)	0,018	0,629

Normality was visually checked using Q-Q plots, which showed the existence of outliers. K-S Test checked if residuals had a normal distribution and because the p-value was higher than 0.05, they have a normal distribution. Homoscedasticity check showed that indicator meanings have the same finite variance after eliminating outliers.

The optimal model was chosen due to the rule: "the higher adjusted R square is better", the one with Adjusted R square equal to 0.989. This chosen model is presented in equation 3.

$$ATR = 0.701* FATR + 0.451* CATR – 0.136*EBITDA\ margin + 0.126* ROA – – 0.076* LiqR – 0.039*LR \quad [3]$$

The biggest positive influence has FATR (0.701) and CATR (0.451), smaller positive influence has ROA (0.126). Negatively influencing enterprise efficiency are EBITDA margin (-0.136), LiqR (-0.076) and LR (-0.039).

The final models of efficiency by country are given in following equations and Table 2.

Table 2

The model of efficiency for Portuguese and Ukrainian enterprises

Variables	Portugal			Ukraine		
	Standardized Coefficients Beta	T	Sig.	Standardized Coefficients Beta	T	Sig.
(Constant)		3,608	0,001		1,702	0,111
Fixed Asset Turnover Ratio (FATR)	0,727	38,433	<0,001			
Current Asset Turnover Ratio (CATR)	0,464	32,208	<0,001			
Short-term financial debt to total debt	0,037	2,551	0,017			
Leverage Ratio (LR)	-0,058	-3,479	0,002			
Net profit growth ratio	0,045	2,962	0,006			
EBITDA margin	-0,040	-2,857	0,008			
Short-term debt to total debt				0,825	8,571	<0,001
Return on Assets (ROA)				0,511	5,593	<0,001
Interest coverage ratio				-0,351	-3,640	0,003
Adjusted R Square	0,994			0,859		
Durbin-Watson	1,785			1,530		
F-test	919,053			35,508		
Sig.	<0,001			<0,001		

$$ATR\ (Port) = 0.727*FATR + 0.464*CATR + + 0,037*Short\text{-}term\ financial\ debt\ to\ total\ debt – 0.058*LR – 0.04*EBITDA\ margin \quad [4]$$

The biggest positive influence on ATR in Portugal has FATR (0.727) and CATR (0.464), smaller positive influence has Net profit growth ratio (0.045) and Short-term financial debt to total debt (0.037). Small negative impact made by LR (-0.058) and EBITDA margin (-0.136).

$$ATR\ (Ukr) = 0.825*\ Short\text{-}term\ debt\ to\ total\ debt + 0.511*ROA – – 0.351*Interest\ coverage\ ratio \quad [5]$$

The biggest positive influence at Ukrainian enterprises has a short-term debt to total debt (0.825), also ROA has a positive impact (0.511), the opposite correlation with ATR has

Interest coverage ratio (-0.351). Accordingly, the factors that explain efficiency among Portuguese enterprises are different from Ukrainian ones.

Efficiency analysis. Our sample consists of 90 cases. Reviewing of normality showed the existence of several outliers. After correcting sample by the use of regression analysis, calculation of p-value and selecting reliable variables, 49 valid cases are left. In this part, the research hypothesis (RH1: Enterprise efficiency indicator (comprehensive indicator – ATR) equals to 1) was checked using the one sample t-test (Table). The model results can be described as next: 0 – means inefficiency; 1 – efficiency.

Table 3

Result of One-Sample T-test for Asset Turnover Ratio

Descriptive statistics	n		Mean	Std. Deviation		Std. Error Mean
	65		0,731204	0,3834501		0,0475611
One-Sample T-test for Asset Turnover Ratio (Test Value = 1)	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
	-5,652	64	<0,001	-0,2687961	-0,363810	-0,173782

Given the results (Table), ATR mean is 0.73 (S.D. = 0.38) which is statistically significantly different from the test value of 1. It has been concluded that enterprises are efficient.

Nonparametric 2-independent samples t-test is used to compare the means of efficiency for two independent groups of Ukrainian and Portuguese enterprises (Table 4).

Table 4

Result of Mann Witney after eliminating outliers

Ranks					Test Statistics for ATR	
	Country	n	Mean Rank	Sum of Ranks	Mann-Whitney U	269,000
Asset turnover ratio	Portuguese	42	27,90	1172,00	Wilcoxon W	1172,000
	Ukrainian	23	42,30	973,00	Z	-2,936
	Total	65			Asymp. Sig. (2-tailed)	0,003

First of all the distribution should be checked. P-value is less than 0.05 which means that efficiency of Ukrainian and Portuguese enterprises have statistically significant different efficiency.

In order to compare efficiency by country descriptive statistics are displayed in Table .

Table 5

The level of efficiency results by country

	n	Minimum	Maximum	Mean	Std. Deviation
Asset Turnover Ratio (Portugal)	34	0,2044	1,4639	0,6280	0,3064
Asset Turnover Ratio (Ukraine)	30	0,2356	1,6740	0,9197	0,4419

Given the average of efficiency by country it seems that in average Ukrainian enterprises are more efficient.

In order to find out if there is a difference in efficiency by sector in which enterprise is functioning, Shapiro-Wilk test was used (sample does not follow a normal distribution and n<30). Descriptive statistics and results of Kruskal Wallis test is shown in Table .

Table 6

The level of efficiency results by industrial sector

Asset Turnover Ratio		n	Minimum	Maximum	Mean	Standard Deviation	Shapiro-Wilk sig.
Industry	Paper	24	0	2,2304	0,7407	0,7370	0,002
	Automotive	12	0	1,4639	0,6923	0,5640	0,067
	Building materials	18	0	1,0403	0,5547	0,3562	0,040
	Steel	18	0	1,5248	0,6351	0,5134	0,113
	Building	18	0	0,6814	0,4965	0,1976	0,000

After checking significance p-value in Shapiro-Wilk test to standard $\alpha=0.05$ – in this case $\alpha>0.05$ in some industries. Thus, there is a difference in efficiency regarding the industry sector. As in descriptive statistics of Table is shown, the average efficiency is slightly higher in the paper industry and slightly lower in building enterprises.

Results of checking of assumptions for performance given in Table 7.

Table 7

Results of assumptions check for profitability model

Test	Indicator	Before crossing out of outliers	After crossing out of outliers
Regression analysis	Adjusted R Square	0,917	0,923
	Durbin-Watson	1,619	1,396
	Number of possible models	8	5
	Predictors	(Constant) including Profit margin, EBITDA margin, log(TA), Debt to equity ratio, Number of employees, Operating expense to net sales ratio	(Constant) including Profit margin, FATR, EBITDA Margin, Country, Debt to equity ratio
Check of residuals			
Kolmogorov-Smirnov test	Sample size	68	63
	Asymp. Sig. (2-tailed)	0,840	0,986
Koenker test	(Sig.)	0,748	0,095

A closer look at the variables highlighted few cases which prove the existence of collinearity, which was avoided by eliminating outliers. K-S Test for normality resulted in

improved significance after crossing outliers. Homoscedasticity check showed that heteroskedasticity is not present as an indicator.

The optimal model for performance was chosen due to the same rule as efficiency and it is given in equation 6.

$$\text{ROA} = 0.678*\text{Profit margin} + 0.236*\text{ FATR} + 0.277*\text{EBITDA margin} + \\ + 0.137*\text{Country} + 0.122*\text{ Debt to equity ratio} \quad [6]$$

All of the variables have a positive influence, the biggest impact belongs to Profit margin (0.678). These factors explain 92.3% of performance's variance.

The final model for Portuguese and Ukrainian enterprises is given in equations 7-8 and Table 8.

$$\text{ROA (Port)} = 0.137*\text{FATR} – 0.221*\text{CATR} + 0{,}152*\text{ Debt to equity ratio} + \\ + 1.110*\text{ Profit margin} – 0.102*\text{ Interest coverage ratio} \quad [7]$$

In case of Portuguese enterprises, variables are statistically significant, and each factor influences dependable variable differently. The biggest positive influence on ROA has Profit margin (1.110), a bit smaller impact have Debt to equity ratio (0.152) and FATR (0.137). Small negative impact is made by CATR (-0.221) and Interest coverage ratio (-0.102).

Table 8

The model of profitability for Portuguese and Ukrainian enterprise

Variables	Portugal			Ukraine		
	Standardized Coefficients Beta	T	Sig.	Standardized Coefficients Beta	T	Sig.
(Constant)		0,548	0,588		1,314	0,206
CATR	-0,221	-8,224	<0,001			
FATR	0,137	4,572	<0,001			
Debt to equity ratio	0,152	4,785	<0,001			
Interest coverage ratio	-0,102	-2,895	0,007			
Profit margin	1,110	30,729	<0,001	0,668	7,375	<0,001
EBITDA margin				0,433	4,781	<0,001
Adjusted R Square	0,979			0,883		
Durbin-Watson	1,830			0,546		
F-test	311,594			68,991		
Sig.	<0,001			<0,001		

$$\text{ROA (Ukr)} = 0.668*\text{ Profit margin} + 0.433*\text{ EBITDA margin} \quad [8]$$

In the model for Ukrainian enterprises, two factors have a different level of influence on ROA. The biggest positive impact has Profit margin (0.668), EBITDA margin also has a positive impact (0.433). Profit margin influences both models of performance for Ukrainian and Portuguese enterprises, but there is a significant difference between those two models.

Analysis of performance. Our sample consists of 90 cases. Analysis of normality showed the existence of several outliers. Correction of the sample was made using the regression analysis, calculation of p-value and selecting reliable variables. In the end, we get 63 valid cases. In this part, the research hypothesis (RH2: Enterprise performance indicator higher than 0) was checked using the one sample t-test (Table).

Table 9

Result of One-Sample T-test for Return on Assets

Descriptive statistics	n		Mean	Std. Deviation		Std. Error Mean
	63		0,018210	0,0622157		0,0078384
One-Sample T-test for Return on Assets (Test Value = 1)	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
	-125,652	62	<0,001	-0,981789	-0,997459	-0,966121

Given the results (Table 11), ROA mean is 0.018 (S.D. = 0.062) which is statistically significantly different from the test value of 1. It has been concluded that enterprises are not as profitable and they could be characterized as enterprises with a low-performance level, which still shows that companies on average have a positive performance.

Results of nonparametric 2-independent samples t-test have shown that meaning of p-value is smaller than 0.05 indicating the difference between countries performance models (Table 10).

Table 10

Result of Mann Witney after eliminating outliers for ROA

Ranks					Test Statistics for ROA	
	Country	n	Mean Rank	Sum of Ranks	Mann-Whitney U	233,000
Return on Assets	Portuguese	41	26,68	1094,00	Wilcoxon W	1094,000
	Ukrainian	22	41,91	922,00	Z	-3,143
	Total	63			Asymp. Sig. (2-tailed)	0,002

In order to compare profitability descriptive statistics by state are displayed in Table .

Table 1

Profitability statistics by country

	n	Minimum	Maximum	Mean	Std. Deviation
Return on Assets (Portugal)	41	-0,1131	0,0823	0,0002	0,0419
Return on Assets (Ukraine)	22	-0,1338	0,1947	0,0517	0,0793

As can be observed from Table 11, Ukrainian enterprises have higher average ROA, meaning higher profitability than Portuguese enterprises. This indicates that there is a difference in performance level among Ukrainian and Portugal companies.

In order to find out if there is a difference in profitability in enterprises by sector they are functioning in, reasoning by small samples of enterprises performance by industrial sectors, Shapiro-Wilk Test (Table 12) was used.

Table 12

Profitability level by industrial sector

Return on Assets		n	Minimum	Maximum	Mean	Standard Deviation	Shapiro-Wilk sig.
Industry	Paper	15	-0,0106	0,1947	0,0855	0,0609	0,500
	Automotive	6	-0,0144	0,0410	0,0115	0,0230	0,478
	Building materials	14	-0,1338	0,0499	-0,0167	0,0477	0,212
	Steel	12	-0,1131	0,0823	-0,0193	0,0621	0,630
	Building	16	-0,0790	0,0416	0,0163	0,0271	0,000

After checking significance p-value in Shapiro-Wilk Test some industries do not follow a normal distribution and have less than 30 cases, which imply that level profitability by sectors has a significant difference.

Thus, there is a slight difference in profitability between industrial sectors, for example, paper industry is the most profitable one among the studied sample. Automotive and building enterprises also give profit, and according to the results of descriptive analysis steel and building materials sectors of the economy in the sample have losses regarding the industry sector.

Conclusions

In order to conduct a comparison of Ukrainian and Portuguese enterprises, a descriptive and inferential analysis was performed as well as multivariate regressions (through OLS regressions) were applied to identify the factors that may explain the efficiency (measured by ATR) and performance as profitability (measured by ROA) based on collected data.

The final conclusion can have next statements:

1. On average the companies in the sample are efficient.

According to the results average efficiency (ATR) of all enterprises equal to 0.73 (S.D. = 0.38) which in the interval from 0 to 1 is significantly closer to the efficient level that is why enterprises are considered as efficient. While assessing efficiency by country better efficiency belonged to Ukrainian enterprises (mean = 0.92; S.D. = 0.44) compared to Portuguese (mean = 0.63; S.D. = 0.31). There was no significant difference revealed of

efficiency in industrial sectors, but average efficiency is slightly higher in paper industry and slightly lower in building enterprises.

2. Although the average of ROA enterprises (mean = 0.02; S.D. = 0.06) showed that enterprises have low-performance level it is still considered as a positive (between countries there is a slight difference in performance level among Ukrainian and Portugal companies in favour of Ukraine).

3. Companies efficiency is influenced by FATR, CATR, EBITDA margin, ROA, LiqR, LR.

4. Companies performance is influenced by EBITDA margin; Profit margin; NWC turnover ratio; FATR, CATR; Net operation expenses to net sales ratio; Sales growth ratio; LR; Debt-to-Equity; Interest coverage ratio.

In order to improve performance and efficiency enterprises are suggested to pay more attention to the factors determined as a factors with high influence level. More detailed suggestions include next:

- for Ukrainian enterprises – paying attention to the factors of short-term debt to total debt, ROA, Interest coverage ratio in order to be more efficient; Profit margin and EBITDA margin to make their performance better.
- for Portuguese enterprises – in order to improve efficiency to observe and develop factors of fixed assets turnover ratio, current assets turnover ratio, Short-term financial debt to total debt, Leverage Ratio, EBITDA margin. As for profitability, fixed assets turnover ratio, current assets turnover ratio, Debt to equity ratio, Profit margin and Interest coverage ratio are suggested to be tracked.

Optimization of efficiency and management of the analyzed enterprises can be found in the results of a comprehensive analysis of the factors of influence on the efficiency and effectiveness of their activities. The dynamism of those factors (It) serves as an information base for the development and adoption of tactical and strategic decisions, as well as for improving the management of the investigated corporations.

This research indicated robust results with statistical significance, and thus the conclusions are relevant. Among limitations of the present work were set of requirements that companies should have been listed and had free access to data and function in the industrial sector.

In the future, it is advised to consider expand the sample to other countries and include more enterprises, sub-sampling based on individual enterprises and non-researched sectors of the economy, also, testing the model on sub-periods.

References

Adzhavenko, M. N. (2014). Theoretical bases of defining the essence of the category "development effectiveness" of the enterprises [Аджавенко, М. Н. (2014). Теоретические Основы Определения Сущности Категории «Эффективность Развития» Предприятий. Бизнес Информ, 2, 264-270]. [On-line]. Available: http://cyberleninka.ru/article/n/teoreticheskie-

osnovy-opredeleniya-suschnosti-kategorii -effektivnost-razvitiya-predpriyatiy, Access date: 29.03.2016.

Aguilera-Caracuel, J., Guerrero-Villegas, J., Vidal-Salazar, M. D. & Delgado-Márquez, B. L. (2015). International Cultural Diversification and Corporate Social Performance in Multinational Enterprises: The Role of Slack Financial Resources. Management International Review, 55(3), 323-353. [On-line]. Available: http://doi.org/10.1007/s11575-014-0225-4, Access date: 29.03.2016.

Banerjee, A. & De, A. (2014). Determinants of Corporate Financial Performance Relating to Capital Structure Decisions in Indian Iron and Steel Industry An Empirical Study. Paradigm, 18(1), 35-50.

Capon, N., Farley, J. U., & Hoenig, S. (1990). Determinants of financial performance: a meta-analysis. Management Science, 36(10), 1143–1159.

Ching, H. Y., Gerab, F. (2012). Determinants of financial performance in Brazilian companies: a multi-ratio model using multivariate statistical method. Journal of Global Business and Economics, 5(1), 79-99.

Delen, D., Kuzey, C. & Uyar, A. (2013). Measuring firm performance using financial ratios: A decision tree approach. Expert Systems with Applications, 40(10), 3970-3983. [On-line]. Available: http://doi.org/10.1016/j.eswa.2013.01.012, Access date: 29.03.2016.

Dudukalo, G. O. (2012). Analysis of the methods of assessment of enterprise management efficiency [Дудукало, Г. О. (2012). Аналіз методів оцінювання ефективності управління діяльністю підприємства. Електронне наукове фахове видання "Ефективна економіка", 3]. [On-line]. Available: http://www.economy.nayka.com.ua/?op=1&z=1031, Access date: 28.03.2016.

Greene, W. H. (2003). Econometric analysis (5th ed). Upper Saddle River, N.J: Prentice Hall.

Gupta, V. (1999). SPSS for Beginners. VJBooks Inc.

Kijewska, A. (2016). Determinants of the return on equity ratio (ROE) on the example of companies from metallurgy and mining sector in Poland. Metalurgija, vol. 55(2), 285-288.

Kotane, I. (2015). Evaluating the importance of financial and non-financial indicators for the evaluation of company's performance. Management Theory and Studies for Rural Business and Infrastructure Development, vol. 37(1), 80-94. [On-line]. Available: http://doi.org/10.15544/mts.2015.08, Access date: 29.03.2016.

Kotane, I., & Kuzmina-Merlino, I. (2012). Assessment of financial indicators for evaluation of business performance. European Integration Studies, 6, 216-224. [On-line]. Available: http://doi.org/10.5755/j01.eis.0.6.1554, Access date: 29.03.2016.

Krivovyazyuk, I.V. (2012). Functioning and development of the enterprises in condition of crisis: systematic-analytical approach: monograph. [Кривов'язюк, І.В. (2012). Функціонування та розвиток підприємств в умовах кризи : системно-аналітичний підхід : Монографія. Луцьк : ЛНТУ, 392].

Kryvovyazuk, I.V. & Kryvoviaziuk, L.V. (2014). The use of comprehensive economic analysis to improve the efficiency of activity of engineering enterprises of Volyn region [Кривов'язюк, І.В., Кривовязюк, Л.В. Використання комплексного економічного аналізу для підвищення ефективності господарювання машинобудівних підприємств Волинської області. Економічні науки. Серія "Регіональна економіка". Збірник наукових праць. ЛНТУ, 11 (43), 133-149].

Kryvovyazuk, I.V., Kryvoviaziuk, L.V., Strilchuk, R.M. (2013). Selection of the strategy of engineering enterprises development based on diagnostics results of their state [Кривов'язюк, І.В., Кривовязюк, Л.В. & Стрільчук, Р.М. (2013). Вибір стратегії розвитку підприємств машинобудування на базі результатів діагностування їх стану. Економічний форум, 2, 154-164].

Kryvoviaziuk, L.V. (2014). An integrated approach to the diagnosis of innnovation-active engineering enterprises of Volyn [Кривовязюк Л.В. Комплексний підхід в діагностиці інноваційно активних машинобудівних підприємств Волині. Науковий вісник ЛНТУ. Серія «Економічні та гуманітарні науки». Науковий збірник, 14. Луцьк : РВВ ЛНТУ, 115-121].

MÍkva, M. (2013). Importance of non-financial indicators for measuring enterprise performance. In: Eurobrand: 6th International Multidisciplinary Scientific Conference, Požarevac, 24-26(5), 2-7.

Regression diagnostics (2016, April 10.). Oxford Journal. [On-line]. Available: http://www.oxfordjournals.org/our_ journals/tropej/online/ma_chap5.pdf.

Robinson, T.R., Greuning, H.V., Henry, E. & Broihahn, M.A. (2009). International Financial Statement analysis. CFA Institute, John Wiley & Sons, Inc., Hoboken, New Jersey.

Ross, S. A., Westerfield, R., & Jordan, B. D. (2008). Fundamentals of corporate finance. Tata McGraw-Hill Education.

Shliaga, O. V. & Gal'tsev, M. V. (2014). The ways of the enterprise' efficiency increasing. [Шляга, О. В. & Гальцев, М. В. (2014). Шляхи підвищення ефективності роботи підприємства. Економічний Вісник Запорізької Державної Інженерної академії, 7, 66-75].

Trokoz, D. & Orlikovsky, M. (2014). The last concepts of performance management of modern enterprises. [Трокоз, Д. І. & Орликовський, М. О. (2014). Новітні концепції управління ефективністю діяльністю сучасних підприємств. Ефективна економіка, 5]. [On-line]. Available: http://www.economy.nayka.com.ua/?op=1&z=3034, Access date: 29.03.2016.

Vătavu, S. (2014). The determinants of profitability in companies listed on the Bucharest stock exchange. Annals of the University of Petrosani, Economics, 14(1), 329-338.

Appendix I

Table A1

Indicators used in the work and their formulas and meaning

Group	Indicator	Meaning	Formula
Liquidity ratios	Quick ratio	Shows ability to meet its short-term obligations with liquid assets (excluding inventories); Higher is better.	$\frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}}$
	Current ratio	A measure of short-term liquidity; Higher – larger margin of safety.	Current Assets/Current liabilities
	Cash ratio	Shows ability to pay its short-term debts by cash	Cash/Current liabilities
Asset utilization or turnover ratios	Receivable turnover ratio	Indicates the efficiency with which a firm manages the credit it issues to customers and collects on that credit.	Sales/Accounts Receivable
	Inventory turnover ratio	Shows how many times a company's inventory is sold and replaced over a period.	$\frac{\text{Cost of Goods Sold}}{\text{Inventory}}$
	NWC turnover ratio	Shows how effectively a company is using its working capital to generate sales; Higher is better.	$\frac{\text{Sales}}{\text{NWC}}$
	Asset turnover ratio (ATR)	Shows ability to generate more revenue per euro of assets.	$\frac{\text{Sales}}{\text{Total Assets}}$
	Equity turnover ratio	Determine the efficiency with which management is using equity to generate revenue.	$\frac{\text{Sales}}{\text{Total Equity}}$
	Fixed asset turnover ratio	Measures operating performance	$\frac{\text{Sales}}{\text{Net Fixed Assets}}$
	Current asset turnover ratio	Analyze the efficiency of usage of current assets.	$\frac{\text{Sales}}{\text{Current Assets}}$
Profitability Ratios	Gross profit margin	Used to assess a firm's financial health.	Gross Profit/Sales
	EBITDA margin	A measurement of a company's operating profitability as a percentage of its total revenue.	$\frac{\text{EBITDA}}{\text{Sales}}$
	Return on equity (ROE)	Measures a corporation's profitability.	$\frac{\text{Net Income}}{\text{Total Equity}}$
	Return on assets (ROA)	Shows how efficient management is at using its assets to generate earnings.	$\frac{\text{Net Income}}{\text{Total Assets}}$
	Operating expense-to-Net sales ratio	The smaller ratio shows the greater the organization's ability to generate profit if revenues decrease.	$\frac{\text{Operating Expense}}{\text{Net Sales}}$

	Profit margin	Shows how much out of every dollar of sales a company actually keeps in earnings.	$\frac{\text{Net Income}}{\text{Net Sales}}$
Growth Ratios	Assets growth ratio	Growth rates refer to the amount of increase that a specific variable has gained within a specific period and context.	$\frac{TA_t - TA_{t-1}}{TA_{t-1}}$
	Net Profit growth ratio		$\frac{\text{Net Income}_t - \text{Net Income}_{t-1}}{\text{Net Income}_{t-1}}$
	Sales growth ratio		$\frac{\text{Sales}_t - \text{Sales}_{t-1}}{\text{Sales}_{t-1}}$
Asset Structure Ratios	Current assets-to-Total assets ratio,	Indicate the extent of total funds invested for the purpose of working capital	
	Inventory-to-Current assets ratio	Shows part of inventory in structure of current assets.	$\frac{\text{Inventory}}{\text{Current Assets}}$
	Cash and cash equivalents-to-Current assets ratio	Shows part of cash and cash equivalents in structure of current assets.	$\frac{\text{Cash and Cash Equivalents}}{\text{Current Assets}}$
	Long-term assets-to-Total assets ratio	Shows part of fixed assets in structure of total assets.	$\frac{\text{Long – term Assets}}{\text{Total Assets}}$
Solvency Ratios	Short-term financial debt-to-Total debt	Shows part of short-term financial debt in structure of total debt.	$\frac{\text{Short – term Financial Debt}}{\text{Total Liabilities}}$
	Short-term debt-to-Total debt	Shows part of short-term debt in structure of total assets.	$\frac{\text{Current Liabilities}}{\text{Total Liabilities}}$
	Interest coverage ratio	Determine how easily a company can pay interest on outstanding debt.	$\frac{\text{Earnings before interest and tax}}{\text{Interest}}$
Debt Ratio	Leverage ratio (LR)	Shows how much capital comes in the form of debt (loans), or assesses the ability of a company to meet financial obligations.	$\frac{\text{Total Liabilities}}{\text{Total Assets}}$
	Debt to Equity ratio	Indicates how much debt a company is using to finance its assets relative to the amount of value represented in shareholders' equity	Debt / Equity
	Total financial debt-to-Total debt	Shows part of financial debt in structure of total debt.	$\frac{\text{Total financial debt}}{\text{Total Liabilities}}$

Source: based on Ross, Westerfield and Jordan (2008).

APPENDIX II

Table A2

Descriptive staistics of economic and financial indicators by country sample (Portugal and Ukraine)

Indicators by country	Portuguese					Ukrainian				
	n	Minimum	Maximum	Mean	S.D.	n	Minimum	Maximum	Mean	S.D.
Quick ratio	42	0,258	1,479	0,802	0,240	48	0,107	7,519	1,356	1,314
Liquidity Ratio	42	0,434	2,128	1,078	0,357	48	0,465	12,084	2,672	2,759
Cash ratio	42	0,032	0,997	0,240	0,245	48	0,001	1,689	0,171	0,340
Receivable turnover ratio	42	1,526	11,959	5,134	2,773	48	0,000	28,170	7,400	8,283
Inventory turnover ratio	42	0,918	12,709	4,214	2,555	48	0,411	37,842	6,840	5,742
Net Working Capital turnover ratio	42	-574,690	513,507	0,237	121,537	48	-327,787	80,740	-5,238	51,290
Asset Turnover Ratio	42	0,204	1,464	0,628	0,306	48	0,000	2,230	0,626	0,656
Equity turnover ratio	42	0,747	12,308	3,645	2,478	48	0,000	13,772	1,516	2,246
Fixed Asset Turnover Ratio	42	0,259	3,487	1,166	0,765	48	0,000	7,231	1,319	1,794
Current Asset Turnover Ratio	42	0,525	4,153	1,721	0,958	48	0,000	7,875	1,772	1,914
Gross profit margin	42	0,126	0,809	0,547	0,159	48	-0,179	0,350	0,122	0,098
EBITDA margin	42	-0,173	0,484	0,137	0,119	29	-0,352	0,836	0,145	0,291
Profit margin	42	-0,320	0,190	0,010	0,090	48	-2,430	0,210	-0,060	0,380
Return on Equity	42	-4,661	0,533	-0,104	0,756	48	-0,574	2,179	0,039	0,393
Return on Assets	42	-0,113	0,082	0,001	0,042	48	-0,275	0,210	0,007	0,111
Operating expense to net sales ratio	42	0,782	1,280	0,945	0,104	45	0,517	3,354	1,033	0,376
Assets growth ratio	35	-0,230	0,410	-0,016	0,129	40	-0,475	1,531	0,077	0,305
Net profit growth ratio	35	-1,640,18	1,485	-47,45	277,143	40	-4,712	91,282	3,369	15,281
Sales Growth ratio	35	-0,434	0,773	0,016	0,237	40	-0,714	1,444	0,056	0,365
Current assets to total assets ratio	42	0,194	0,607	0,401	0,145	48	0,190	0,939	0,412	0,204
Inventory to current assets ratio	42	0,042	0,471	0,246	0,129	48	0,045	0,945	0,424	0,235
Cash and cash equivalents to current assets ratio	42	0,031	0,606	0,210	0,172	48	0,001	0,303	0,057	0,068
Long-term assets to total assets ratio	42	0,393	0,806	0,597	0,147	48	0,061	0,810	0,587	0,205
Short-term financial debt to total debt	42	0,019	0,503	0,230	0,110	48	0,000	0,811	0,191	0,238
Short-term debt to total debt	42	0,127	0,930	0,532	0,208	48	0,072	1,000	0,612	0,296
Interest coverage ratio	42	-9,308	70,569	4,784	13,985	48	-331,766	101,631	-0,661	53,261
Leverage Ratio	42	0,360	0,976	0,769	0,154	48	0,071	3,676	0,521	0,525
Total financial debt to total debt	42	0,355	0,862	0,603	0,149	48	0,000	0,952	0,473	0,292
Debt to equity ratio	42	0,560	40,23	5,760	6,370	48	-8,930	9,310	1,420	2,500

ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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STATE AND TRENDS OF BULGARIA'S FOREIGN TRADE WITH ORES AND CONCENTRATES

The paper presents the results of a study of the state and dynamics of the foreign trade of Bulgaria with some of the commodities of the country's trade list – the ones from class "Ores and Concentrates". It covers the period 2000-2016. Foreign trade situation is defined on the basis of processing and analyzing data published by national and international organizations. State and trends of Bulgaria's foreign trade with these strategic products of the mining industry are assessed in the context of the rapidly changing national, European and global market situation. The geographic concentration and sustainability of exports and imports are determined by developing specific coefficients. On this methodological basis, summaries have been made about the current foreign trade situation.
JEL: F14; F16; F50; L70

Introduction

Concerning the foreign trade, mining industry products occupy a significant place in the Bulgarian export list. Of them, ores and concentrates have the largest share. In the combined nomenclature, from which data on foreign trade flows is collected, ores are not separated from their concentrates. For this reason, everywhere in the current paper they are considered together. The significant participation in foreign trade turnovers implies a need to analyze and reassess the state, dynamics and trends in the export and import of ores, making the topic current and relevant from an economic point of view. Commodities of class "Ores and Concentrates" form an average of 1.3% of Bulgaria's annual export of goods for the period 2000-2016. The characteristics of the Bulgarian ores predict the export of the sector to be predominantly ore concentrates[3] and, to a lesser extent, the ores themselves. This makes it particularly important to monitor the state of the export for its

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[3] To be cleared of rock impurities, the ores are subjected to purification (enrichment or concentration). The resulting ore concentrates represent almost pure metal compounds, from which the corresponding metals are obtained.

functioning. The country has one of the highest shares of the mining sector in GDP among the European Union countries. In some areas, mining is a major livelihood of the population.

At the same time, the technical characteristics of the Bulgarian productions impose the import of ores and concentrates in the form of raw materials. It represents annual 4.5% of total imports of goods for the period 2000-2016. This high share accounts for a serious impact of the international business environment on their activity.

The goal of the current study is to analyze and summarize the state and trends in foreign trade with ores and concentrates.

1. Role of Mining Industry for the Economic Development of Bulgaria

The latest data on the value of the total mineral extraction index, published by the Bulgarian Chamber of Mining and Geology, show that Bulgaria has parameters above the average world values – 11 ton/person (Ministry of Economy, Energy and Tourism, 2012). This gives grounds to be defined as a "mining state". In recent years, the country ranks third in copper extraction, fourth in gold extraction and fifth in lignite extraction in Europe. With these key positions in the mining industry on the continent, Bulgaria is recognized as an important and promising market player.

The mining industry has a strategic importance for the development of the Bulgarian economy. Many industries are directly or indirectly related to the extraction of mineral resources, including metallurgy, chemical industry, electrical engineering, construction, transport, information and telecommunication technologies. "By acquiring an export potential, the industry of ferrous metals and ore mining" gets a significant role for foreign trade in 1991-1997 (Tassev, 2012b).

From a macroeconomic point of view, Bulgarian mining industry provides an average of 4-5% of GDP, which confirms its significant role for the economy (Bulgarian Chamber of Mining and Geology, 2014). Mining gives a boost to the development and improvement of the welfare of certain Bulgarian municipalities. It provides direct employment to more than 30 000 people and induced employment to another more than 120 000 people in other sectors servicing the industry, creating 1.3% of the national employment (Ministry of Economy, Energy and Tourism, 2012). According to data from National Statistical Institute (NSI) to 2015, 386 companies and organizations are engaged in exploration, extraction and processing of mineral natural resources and the related activities and services. Mining enterprises, in comparison with other industrial activities, are defined by the object of their activity – the mineral resources and the related requirements for organization and realization of the production activity (Velev, 2011). Compared with the European ones, they are predominantly profitable and competitive, offering quality production, convertible on the international markets. This makes ores and concentrates commodities, for which Bulgaria has competitive advantages.

Bulgaria is among the five countries in the European Union with the highest share of value added in the mining industry – about 3%. Also, "the gross value added of an employee in

the sector is significantly higher than the total one for the country and the industry" (Stoykova, 2016). According to NSI data, the registered operating incomes amount to 2 848 348 000 BGN (2015). By operation incomes of an employed person, the labour productivity amounts to 114.566 BGN per employed person (2015). By the value added by factor cost of an employed person, it is 46.267 BGN per employed person (2015). These data confirm that mining industry accounts for one of the highest labour productivity, exceeding the one of the other sub-sectors of the Industry sector and twice as high as the average for the country. That is why it is defined as a promising activity given the full potential, though not fully exploited.

The ores and minerals have a great production and, consequently, economic importance as the raw material, from which finished products are obtained. By 2016 in Bulgaria the established deposits of mineral natural resources are 1383, of which 218 are of ore minerals and 225 of non-metallic minerals. The main extracted raw materials are lignite, lead-zinc, copper and polymetal ores, gypsum, limestone, bentonite, kaolin, quartz sands, refractory clays and marble. Today, their extraction in Bulgaria reaches 97.68 million tons. In the last years, the extraction of ore minerals has had the greatest contribution to the total production value (53%). This predetermines that in the coming years the products of the mining industry will continue to be constantly present in the export list of Bulgaria.

Foreign trade with ores and concentrates happens with its own specifics, coming from the peculiarities of their character. First, in quantitative terms, with the exception of manganese ore, ores of ferrous metals are insufficient to meet the needs of the Bulgarian industry, therefore "the production is based mainly on imported raw materials (ores)" (Tassev, 2012a). Second, there is some discrepancy between the qualitative characteristics of the raw materials and the capabilities of the enterprises for their rational and full use. There is such deficiency also in non-ferrous metal ores, which is why part of the needs is secured by import. Third, the shortage of ore minerals and the specifics of their qualitative characteristics impedes the development of the structure-defining economic sectors. The insufficient quantity and the demand for ores with better quality characteristics, including even iron ores, of which Bulgaria is rich, requires imports from other countries. Fourth, despite the shortage, the country is also an exporter of ores. The reason for this can be found in the inconsistency of the needs for available ore minerals, and the potentially necessary ones for business purposes. At the same time, the metal content of most ores extracted in Bulgaria is very low, which adversely affects and raises the costs of the final products. As a consequence of ensuring the normal functioning of key industries, it is necessary to import ores with higher metal content or directly – their concentrates.

2. Research Methodology

Determining the state and role of the mining industry for the economic development of Bulgaria takes into account the most current data and sources on the subject, including reports of state institutions and analyses of branch organizations, published as of October 1st, 2017. Data on exports and imports have been collected and verified by the customs authorities of Bulgaria on the basis of the "Combined Nomenclature" of the European

Union. It is based on the commodity nomenclature of the Harmonized System (UN) and is supplemented by its subsections. Combined Nomenclature is adopted by the European Council **Regulation (EEC) No 2658/87** and is updated annually. The Chapters of the Combined Nomenclature, used for the purposes of the current study, are from 2601 to 2617 of section 26 (see Annex 1). Within the current study, this part of the nomenclature section is called "ores and concentrates".

Regarding the information on foreign trade, the main source is the National Statistical Institute (NSI) and "Statistical Time Series of the Bulgaria's Foreign Trade of Goods, 1986-2006" (Tassev, 2011). Detailed data of partner countries in foreign trade are published in "Foreign Trade" database of NSI. The time series that can be generated by the data start at 2000. For this reason, the current study examines the period 2000-2016. The annual values of the deals with the respective ores and concentrates are used, as well as the quantity of first additional measure – kg.

In view of the set goal, statistical methods have been applied to track the state and dynamics of Bulgaria's foreign trade with ores and concentrates.

First, descriptive statistics tools are used to describe the values and trends in their development. Taking into account the annual value of the respective ore and concentrate, and dividing it to the annual quantity, results in the average annual price of the respective ore and its concentrate.

Second, geographic structure of foreign trade is thoroughly analyzed. This is realized by examining two important parameters – concentration and sustainability.

In the practice so far, Herfindahl-Hirschman Index (HHI) is used to calculate the foreign trade concentration. In economic theory and practice, it has been accepted as a conditional measure of market concentration. It can establish the existence of a monopoly or a competitive market. HHI is considered a measure of the extent to which a market is dominated by a small number of large firms and a large number of small firms, i.e. it shows the degree of concentration on a certain market (Rutherford, 1997). For example, in a sector with *i* firms the index is calculated using the formula:

$$HHI = \sum Si^2 , \quad (1)$$

where:

Si is a market share of firm *i*.

The index shows both the number of companies and their relative size. Its value is *1* if there is only one company on the relevant market, and it is close to *1* if the companies are few or some of them are much larger than the others. If the value is *0* or close to *0*, then it is a highly competitive market.

Herfindahl-Hirschman Index is used in some foreign trade analyses to measure the degree of concentration and diversification. Used for this purpose, however, it has a weakness regarding the objectivity of the interpretation of the obtained results. Index values change in the range of *1/n*, where *n* is the number of foreign trade partner countries, up to *1*. This

means that they depend directly on the size of the assessed group of countries (Ilieva and Iliev, 2014). The lower limit of the index variation is floating according to the number of foreign trade partners. Thus, if they are too many, the values will change in a larger range, and vice versa – if they are fewer, the values will change in a smaller range. Then the smaller value of the index would mean higher diversification, and the larger value would mean a higher concentration. The described specifics in the interpretation of the index values are present when it is used to track the foreign trade situation. They do not allow for direct comparisons between different periods, if in the meantime the number of foreign trade partners has changed, since then the value of *n* has also changed. In this case, the index values will be incomparable, and comparative analyses based on similar values are not objective.

To avoid the difficulty of interpreting HHI, the authors here suggest that *Geographic Concentration rate (GCr) of export/import* should be used to study the geographical distribution of foreign trade. It is calculated as a coefficient representing the relative share of the sum of the first five countries in the geographical distribution of exports, or respectively imports, to the amount of deals with all countries. The mathematical record is expressed by the following formula:

$$GCr = \frac{\sum_{1}^{5} topD}{\sum_{1}^{n} D}, \tag{2}$$

where:

GCr is Geographic Concentration rate of export/import;

D – foreign trade deals with *n* countries;

top – members of ranked row of deals.

The geographic concentration rate can be calculated for each separate studied time period, for example, a year. Its values change from 0 to 1. The lower the respective value, the lower the geographic concentration, in other words, diversification is achieved. On the contrary, the higher its value, the higher the geographic concentration, i.e. no geographic diversification has been achieved.

The authors suggest the following scale for interpreting the values of the rate (see Table 1).

Table 1

Interpretation of GCr values

GCr value	Interpretation
0.0 – 0.2	Highly diversified geographic structure
0.2 – 0.4	Diversified geographic structure
0.4 – 0.6	Balanced geographic structure
0.6 – 0.8	Concentrated geographic structure
0.8 – 1.0	Highly concentrated geographic structure

The Interpretation of the rate provides analytical and cognitive information on the degree of dependence of a country on its foreign trade partners and on their market situation, political, social and economic environment. It is proven that a greater degree of concentration is unfavourable because it shows a greater degree of dependence and commitment with fewer foreign trade partners and their trading conditions, and vice versa. At the same time, for each country, the high stable and predictable export incomes are of particular economic importance. They can be achieved by diversifying the geographic structure. The greater degree of diversification is more favourable because it reflects into a greater independence and lack of such strong commitment. Moreover, it shows less vulnerability to external shocks and shakings, which can significantly alter the geographical distribution of foreign trade.

It is important that the analysis of a country's foreign trade relations should take into account and include their sustainability over time. *Geographic Sustainability Rate (GSr) of export/import* is introduced to measure sustainability. The coefficient shows changes in the structure over time. The mathematical record is expressed by the following formula:

$$GSr = \frac{\sum_{1}^{5} \frac{C}{m}}{5}, \tag{3}$$

where:

GSr is Geographic Sustainability rate of export/import;

C – number of times the partner country has been on the first five places of the geographic structure by different periods;

m – number of studied periods.

Its values change from 0 to 1. The lower the value, the lower the sustainability of the partner countries in export/import, in other words, the geographic structure is dynamic. On the contrary, the higher the value of the rate, the higher the geographic concentration – during a certain period the partner countries remain for a longer time. The authors suggest the following scale for interpreting the values of the rate (see Table 2).

Table 2

Interpretation of the GSr values

GSr value	Interpretation
0.0 – 0.2	Highly dynamic geographic structure
0.2 – 0.4	Dynamic geographic structure
0.4 – 0.6	Balanced geographic structure
0.6 – 0.8	Sustainable geographic structure
0.8 – 1.0	Highly sustainable geographic structure

Foreign trade theory and practice prove that a higher sustainability for a longer time is a favourable development scenario because it shows relative stability and predictability. If

the partner countries do not change significantly over the years, it can be argued that the followed foreign trade policy has a specific geographic focus. On the contrary, with a smaller degree of sustainability of the connections, substantial structural changes are observed. If such changes are made in short periods, this indicates a lack of stability and predictability of the followed policy. For these reasons, sustainability of foreign trade relations is one of the important characteristics of foreign trade to be traced.

As "an expression of the external sector of an economy, foreign trade of goods is indicative of its openness, its participation in the international division of labour, its international trade specialization and competitiveness" (Marinov, 2017). That is why, when analyzing such a topic, it is important to monitor the state and dynamics of the country's exports and imports. Precisely the geographic structure, which shows the direction of trade relations, has an important place.

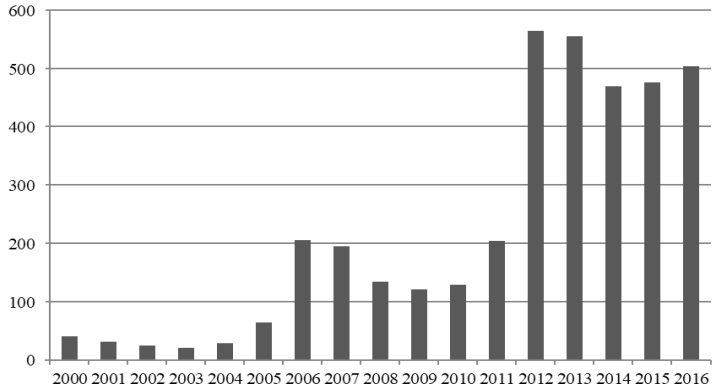
The introduced two coefficients allow to analyze the geographical distribution of foreign trade in a selected class of commodities or total for a country's entire foreign trade over a certain period or to a particular year. This is of great importance because "the development of external economic relations can be assessed by the location and structure of the main trading partners" (Panusheff, 2017). The obtained values show the degree of trade concentration in terms of geographical distribution and sustainability of foreign trade relations.

3. State and Dynamics of Exports of Ores and Concentrates

Between 2000 and 2016, ores and concentrates account for between 1 and 3% of all Bulgarian exports. Figure 1 illustrates the export in value, realized during the studied period.

Figure 1

Exports of "Ores and concentrates" during the period 2000-2016 in value (million EUR)



Source: Constructed by the authors using NSI data, 2017.

Presented data allow the tracking of the state and the dynamics of the realized export. As shown, the lowest value of exports of ores and concentrates is registered in 2003 – 21 million EUR. The highest value is reported in 2012, when exports reach nearly 560 million EUR. The values resulting from the export of these goods fall between 2000 and 2003. At the same time, in 2004-2006 a slight increase starts, followed by a more rapid rise. Between 2006 and 2007 there is a slight decline, followed by a more dynamic one in the next two years. In 2010, the trend breaks, with growth in 2011 and 2012, and the growth rate is double. In this sense, it can be argued that the relatively rapid recovery of the value of Bulgarian exports after the 2008 crisis is due, to a certain extent, to exports of ores and concentrates. Export volumes in value terms in 2013 again mark a slight decline, followed by a faster one in 2014. Data for 2015 and 2016 show a slight increase. This shows the potential opportunity for regaining the positive trends and the results achieved in 2012 and 2013. The projections are for a gradual recovery of the higher levels achieved during these two consecutive years. Thus the presented wave-like development is practically described as a cycle of six years.

In the "Ores and concentrates" class, the following items have the largest relative shares in the export structure:

- "Copper ores and concentrates" with an average share of 80%;
- "Precious-metal ores and concentrates" with an average share of 15%;
- "Lead ores and concentrates" with an average share of 2% for the period.

The export of the other representatives of the group of "Ores and concentrates" is of an occasional nature and of negligible size. This is the main reason why they will not be considered within the scope of this study.

3.1. Export of "Copper ores and concentrates"

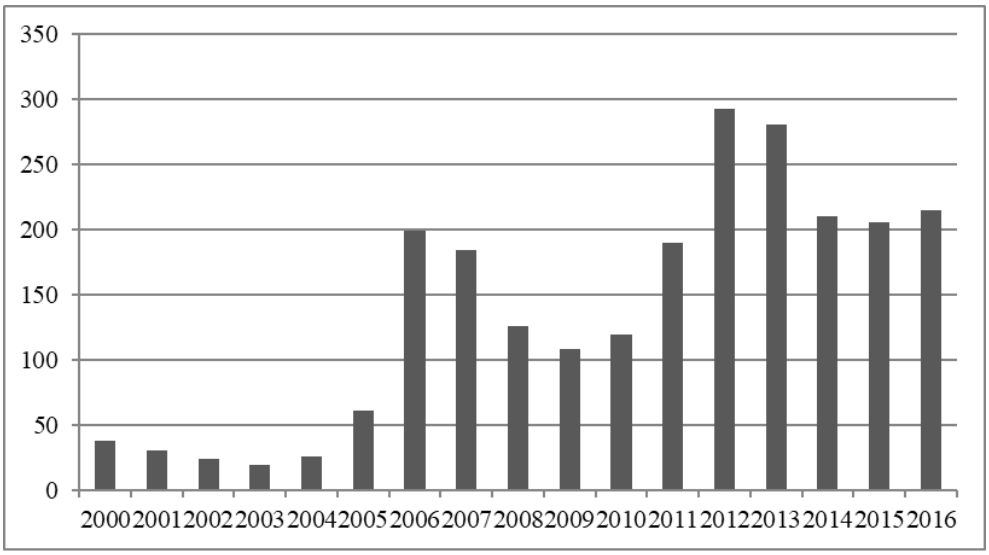
From the structure of export volumes of ores and concentrates, it is clear that during the studied period the average share of the group of copper ores and concentrates was the most significant and amounted to 80%. Although copper ores have a very low metal content (<0.5%), which determines their qualitative characteristics, they have a decisive influence on the total export of ores and concentrates over the years, given their high relative share.

Bulgaria's export of "Copper ores and concentrates" in 2000-2016 is shown graphically on Figure 2. It shows that the export values of "Copper ores and concentrates" follow the trends described for the whole class. Every six years they show cyclical fluctuations. Market demand follows the dynamics of the business cycle, which leads to dependence on the more favourable or unfavourable market situation.

When reporting exported quantities, Figure 3 shows the average annual unit price.

Figure 2

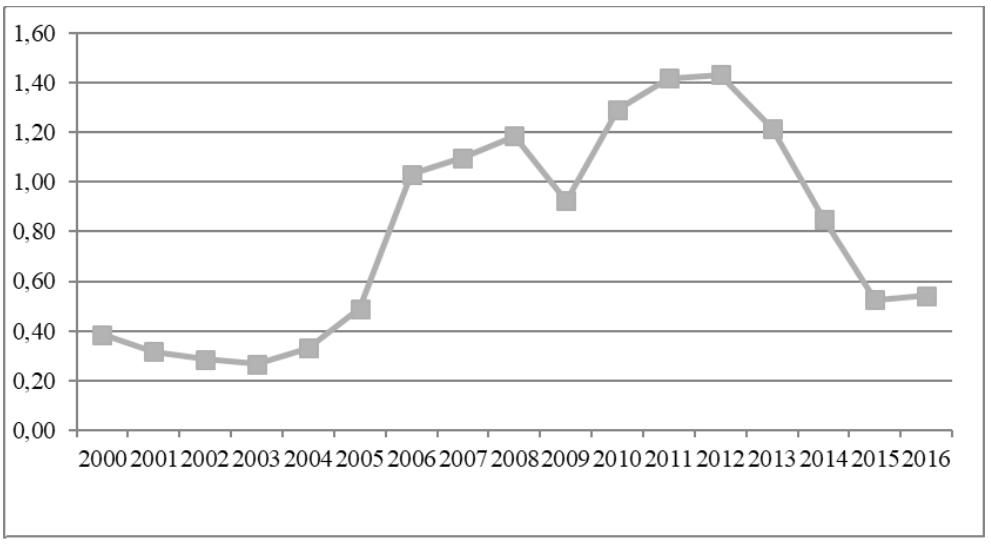
Export of "Copper ores and concentrates" in 2000-2016 (million EUR)



Source: Constructed by the authors using NSI data, 2017.

Figure 3

Average annual price of "Copper ores and concentrates" in the export of Bulgaria (EUR/kg)



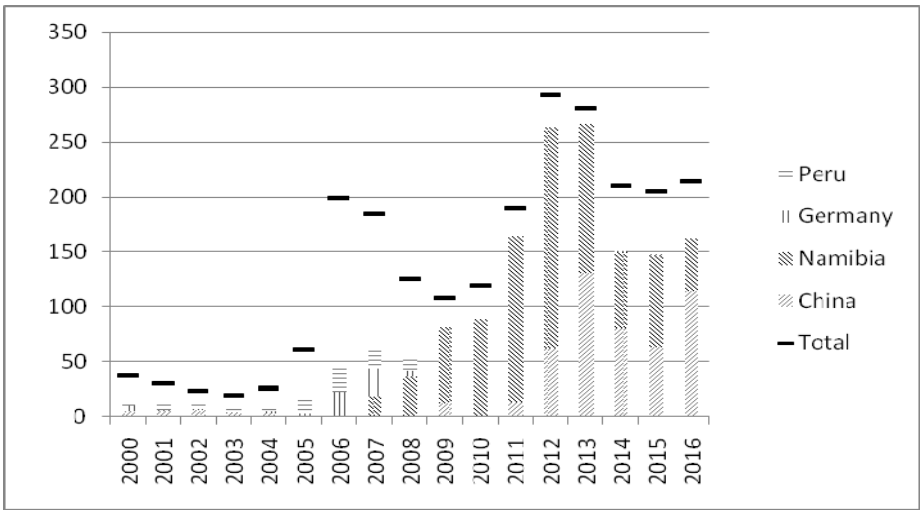
Source: Constructed by the authors using NSI data, 2017.

Data, summarized and presented on Figure 3, give grounds to distinguish four separate sub-periods over the 17-year studied period.

First, in 2000-2005 the average annual export price of "Copper ores and concentrates" is less than 1 EUR/kg. Second, the period 2006-2009 is characterized by a price close to 1 EUR/kg. Third, 2010-2013 is defined as a period with a price above 1 EUR/kg. A downward trend in unit price under 1 EUR/kg appears again in the period after 2014.

Geographical distribution of the deals also influences the dynamics of exports of ores and concentrates. For this purpose, Figure 4 presents the distribution of copper ores and concentrates by partner countries during the studied period.

Figure 4
Foreign trade partners of Bulgaria in the export of "Copper ores and concentrates" in 2000-2016



Source: Constructed by the authors using NSI data, 2017.

Over the years, the relative shares of the different countries widely vary. The analysis of data on Bulgaria's foreign trade partners in the export of copper ores and concentrates presents the distribution of deals during the period. First, the territorial focus of exports in individual years changes under the influence of certain factors and conditions. Second, it is clear that foreign trade relations with different countries are deepening or limiting, some at the expense of others.

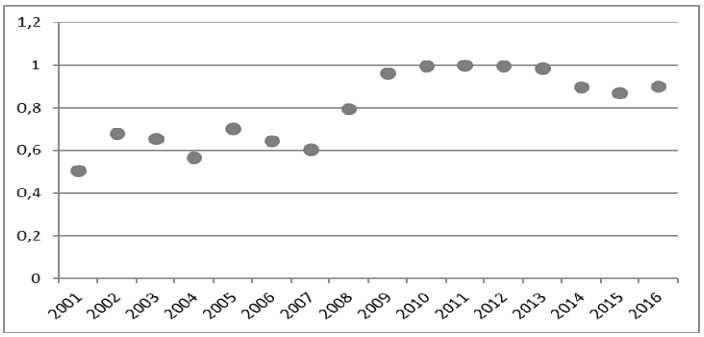
Concerning the partner countries, the export of "Copper ores and concentrates" can be distinguished into two sub-periods with a different profile. The first sub-period is from 2000 to 2008. Then the leading trading partners of Bulgaria are Peru (13%), Canada (13%) and Germany (9%). There have been occasional deals over the years with Serbia, China and Spain in regards to the implementation of specific arrangements. The second sub-period is after 2008. The data show that the geographic focus of exports of "Copper ores and concentrates" radically changes. Namibia (52%) and China (30%) become the leading trading partners. It is noteworthy that trade with Namibia represents over 50% of all exports

of the commodity group, which establishes the country as a leading export destination. In the foreign trade relations with the African state, exactly the raw materials have a dominant role (99%), "and the only product of this commodity group that Bulgaria exports to Namibia is copper ores" (Marinov, 2015). After 2014, exports to China surpass that to Namibia. In the second subperiod, there have been occasional deals with Spain, Finland and Oman, in regards to the implementation of specific company arrangements. To sum up, by 2016 there is a significant concentration of exports of "Copper ores and concentrates" in only two main geographic directions – Namibia and China, which form the predominant share of total exports.

To measure the geographic concentration, a suggested GCr coefficient is calculated, the values of which are presented on Figure 5.

Figure 5

Values of Geographic Concentration rate of exports of "Copper ores and concentrates" in 2000-2016



Source: Constructed by the authors using NSI data, 2017.

GCr shows variations in the range of 0.50 to 0.99. Average in the period it is 0.80. At the beginning of the period, the concentration is lower and the geographic structure can be defined as balanced. After 2007, processes of increasing the concentration begin and the coefficient reaches values close to 1, i.e. a highly concentrated geographic structure is formed.

The registered high concentration of the geographic structure of exports of "Copper ores and concentrates" is indicative of the dependence on a few foreign trade partners. As a result, exports are heavily dependent on the market situation of the two countries – Namibia and China, as well as on their political, economic, social and legal conditions. The risk of transferring negative influences affecting the foreign trade relations of Bulgaria in the event of shakings and internal shocks in the partner countries increases. Exports to such a small number of countries show a high degree of concentration or vulnerability and sensitivity to potential changes in the structure of foreign trade partners. This may lead to a number of shocks related to the risk of losing market positions and revenues from foreign trade.

The sustainability of exports of copper ores and concentrates is measured by the GSr coefficient. For the studied period, it is 0.5375, or there is a relatively balanced geographic structure.

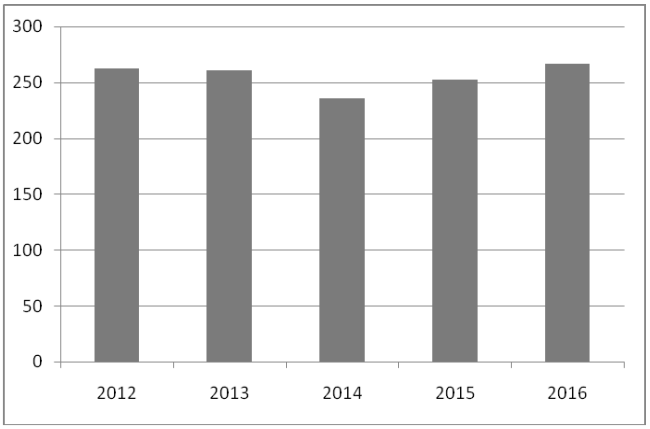
A summary of the data shows that exports of "Copper ores and concentrates" has increased in value over the period. By 2016 there is a significant concentration of the geographic structure of exports, which increases the risk of shakings and shocks, as well as loss of revenue from foreign trade activity. There is a relative sustainability and stability of foreign trade relations. Yet, the main foreign trade partners change, and some export destinations are replaced by other. This shows a certain incoherence of Bulgaria's general foreign trade policy and strategy regarding exports of copper ores and concentrates, given the change of strategic markets with other markets in short periods of time.

3.2. Export of "Precious-metal ores and concentrates"

Statistical information on the export of "Precious-metal ores and concentrates", especially in some of the studied years, falls under the confidentiality hypothesis, defined by the Law on Statistics[4] of Bulgaria. For this reason, the presented data timeline is incomplete. However, for the period after 2012 there are such data, summarized and presented graphically on Figure 6. Lack of information on the export of silver ores and their products for certain years does not allow them to be included in the analysis.

Figure 6

Exports of "Precious-metal ores and concentrates" in 2000-2016 (million EUR)



Source: Constructed by the authors using NSI data, 2017.

Data, presented on Figure 6, are indicative of the relatively constant value of deals with "Precious-metal ores and concentrates", which is around 250 million EUR annually.

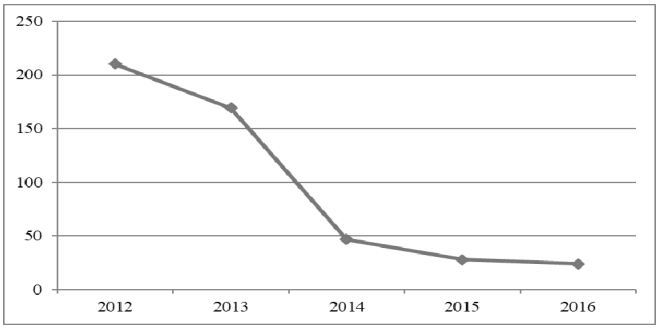
[4] Law on Statistics (to 07.10.2017), Art. 25, Par. 2 и 3, concerning the protection of the statistical secret.

The following unit prices per kilogram are obtained when reporting the quantities.

Data on exports of "Precious-metal ores and concentrates", presented on Figure 7, shows a steep decrease and subsequent keeping of unit prices to around 25 EUR/kg.

Figure 7

Annual prices of export of "Precious-metal ores and concentrates" in 2012-2016 (EUR)

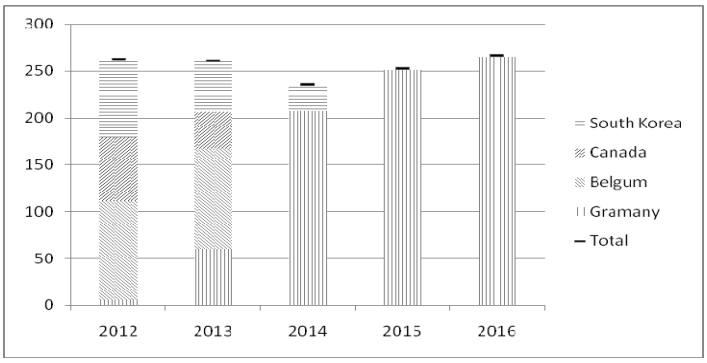


Source: Constructed by the authors using NSI data, 2017.

The partner countries' structure of exports of "Precious-metal ores and concentrates" is shown on Figure 8.

Figure 8

Exports of "Precious-metal ores and concentrates" in 2012-2016



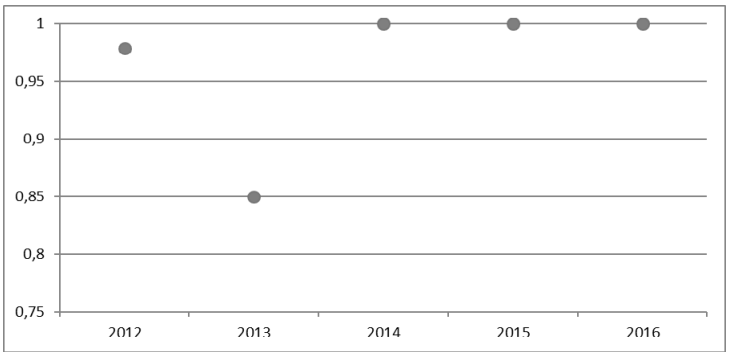
Source: Constructed by the authors using NSI data, 2017.

The generalized data testify that over the last four years the share of exports to Germany has increased to reach 100% in 2016. Over the last three years, Germany has also become a main foreign trading partner. At the same time, exports to other main export destinations – Korea, Canada and Belgium – have stopped.

Measured by GCr, the concentration of "Precious-metal ores and concentrates" turns out to be as high as possible (Figure 9).

Figure 9

Values of Geographic Concentration rate of exports of "Precious-metal ores and concentrates" in 2000-2016



Source: Constructed by the authors using own calculations.

Throughout the whole period, GCr shows high values – close to or equal to 1. On average, it is 0.97, i.e. the foreign trade structure can be defined as highly concentrated. By orienting to only one partner country (Germany), export is directly dependent on the market situation in that country.

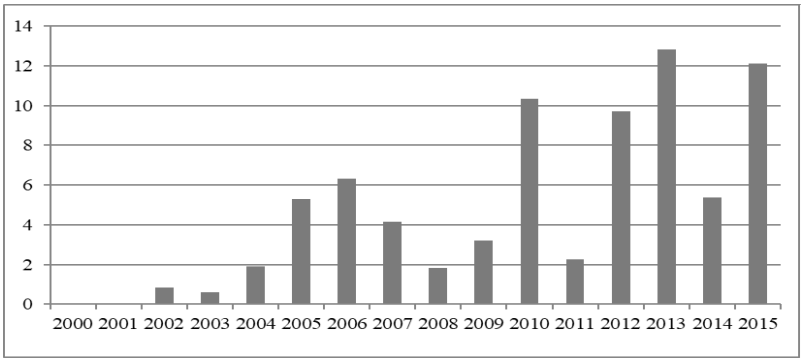
According to the obtained value of the Geographic Sustainability rate (GSr = 0.59), there is a balanced geographic structure, characterized by average sustainability and stability of the foreign trade relations and connections.

3.3. Export of "Lead ores and concentrates"

Exports of ores and concentrates include also deals with "Lead ores and concentrates", presented on Figure 10.

Figure 10

Exports of "Lead ores and concentrates" in 2000-2016 (million EUR)



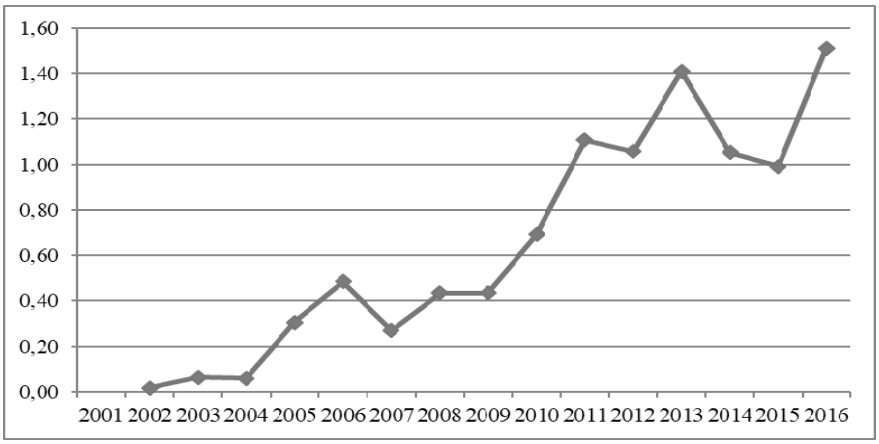
Source: Constructed by the authors using NSI data, 2017.

Obviously, until 2003 the deals with "Lead ores and concentrates" are negligibly few. In the next years, their size is marked by strong fluctuations. Deals reach their maximum of 13 million EUR in 2013.

When reporting exported quantities, the average annual unit price is obtained (Figure 11).

Figure 11

Unit prices of export of "Lead ores and their concentrate" in 2000-2016 (EUR)



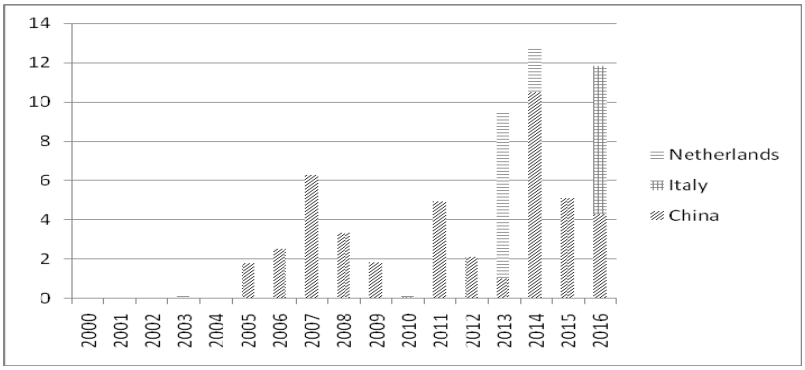
Source: Constructed by the authors using NSI data, 2017.

Concerning the unit prices, Figure 11 shows the unit export price of "Lead ores and concentrates". There is a steady tendency of increase of the unit price of individual deals over the years. Deals start at around 0.02 EUR in 2002 and reach 1.51 EUR in 2016.

Figure 12 shows the interesting tracking of their geographical distribution.

Figure 12

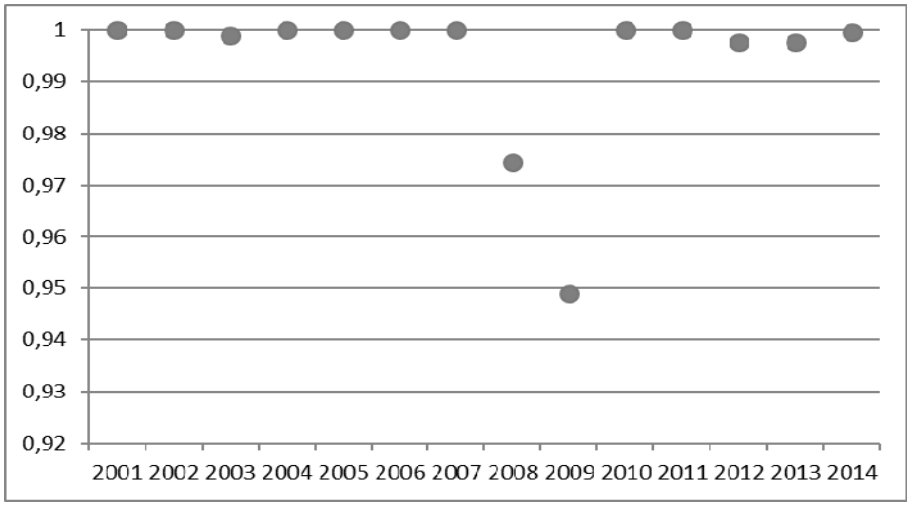
Geographical distribution of exports of "Lead ores and concentrates" in 2000-2016 (million EUR)



Source: Constructed by the authors using NSI data, 2017.

Analysis of the geographic structure of exports of lead ores and concentrates shows that China is again a main trading partner. There are single deals also with the Netherlands and Italy.

Figure 13
Values of Geographic Sustainability rate of export of "Lead ores and concentrates" in 2000-2016



Source: Constructed by the authors using own calculations.

Throughout the period, GCr shows high values – close to 1. The average value for the period is 0.99, hence the foreign trade structure can be defined as highly concentrated. Obviously, however, with the orientation to a certain partner country, the export of copper ores and concentrates is directly dependent on its market situation.

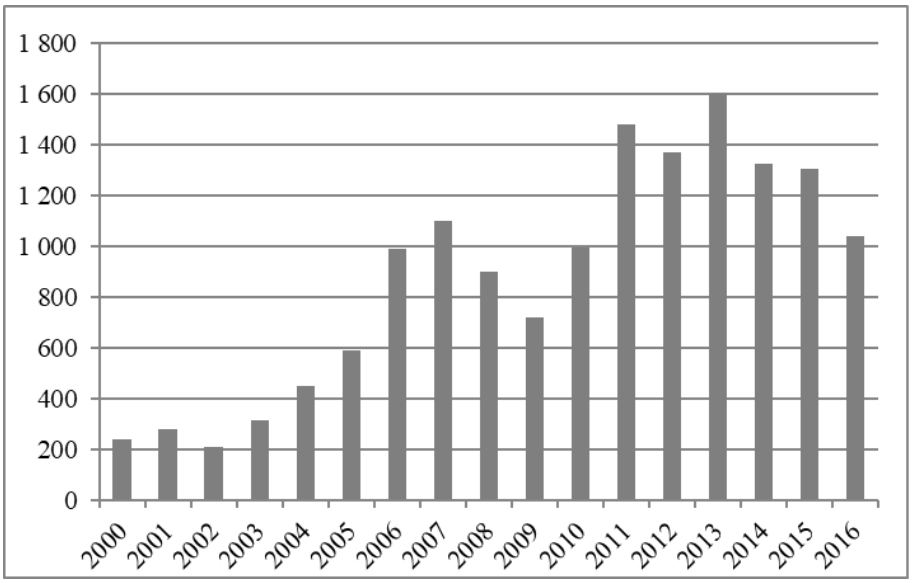
According to the obtained value of the Geographic Sustainability rate (GSr = 0.61), there is a sustainable geographical structure, characterized by stability of the foreign trade relations and connections.

In the studied period, Bulgaria exports also "Zinc ores and concentrates" and "Chrome ores and concentrates". Their values, however, are irregular and can be referred to rather occasional deals than to a trend or regular foreign trade relations, which could be traced.

4. State and Dynamics of Imports of Ores and Concentrates

In the period 2000-2016, ores and concentrates occupy between 3 and 6% of all Bulgaria's commodity imports. Figure 14 shows graphically the value of their imports.

Figure 14
Imports of "Ores and concentrates" during the period 2000-2016 in value (million EUR)



Source: Constructed by the authors using NSI data, 2017.

As Figure 14 shows, the lowest value of imports of ores and concentrates for the studied period is in 2003 – nearly 200 million EUR. The highest value is in 2013 when imports in value terms reach nearly 1.6 billion EUR. It is noteworthy that the values realized by imports of this commodity class have their peak in 2001. At the same time, in 2003-2007 a slight increase begins, followed by a more rapid one. Between 2008 and 2009, there is a significant drop. In 2010, the trend breaks, with growth in 2010 and 2011. For this reason, it can be argued that there is a relatively rapid recovery of imports of ores and concentrates in Bulgaria after the impact of the 2008 financial and economic crisis. In 2013, the import volume in value terms marks its record and in the years after that there is a consistent decrease.

In the class of ores and concentrates, the following subclasses have the largest relative shares in the imports structure:

- "Copper ores and concentrates" with an average share of 81%;
- "Zinc ores and concentrates" with an average share of 8%;
- "Lead ores and concentrates" with an average share of 7%;
- "Iron ores and concentrates" with an average share of 4% for the period.

Deals with the rest of the group of ores and concentrates are of negligible values. This is the main reason why they will not be considered in the context of this paper.

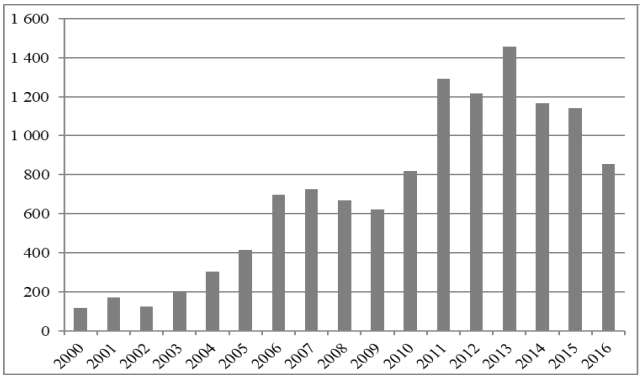
4.1. Imports of "Copper ores and concentrates"

When considering the import of ores, expressed in value, it is clear that during the period the average relative share of the group of "Copper ores and concentrates" is the most significant and amounts to 81%.

Figure 15 shows graphically the import in Bulgaria of copper ores and concentrates in 2000-2016.

Figure 15

Imports of "Copper ores and concentrates" in 2000-2016 (million EUR)



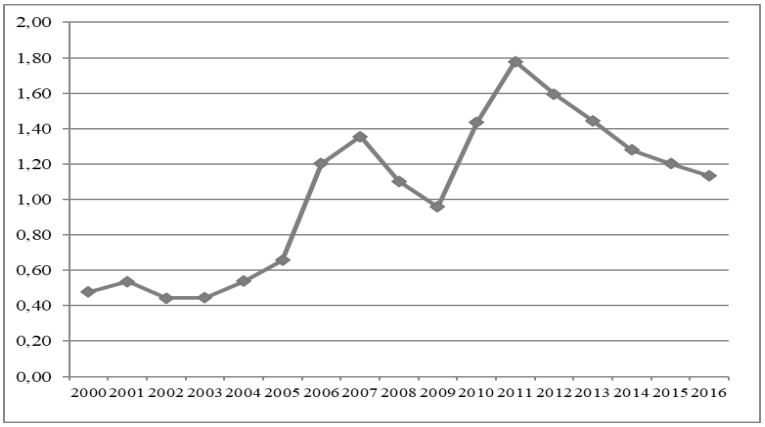
Source: Constructed by the authors using NSI data, 2017.

Figure 15 shows that the values of import of "Copper ores and concentrates" follow the trends described for the whole class.

When reporting imported quantities, the average annual unit price is obtained (Figure 16).

Figure 16

Average annual price of imports of "Copper ores and concentrate" of Bulgaria (EUR/kg)

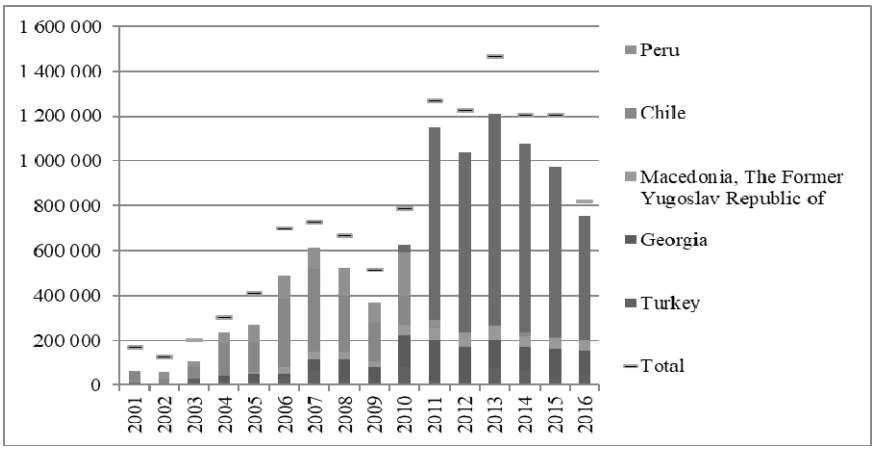


Source: Constructed by the authors using NSI data, 2017.

It is clear that in 2000-2007 the average annual import price of copper ores and concentrates has steadily increased. There is a decline in 2008 and 2009, followed by a rise in 2010 and 2011, and there is a sustained price drop towards the end of the period.

The geographical distribution of the executed deals also influences the dynamics of imports of ores. For the purposes of the analysis, Figure 17 presents the distribution of copper ores and concentrates by partner countries over the studied period.

Figure 17
Foreign trade partners of Bulgaria in the import of "Copper ores and concentrates" in 2000-2016 (thousand EUR)



Source: Constructed by the authors using NSI data, 2017.

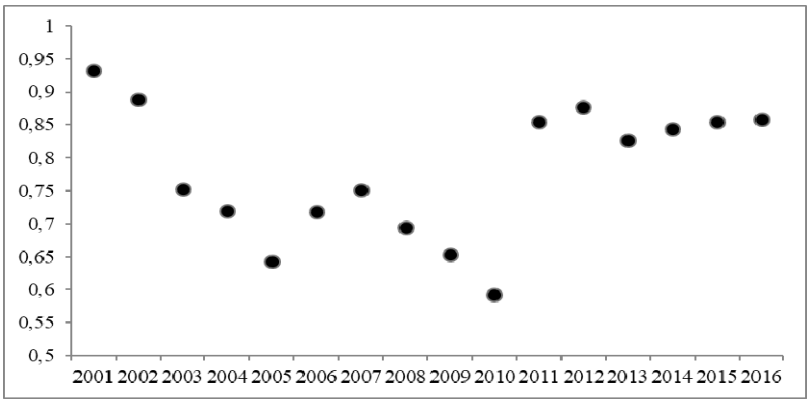
In terms of geographic distribution, at the beginning of the studied period, the main imports are from three countries – Indonesia, Chile and Peru. After 2010, this distribution changes significantly. Strategic trading partners become Spain, Georgia, Macedonia and Turkey. It is noteworthy that in 2016 Spain's share rises significantly to 67%.

Determining the degree of concentration of imports, the geographical distribution has an important significance for the objectivity of the analysis. For its determination, the Geographic Concentration rate, which values are presented on Figure 18, is calculated. During the different years, it shows variations ranging from 0.55 to 0.95.

Interpreting the values of the coefficient, those closer to 1 indicate a very high concentration of deals in the import of copper ores and concentrates and their limiting to only a few partner countries. On the contrary, values close to 0 indicate a lower concentration of deals and respectively certain degree of diversification of trade connections. It is clear that there is a higher concentration in 2001-2002 and 2011-2016. There is a relatively lower concentration in 2003-2010, with 2010 being the year with the lowest concentration in the whole period. The average value of the coefficient for the studied 17 years is 0.78, indicating a significant concentration in the distribution of deals and a highly concentrated geographic structure.

Figure 18

Values of Geographic Concentration rate of exports of "Copper ores and concentrates" in 2000-2016



Source: Constructed by the authors using NSI data, 2017.

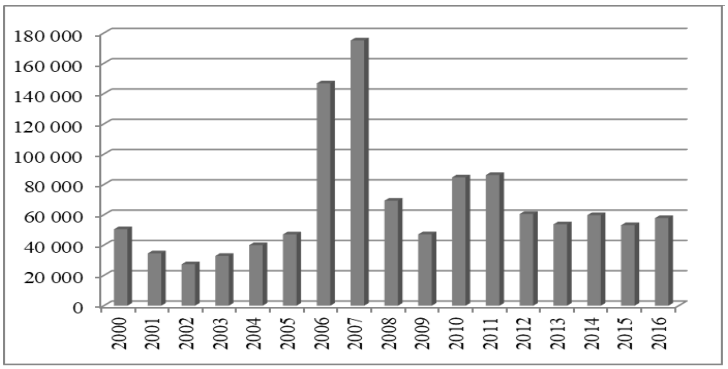
On the other hand, the specific Geographic Sustainability rate is calculated to characterize the sustainability of trade relations and to track changes in the structure of partner countries. For the period 2000-2016, its value is 0.63, indicating relative stability and sustainability of the geographic structure.

4.2. Import of "Zinc ores and concentrates"

Zinc ores and concentrates form an average of 8% of imports of ores and concentrates in Bulgaria. The import to Bulgaria of zinc ores and concentrates in value during the period 2000-2016 is presented graphically on Figure 19.

Figure 19

Imports of "Zinc ores and concentrates" in 2000-2016 (million EUR)



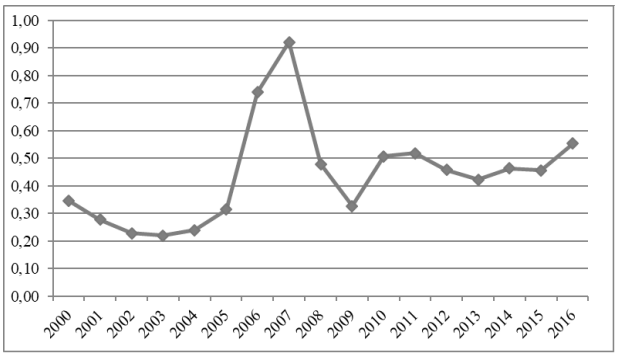
Source: Constructed by the authors using NSI data, 2017.

Generally, the import of zinc ores and concentrates follows the typical cyclicality of deals for the whole class of ores. In the different years, deals range around 20-80 million EUR. 2006 and 2007 are exceptions with their extreme values, reaching up to 140-180 million EUR.

Taking into account the imported quantities, the average annual unit price can be obtained (Figure 20).

Figure 20

Average annual price of import of "Zinc ores" in Bulgaria (EUR/kg)



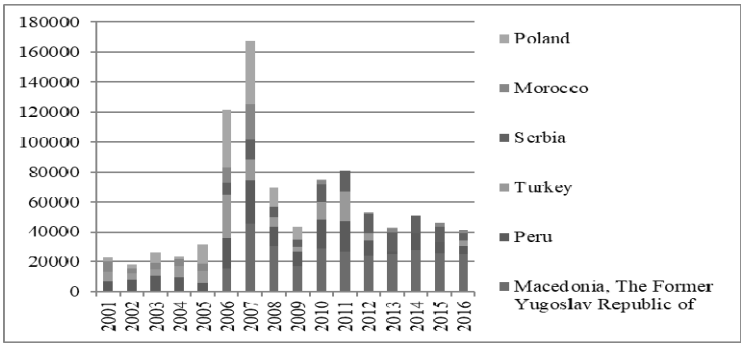
Source: Constructed by the authors using NSI data, 2017.

Figure 20 shows that the price per kilogram of imports of zinc ores ranges from 0.2 to 0.6 EUR. Only 2006 and 2007 are exceptions with prices of 0.9 EUR.

Geographical distribution of the deals also influences the dynamics of imports of ores and concentrates. That is why Figure 21 presents the distribution of zinc ores and concentrates by partner countries during the studied period.

Figure 21

Foreign trade partners of Bulgaria in the import of "Zinc ores and concentrates" in 2000-2016 (thousand EUR)



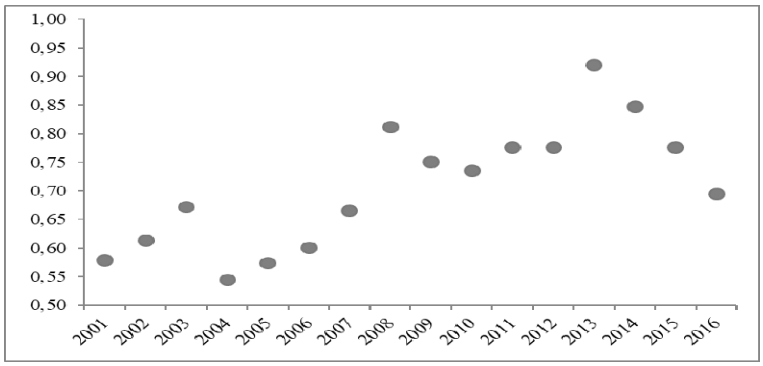
Source: Constructed by the authors using NSI data, 2017.

At the beginning of the studied period, main imports are from Peru, Turkey and Morocco, which are main trading partners. After 2006, there are imports also from Macedonia. As a result, geographical distribution changes, with the main trading partners at the end of the period being Macedonia, Bosnia and Herzegovina, and Peru, which has been a strategic partner since 2000. The significant relative share of Macedonia, which accounts for just over half of all imports, is noticeable.

The calculation of the Geographic Concentration rate of imports of zinc ores and concentrates is presented on Figure 22.

Figure 22

Values of Geographic Concentration rate of imports of "Zinc ores and concentrates"



Source: Authors' calculations.

As Figure 22 shows, there is a variation of the values of GCr in the range of 0.55 to 0.92 in the different years. Average for the period the rate is 0.71. This value indicates a relatively higher concentration and smaller diversification, expressed in higher dependence on a few trading partners, which increases a number of risks and worsens the prospects of the foreign trade relations.

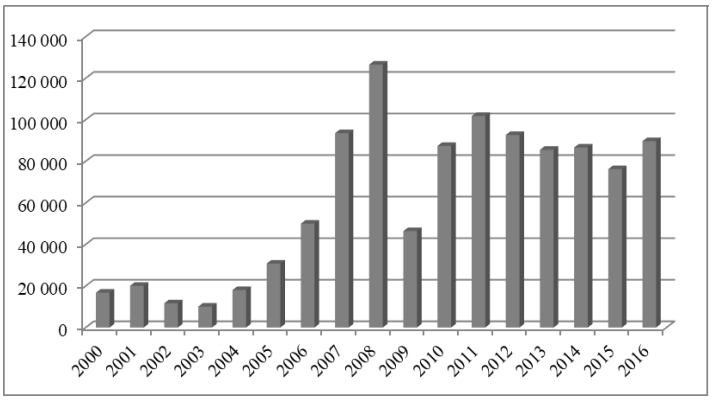
According to the obtained value of the Geographic Sustainability rate (GSr = 0.70), there is a relatively sustainable geographic structure, characterized by stability of the foreign trade connections.

4.3. Import of "Lead ores and concentrates"

Imports of "Lead ores and concentrates" represent about 7% on average of total imports of ores and concentrates in Bulgaria. Imports for the period 2000-2016 in volume terms are shown graphically on Figure 23.

Figure 23

Import of "Lead ores and concentrates" in 2000-2016 (thousand EUR)



Source: Constructed by the authors using NSI data, 2017.

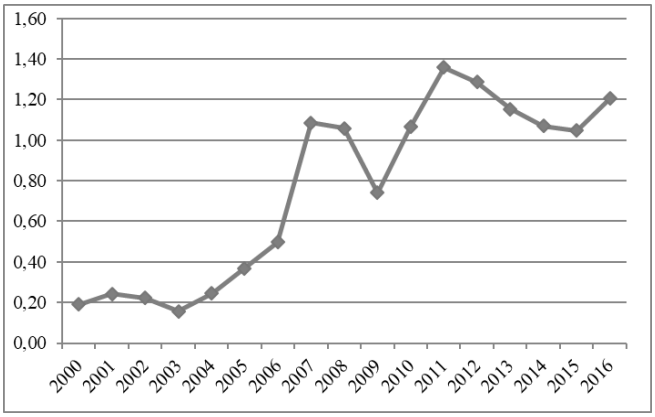
As Figure 23 shows, the lowest value of imports of "Lead ores and concentrates" in the studied period is in 2003 – nearly 10 million EUR. The highest value is in 2008, when imports in value amount to nearly 130 million EUR. It is noteworthy that the values, realized by imports of this commodity class, have their peak in 2001. At the same time, in 2003-2007 there is a slight increase, followed by a more rapid one. Between 2008 and 2009, there is a significant drop. In 2010, the trend breaks, with growth in 2010 and 2011.

Referring to these data, we can argue that there is a relatively rapid recovery in the value of imports of ores and concentrates in Bulgaria after the 2008 crisis. The volume of imports in value terms is record high in 2013, and consistently declining in the years after that.

When reporting imported quantities, the average annual unit price is obtained (Figure 24).

Figure 24

Average annual price of lead ores and concentrates of import of Bulgaria (EUR/kg)



Source: Constructed by the authors using NSI data, 2017.

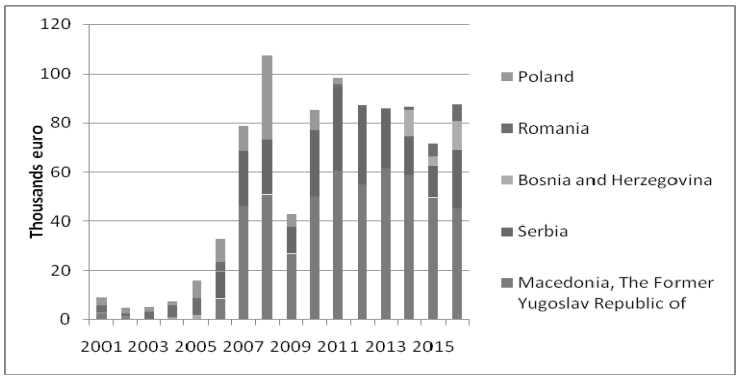
Figure 24 shows that the unit import price of lead ores and concentrates has a steady upward trend, with small fluctuations over the years.

The geographical distribution of the deals also has a significant impact on the state and dynamics of imports of lead ores and concentrates.

Figure 25 presents the distribution of deals with lead ores and concentrates by partner countries over the studied period. At the beginning of the period, main trading partners are Greece, Poland, Romania. Gradually they change and at the end of the period, such are Macedonia, Serbia, Bosnia and Herzegovina.

Figure 25

Foreign trade partners of Bulgaria in the import of "Lead ores and concentrates" in 2000-2016 (thousand EUR)

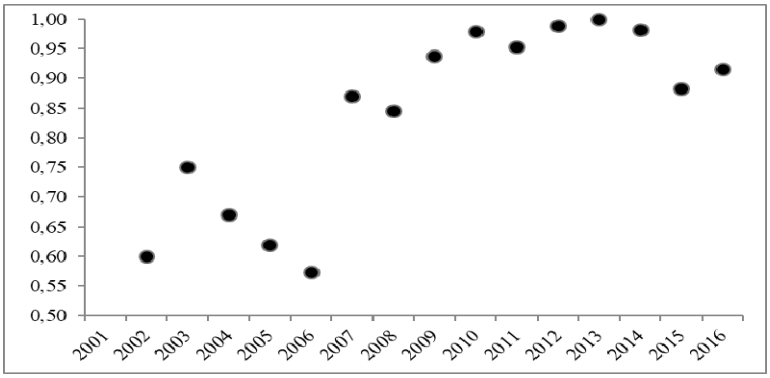


Source: Constructed by the authors using NSI data, 2017.

For determining the concentration of the import of "Lead ores and concentrates", Geographic Concentration rate is calculated, presented on Figure 26.

Figure 26

Values of Geographic Concentration rate of import of "Lead ores and concentrates"



Source: Constructed by the authors using NSI data, 2017.

It is evident that in the different years the rate ranges from 0.55 to 1. Average in the period it is 0.82, which shows a quite high level of concentration. In 2009-2016, the values are significantly higher, and in the period 2002-2006, they are lower.

According to the obtained value of the Geographic Sustainability rate (GSr = 0.71), there is a sustainable geographic structure, characterized by stability of the foreign trade connections.

4.4. Import of "Iron ores and concentrates"

Imports of "Iron ores and concentrates" represent about 4% on average of the total imports of ores and concentrates in Bulgaria. Imports during the period 2000-2016 are shown graphically on Figure 27.

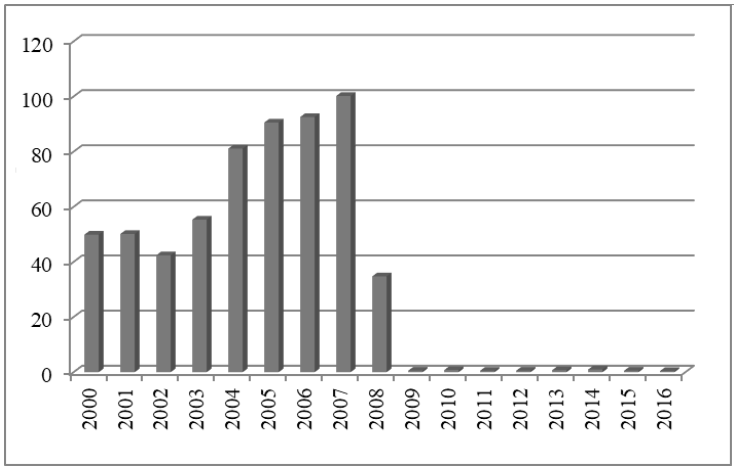
It is noteworthy that the import of iron ores and concentrates has practically faded after 2008. By time, it coincided with the closure of the largest metallurgical plant in Bulgaria, which in recent years has operated mainly with imported iron rods. At the same time, the highest value is recorded in 2007, when imports in value terms reach almost 100 million EUR. Since 2009, the values are minimal.

When reporting imported quantities, the average annual unit price is obtained (Figure 28).

The cost per kilogram of imported iron ores and concentrates shows a steady upward trend. Due to the episodic nature of the deals after 2008, it is not possible to analyze the unit price for this period.

Figure 27

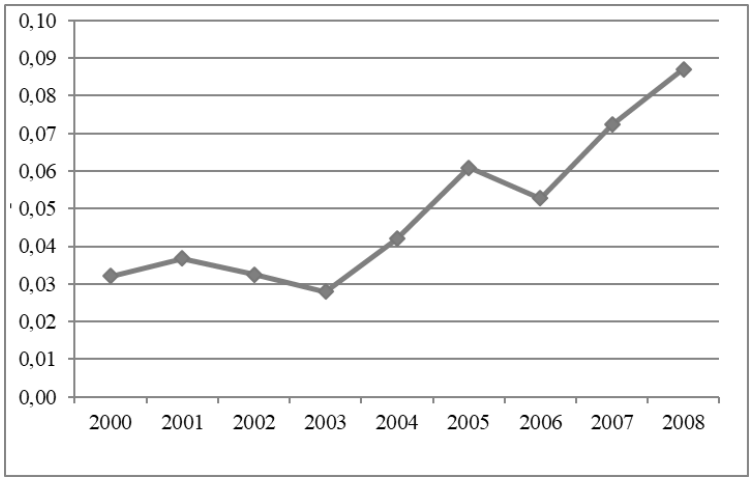
Imports of "Iron ores and concentrates" in 2000-2016 (million EUR)



Source: Constructed by the authors using NSI data, 2017.

Figure 28

Average annual price of iron ores in the import of Bulgaria (EUR/kg)



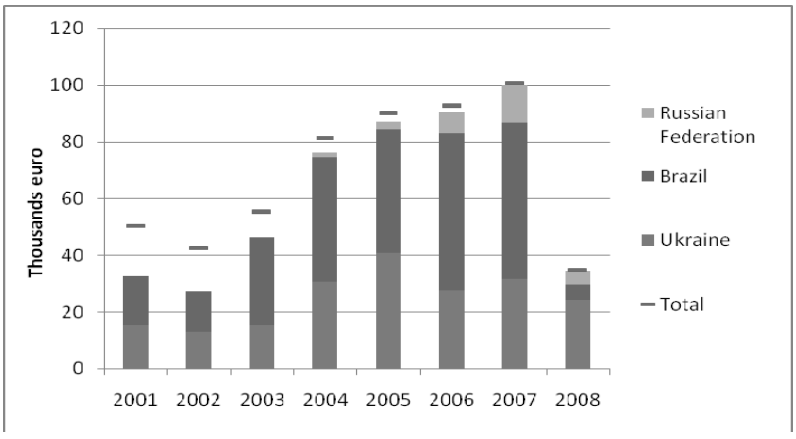
Source: Constructed by the authors using NSI data, 2017.

The geographical distribution of the deals has also a significant impact on the dynamics of imports of iron ores and concentrates.

Figure 29 presents the distribution of deals with iron ores and concentrates by partner countries during the studied period. The data show that Brazil and Ukraine are the main trading partners. After 2004, there are deals with the Russian Federation.

Figure 29

Foreign trade partners of Bulgaria in the import of "Iron ores and concentrates" in 2000-2009 (thousand EUR)

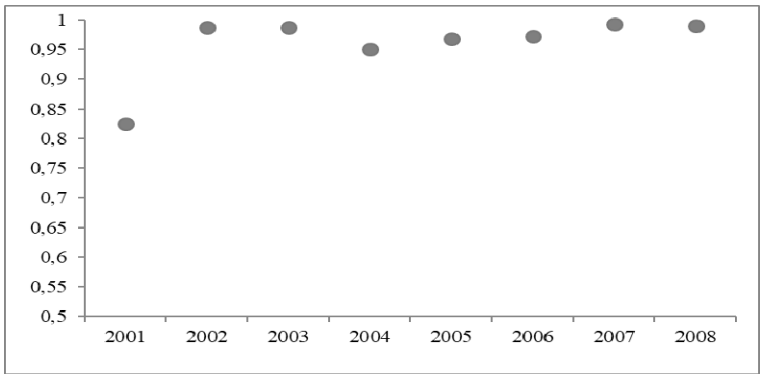


Source: Constructed by the authors using NSI data, 2017.

The Geographic Concentration rate is calculated for determining the concentration in the import of "Iron ores and concentrates" (Figure 30). It shows variations ranging from 0.55 to 0.95 in the different years. These values are very high and indicate a high level of concentration and low degree of diversification.

Figure 30

Values of Geographic Concentration rate of imports of "Iron ores and concentrates"



Source: Authors' calculations.

It is clear that the values of the rate for each year are close to 1, with the exception of 2001. This shows a very high concentration of deals in the import of "Iron ores and concentrates", the list of foreign trade partners being limited to very few countries. Its average value for the entire period is very high (0.96), indicating persistently high concentration.

On the other hand, the degree of sustainability in partner countries is estimated by the specific Geographic Sustainability rate, with a value for the period of 0.88, i.e. a strongly sustainable geographic structure is formed.

Conclusion

The two new proposed rates – *Geographic Concentration rate* and *Geographic Sustainability rate of exports/imports* – allow the geographic structure to be determined and its leading characteristics to be specified. The rates have an analytical and cognitive value and are applicable both to a particular commodity class and to a certain country's foreign trade. They provide adequate results that can be used for foreign trade and economic analyses to track the geographic direction of deals and relations.

The obtained values of the rates of the export of "Ores and concentrates" suggest that during the period 2000-2016, there is a highly concentrated (copper and lead ores and concentrates) and concentrated geographic structure (precious-metal ores and concentrates). This shows serious dependence on a few partner countries, increasing risks and limiting export prospects. At the same time, on the average, there are rather balanced or sustainable

geographic structures for the period, which indicates a lack of serious dynamics in the foreign trade partnerships of Bulgaria.

The values obtained in the import of ores give grounds to assert that in the same period there is a very high concentration with significant sustainability to the geographic structure. Similar to exports, there is a serious dependence on few partner countries, indicating a rather unfavourable foreign trade situation. There is also no serious change regarding the foreign trade partners of Bulgaria.

In comparison, the average concentration and sustainability of the geographic structure is higher for imports than exports. In this sense, one of the main directions for future development of the country's foreign trade with ores should be in limiting the concentration in the geographic direction of the deals and achieving greater diversification.

In the conditions of global and regional trends and prospects, the importance of the mining industry has continued to strengthen over the last 16 years. Today's global economic development imposes an ever more pressing need to use more, diverse and higher quality raw materials and energy. Globalization, internationalization and economic integration do not allow us to stay away from dynamic and complex processes. In the context of increasing foreign trade and the significant openness of the national economy to a globalizing global economy, it is necessary to maintain and expand foreign trade relations. Active participation in international trade is one of the real opportunities for rapid development of strategic sectors, especially export-oriented ones. As a component of GDP, exports contribute to economic growth. In this sense, export-oriented development is one of the opportunities for increased economic progress.

The mining industry also contributes to the country's total exports. The output of mining enterprises is largely made for highly competitive international markets where it finds a good realization. That is why the expansion of exports of ores and concentrates is an alternative path for development in the context of a severe decline in commodity prices in the last four years. According to World Bank forecasts, their demand and consumption are expected to shrink both nationally and globally, along with a worsening international market situation. Based on this statement, the export of concentrates is a real opportunity to earn extra revenues and realize economic benefits. On the other hand, this is a possible direction of the business development of companies and investors in the industry. The full use of the potential of foreign markets, in the context of increased raw materials needs, is a way to boost them and achieve even better financial and economic results at a micro level. Also, the priority development of the sector would help to increase the economic well-being of certain regions and boost the associated industries and therefore the overall economic development.

References

Ali, R., Alwang, J., Siegel, P. B. (1991). Is Export Diversification the Best Way to Achieve Export Growth and Stability? A Look at Three African Countries. – Policy, Research, and External Affairs working papers. N: WPS 729. Agriculture operations. Washington, DC: World Bank,

http://documents.worldbank.org/curated/en/635281468774612514/Is-export-diversification-the-best-way-to-achieve-export-growth-and-stability-A-look-at-three-African-countries.

Bulgarian Association of Metallurgical Industry. (2012). Information on the State of the Metallurgical Industry in Bulgaria (in Bulgarian). *[Българска асоциация на металургичната индустрия. (2012). Информация относно състоянието на металургичната индустрия в Р България]*.

Bulgarian Chamber of Mining and Geology. (2014). Revival of the Mining and Quarrying Industry (in Bulgarian). *[Българска минно-геоложка камара. (2014). Възраждане на минно-добивната промишленост]*.

Bulgarian Chamber of Mining and Geology. (2015). Annual Bulletin for 2015, Mineral and Raw Materials Industry in Bulgaria in 2014 (in Bulgarian). *[Българска минно-геоложка камара. (2015). Годишен бюлетин за 2015 г., Минерално-суровинната индустрия в България през 2014 г.]*.

Cadot, O., Carrere, C., Strauss-Khan, V. (2011). Export Diversification: What's behind the Hump?. – The Review of Economics and Statistics, Vol. 93, N 2, pp. 590-605.

Dai, J. (2013). Efficient Geographical Diversification of Export Trade: The Case Study of China. – In: Bian, F., Xie, Y., Cui, X., Zeng, Y. (eds.). Geo-Informatics in Resource Management and Sustainable Ecosystem. Communications in Computer and Information Science, Vol. 399. Springer, Berlin, Heidelberg.

Davis, G. (2010). Trade in Mineral Resurces. World Trade Organization, Economic Research and Statistics Division, Geneva, Switzerland.

Davis, G. A. (1998). The Minerals Sector, Sectoral Analysis and Economic Development. – Resources Policy, 24 (4), pp. 217-228.

Executive Agency for the Promotion of Small and Medium-Sized Enterprises. (2012). Export Structure by Sections and Chapters of Customs Statistics (in Bulgarian). *[Изпълнителна агенция за насърчаване на малките и средните предприятия. (2012). Структура на износа по раздели и глави на Митническата статистика]*.

Hummels, D., Skiba, A. (2004). Shipping the Good Apples out? An Empirical Confirmation of the Alchian-Allen Conjecture. – Journal of Political Economy, 112 (6), pp. 1384-1402.

Iliev, Dr. (2011). International Market Diversification. – Business World, N 112 (in Bulgarian). [Илиев, Др. (2011). Международна пазарна диверсификация. – Стопански свят, N 112].

Iliev, Iv. (2010). The Open Economy in the International Relations System. Varna (in Bulgarian). *[Илиев, Ив. (2010). Отворената икономика в системата на международните отношения. Варна]*.

Ilieva, D., Iliev, D. (2014). Regional and Global Aspects of the EU's External Trade. – Scientific Papers of the University of Rousse, p. 53, p. 14-19. [Илиева, Д., Илиев, Д. (2014). Регионални и глобални аспекти на външнотърговската обвързаност на ЕС. – Научни трудове на Русенския университет, т. 53, с. 14-19]

Kelly, W. (1981). A Generalized Interpretation of the Herfindahl Index. – Southern Economic Journal, 48(1), pp. 50-57.

Kemp, M. C., Ngo Van Long. (1984). The Role of Natural Resources in Trade Models. – In: Jones, R. W., Kenen, P. B. (eds.). Handbook of International Economics, Vol. I, Amsterdam, North-Holland, pp. 367-417.

Kenen, P. B. (1965), Nature, Capital, and Trade. – Journal of Political Economy, 73 (5), p. 437-460.

Marinov, E. (2015). Foreign Trade Relations between the European Union and Regional Integration Communities in Africa. Individual Research Project, Economic Research Institute at BAS (in Bulgarian). *[Маринов, Е. (2015). Външнотърговски отношения между Европейския съюз и регионалните интеграционни общности в Африка. Индивидуален изследователски проект, Институт за икономически изследвания при БАН]*.

Marinov, E. (2017). Foreign Trade Relations of Bulgaria. – In: Bulgarian Economy Ten Years in the European Union, Sofia, pp. 196-212 (in Bulgarian). *[Маринов, Е. (2017).*

Външнотърговските отношения на България. – В: Българската икономика десет години в Европейския съюз, София, с. 196-212].

Ministry of Economy, Energy and Tourism. (2012). National Strategy for Mining Development (Mineral and Raw Materials Industry) (in Bulgarian). *[Министерство на икономиката, енергетиката и туризма. (2012). Национална стратегия за развитие на минната (минерално-суровинната индустрия)]*.

Mitev, V. (2009). Analysis of the Non-Ferrous Metals Market and Prospects for the Development of Their Production in the Republic of Bulgaria. – Yearbook of UMG, 52, N 4, pp. 67-71 (in Bulgarian). *[Митев, В. (2009). Анализ на пазара на цветни метали и перспективи в развитието на добива им в Р България. – Год. на МГУ, 52, N 4, с. 67-71]*.

Mitev, V. (2009). Prices of Non-Ferrous Metals in the Global Economic Crisis. – Mining and Geology, N 6-7, pp. 42-44 (in Bulgarian). *[Митев, В. (2009). Цените на цветните метали в условията на световната икономическа криза. – Минно дело и геология, N 6-7, с. 42-44]*.

Mitev, V. (2015). Bulgarian Mining Industry in 2014 – Prospects, Expectations and Forecasts. – In: Yearbook of UMG "St. Yves. Rilski", Vol. 58, IV / 2015, Humanities and Business Sciences (in Bulgarian). *[Митев, В. (2015). Българската минна индустрия през 2014 г. – перспективи, очаквания и прогнози. – В: Годишник на МГУ "Св. Ив. Рилски", т. 58, Св. IV/2015, Хуманитарни и стопански науки]*.

Mitev, V., Trifonova, B., Galabova, B. (2017). Labor Productivity in the Mining Industry – Trends and Prospects. – Mining and Geology, N 8-9, pp. 54-58 (in Bulgarian). *[Митев, В., Трифонова, Б., Гълъбова, Б. (2017). Производителност на труда в минната индустрия – тенденции и перспективи. – Минно дело и геология, N 8-9, с. 54-58]*.

Panusheff, E. (2017). The Foreign Economic Orientation of Bulgaria. – In: Bulgarian Economy Ten Years in the European Union, Sofia, pp. 213-220 (in Bulgarian). *[Панушев, Е. (2017). Външноикономическата ориентация на България. – В: Българската икономика десет години в Европейскиясъюз, София, с. 213-220]*.

Rutherford, D. (1997). English-Bulgarian Training Dictionary on Economics. Publishing House "Prozorets" (in Bulgarian). *[Ръдърфорд, Д. (1997).* Английско-български учебен речник по икономика. ИК „Прозорец"].

Seyoum, B. (2009). Export-Import Theory, Practices and Procedures. 2nd edition, Routledge, New York and London.

Stoilova, E. (2008). The Industry is Increasingly Relying on Imported Raw Materials. – In: Extraction Industry. Econorms Require Large Investments. Sofia (in Bulgarian). *[Стоилова, Е. (2008). Браншът все повече разчита на вносни суровини. – В: Добивна индустрия. Економите изискват големи инвестиции. София]*.

Stoykova, A., Naydenov, Al., Bozev, V. (2016). Statistical Survey of Structures, Structural Differences and Structural Dynamics of Main Macroeconomic Indicators (Gross Value Added and Number of Employees) of the EU Member States for the Period 2000-2014. Publishing House of UNWE (in Bulgarian). *[Стойкова, А., Найденов, Ал., Бозев, В. (2016). Статистическо сравнително изследване на структурите, структурните различия и структурната динамика на основни макроикономически показатели (Брутна добавена стойност и брой заети) на страните от Европейския съюз през периода 2000-2014 г. ИК УНСС]*.

Tassev, Al. (2011). Statistical Time Series of the Bulgaria's Foreign Trade of Goods, 1986-2006. Vol. 1, Academic Publishing House "Prof. Marin Drinov" (in Bulgarian). *[Тасев, Ал. (2011). Статистически времеви редове на външнотърговския стокообмен на България, 1986-2006 г. Том 1, Акад. издателство „Проф. Марин Дринов"]*.

Tassev, Al. (2012a). Foreign Trade and Foreign Markets of Bulgaria – History, Politics and Economics, 1986-2008. Academic Publishing House "Prof. Marin Drinov" (in Bulgarian).

[Тасев, Ал. (2012a). Външнотърговският стокообмен и външните пазари на България – история, политика и икономика, 1986-2008 г. Акад. изд. „Проф. М. Дринов"]

Tassev, Al. (2012b). Innovative Development of Bulgarian Exports (1986-2008). – Economic Studies, N 2 (in Bulgarian). *[Тасев, Ал. (2012b). Иновационно развитие на българските експортни производства (1986-2008 г.). – Икономически изследвания, N 2]*

Tilton, J. E. (1983). Comparative Advantage in Mining. – Working Paper 83-91, International Institute for Applied Systems Analysis, Laxenburg, Austria.

Velev, V. (1999). Economic and Ecological Problems of Extraction and Processing of Mineral Raw Materials in the Republic of Bulgaria. – Alternatives, N 21-22 (in Bulgarian). *[Велев, В. (1999). Икономически и екологични проблеми на добива и преработката на минерални суровини в Република България. – Алтернативи, N 21-22]*

Velev, V. (2011). Absorption of Mineral Resources in Bulgaria – Market Aspects. Sofia: Publishing House of UNWE (in Bulgarian). *[Велев, В. (2011). Усвояване на минералните ресурси в България – пазарни аспекти. София: ИК УНСС]*

Velev, V. (2014). The Potential of the Bulgarian Mining Industry and the Development of the Economy. – In: Second International Scientific and Practical Conference on Economics and Management "Sustainable Development of Business and Regions", Varna: Technical University (in Bulgarian). *[Велев, В. (2014). Потенциалът на българската минна индустрия и развитието на икономиката. – В: Втора международна научно-практическа конференция по икономика и мениджмънт „Устойчиво развитие на бизнеса и регионите", В.: ТУ]*

World Bank. Trade Indicators, https://wits.worldbank.org/wits/wits/witshelp/Content/Utilities/e1.trade_indicators.htm.

Zhelev, P. (2009). Export Specialization of Bulgaria in the Relations with the European Union (1999-2007). – Scientific Papers of UNWE, Vol. 1, N 1, pp. 229-278 (in Bulgarian). *[Желев, П. (2009). Експортна специализация на България в отношенията с Европейския съюз (1999-2007 г.). – Научни трудове на УНСС, т. 1, N 1, с. 229-278]*

Annex 1

List of positions from Section 26 – "Ores, slag and ash" of the combined nomenclature

26	CHAPTER 26 – ORES, SLAG AND ASH
2601	Iron ores and concentrates
2603	Copper ores and concentrates
2604	Nickel ores and concentrates
2605	Cobalt ores and concentrates
2606	Aluminium ores and concentrates
2607	Lead ores and concentrates
2608	Zinc ores and concentrates
2609	Tin ores and concentrates
2610	Chromium ores and concentrates
2611	Tungsten ores and concentrates
2612	Uranium or thorium ores and concentrates
2613	Molybdenum ores and concentrates
2614	Titanium ores and concentrates
2615	Niobium, tantalum, vanadium or zirconium ores and concentrates
2616	Precious-metal ores and concentrates
2617	Other ores and concentrates

ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
ECONOMIC STUDIES

Volume 27 (1), 2018

Jan Zwolak[1]

SOLD COMMERCIAL PRODUCTION AND ITS FINANCIAL SECURITY IN POLISH AGRICULTURE

The hypothesis that sold commercial production was most elastic with respect to the Single Area Payment Scheme (SAPS) in Polish agriculture in 2011–2013 (1.074) has been confirmed.
This research was based on the Cobb-Douglas power model with one dependent variable, applied in order to identify the regression dependence for commercial production sold under the SAPS (direct payment) and for a separate payment for fruit, vegetables and sugar (indirect payment) in Polish agriculture in 2011–2013. The models were used to calculate marginal and average productivity as a measure of the effectiveness of financial security in the sector. The correlation of sold commercial production with direct/indirect payment(s) in terms of the financial security under discussion was also examined. It was determined that direct payments remain within the irrational management zone, while indirect payments are within the rational management zone.
JEL: G23, Q14, R51

Introduction

Contemporary finance is the generality of monetary/pecuniary phenomena in relation to economic and social activity, as well as those activities that constitute the financial management of specific entities. The ultimate objective of these phenomena and processes is to generate goods and services that satisfy people's needs. The financial dimension is what enables resources to be allocated in the economy. The connection of financial phenomena and processes with the real economy comprises the economic content of finance. Monetary relationships enable economic transactions of goods and services. Economic and accounting theory describes the regularities and correctness of financial operations.

The stimulatory function of financial phenomena can be positive or negative. Any evaluation of these relationships, however, is conditional upon the expectations of the actors and of the financial phenomena triggered by concrete financial instruments.

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After considering all the options of the European Union's Common Agricultural Policy (CAP) as far as 2020, it would appear that the financial situation of economic entities in the EU agricultural sector is going to deteriorate (cf. European Commission, *CAP Towards Impact Assessment*, 2011).

Polish agriculture has additional difficulties as a result of constantly having to adapt to an environment shaped by changing global competition. Delayed return on investment, long production periods, and limited or restricted mobility of production factors are all characteristic of the sector. Within the framework of a single market, the CAP alleviates these local constraints through Community preferences and financial solidarity. This is implemented via income redistribution instruments, the Single Area Payment (SAP) (direct payment), the separate (indirect payment) payment for fruit, vegetables and sugar, and a special (indirect) support. Since the CAP instruments remain unaltered, the development of a competitive agricultural sector remains mostly unchanged. As a result, the development of agriculture calls for increased risk. In turn, this entails a need to ensure financial security, and to improve its efficiency, in the Polish agricultural sector.

The present research is an attempt to identify the regressive dependence of commercial production sold under the SAPS and the separate fruit, vegetable and sugar payment in Poland in 2011–2013. Moreover, the focus is on determining the marginal and average productivity of these EU payments. These payments ensured the financial security of the sold commercial production in Polish agriculture in 2011-2013.

The underlying hypothesis claims that sold commercial production was most elastic with respect to the SAP for the years under examination. As a direct payment, the SAP, when viewed against the other payments, forms the basic financial security of sold commercial production in the agricultural sector.

The remainder of this article is divided into: a brief review of the reference literature (Section 2); an explanation of the methodology applied (Section 3); a description of the results of the research (Section 4); and initial conclusions (Section 5).

Literature Review

The most exhaustive of the many definitions of financial security designates a cash flow that suffices to cover debt payments (Dahiya et al., 2003). This is a variable category of financial threat (Platt and Platt, 2006).

The impact of the detached EU payments examined here on the financial security of farmers is not all that clear (Kropp and Katchova, 2011). Direct payments are a component of the agricultural safety net that stabilises incomes in the event of market adaptability problems (Hill, 2012). Families should be given a choice by maximising usability over time with the assistance of cash income and constrained technology. Only in the case of non-agricultural activities (financial security) can cash income over time and constrained technology be included in one complete constraint of income (Huffman, 2004).

Brealey and Myers (2003) maintain that the choice of capital structure is basically a marketing issue. In their view, an enterprise can issue dozens of varieties of security in any number of combinations. This leads to finding a particular combination being maximised by the market price. Weston and Brigham (1992) claim that the chief optimum structure of large portions of enterprises maximises the market price. In this way, the value of an enterprise (goodwill) is maximised, or its total capital costs reduced (Abor, 2005).

Research conducted by Cameron and Chamala (2004) concludes that there is a high degree of correlation between those farm managers ready to extend the schemes toward building change and those who want to meet targets. This indicates that change is consonant with business objectives. The low uptake of the innovations that agricultural systems need to develop might be justifiable in certain cases. However, a different approach is essential if we are to do better in future or simply the next time. Innovative solutions must therefore be applied at an early stage of development to formulate expert intelligent systems (Lynch et al., 2004). Innovative stimuli are stronger for the endogenous than the exogenous effects of economic activity. These effects strengthen innovative quantitative competition rather than price competition (Gersbach and Schmutzler, 2003). In Gallacher's (2001) view, agricultural education shortens the time that allocation selection options take to adapt. In the longer term, development coexists with short-term security and investment. Coordinating these elements brings about major changes in making these systems more efficient and integrating them with the local landscape (Frost, 2004).

Cook (1995) holds that industrialising agriculture incorporates farmers into an agency whole (cooperatives). Adapting new technologies, in turn, increases resource allocation and disposable income, and also income inequality (Yifu, 1999). An optimal policy contains costs and transfers their bond to the limits of production or acreage (farming area), so that they appear more expensive for the high incomes of farmers (Innes, 2003). No agricultural producer would ever pass up an opportunity to cut costs without reducing returns (Chambers and Quiggin, 2004). Therefore, production has not only to be tailored for calculations, but also reality. Similarly, the most important types of material outlays should be adapted (Vanecek and Kalab, 2003). Improving the quality of agricultural produce, while making it comparatively cheaper, encourages market allocation of processed food and shifts the limits of these trends (Morrison and MacDonald, 2003). This results from the fact that the relationship between research development and innovation are comprehensive and non-linear; new goods, services, and higher-quality final products are created, along with production processes (Guellec and van Pottelsberghe de la Potterie, 2001/II). Marking products forms "justice brands". This makes customers tend to pay more relative to the mean cost of production per unit of time (DiPietre, 2000). Consequently, when built on the interaction of agricultural and technical progress, technological development stabilises the relative variability of production volume over the longer term (Vizvari and Bacsf, 2002).

Agriculture binds rural and farming areas, and focuses rural communities on increasing incomes across generations, increasing resources with implications for the landscape, and rural activities associated with cultivating crops (Cannarella, 2002). These issues expand the structural levels at which a societal family is built, the special regional features that are developed, and the farms that are extended and/or redeveloped, with family members taking their own subjective actions (Vasa, 2002). The flywheel for economic growth is not

some extra benefits ensuing from technological changes, but rather a continuous process of providing opportunities and potential for technological development in the future (Carlaw and Lipsey, 2003). For its part, industrialisation enables greater diversity among foodstuffs and leads to: more clearly coordinated production and marketing channels, such as contracts; extended use by farmers; and enlarged farms (MacDonald et al., 2004). Barry Eichengreen sees no reason why Europe should not be able to overcome the problems of differences in output per capita and per time unit (Aiginger, 2004).

The risk incorporated in the relevant standard models (with their established inputs and other constraints, imperfect capital markets, and financial management with the potential for bankruptcy) renders the resolution of these effects empirically difficult, if not impossible, with the data currently available unless artificial data are imposed and the construction of timeless priorities included (Just and Pope, 2003). The attempt to prove that there is a constrained efficiency (partial) risk that differentiates the model from the imposed constraints indicates that in this day and age of public safety and security networks, spontaneous shocks may be less indemnified (Dercon and Krishnan, 2003).

Research Methodology

The development and growth of agriculture is based on the relationship between the profitability of individual farming economic units, on the one hand, and their liquidity and solvency (financial security), on the other. While a synthetic evaluation of profitability is plausible, liquidity and solvency offer no clear definition of safe limits for the range of incomings and outgoings (cumulative cash flow) for an economic unit in the farming sector. The revenue on sold commercial production in agriculture would therefore seem legitimate as a synthetic category subject to market valuation. It was therefore used as the dependent variable for productive activity in the sector.

It should be stressed that using agricultural income as a dependent variable has proved somewhat difficult since CAP subsidies directly increase farmers' incomes. In some economic units in Polish agriculture, the share of these subsidies is as high as 70%.

It would appear that aggregations of agricultural economic units in particular voivodeships (administrative regions) of the country may be characterised by proportional development opportunities (Brant, 1990). However, proportion financial contributions do not guarantee the continuation or development of agricultural economic activity.

An examination of the sector's financial macroeconometrics is especially interesting in this situation. Econometric verification extends to identifying changes in the level and rate of commercial production resulting from the SAP, the separate fruit, vegetable and sugar payment, and the special support provided under the market conditions of the sector's activity in 2011–2013.

Variables such as sold commercial production, the SAP, the separate fruit, vegetable and sugar payment, and special support are discrete random variables. They additionally form a finite collectivity (encompassing the whole of Poland) and express regression curves. These

curves map the dependencies between features, i.e. the way(s) of associating the values of the features of two aggregates.

The Polish inflation rate gradually decreased during the period in question – and this disinflation led to a deflation. This enables the sets (N=48) of individual variables contained in all the Polish voivodeships in 2011-2013 to be examined.

The empirical variables used in the Cobb-Douglas model were selected using a matrix of logarithm correlation coefficients. The criteria for selecting variables for the model was a strong correlation between the independent variable(s) and the dependent variable, and a weak correlation between the independent variables. The numerical calculations were made using the SPSS program.

Results and Discussion

The financial security network of the Polish agricultural sector consists of a complex system of direct and indirect financial security whose components are direct payments, e.g. the SAP, which is linked to production decisions based on market demand. Direct payments should stabilise the farmer's income in the event of sudden changes in the market situation or natural disasters. Indirect financial security is provided by separate payments for fruit, vegetables and sugar, and by a special support. Indirect financial security influences market orientation. The EU payments mentioned above are detached and constitute internal and external agricultural financial security.

The linear (Pearson) correlation between commercial production sold (Y3) and SAP (x1) is 0.906; for the separate fruit, vegetable and sugar payment (x2), the rate is 0.567; for the special support (x3), 0.030, the reciprocal relevance being 0.01. The sum of the features of the variables (x2 and x3) comes to 0.416, which does not increase the correlation with Y3 all that much. The relevant reciprocal correlation is 0.01. The Pearson correlation coefficients (r) specified above show that sold commercial production is not correlated with special support (0.030), and that the sum of the features of the indirect security variables (x2 and x3) does not significantly increase the correlation (0.416). The lack of correlation between sold commercial production and special support eliminates the latter from the regression model. This situation regarding reciprocal correlation necessitates the use of single-factor regression, albeit without the special support variable (x3) whose parameter is in any case statistically irrelevant (>0.05). These determinations of the strength of the linear correlations of the features are presented in Table 1.

Table 1 shows that the range of commercial production sold (Y3) exhibits a limited variation between voivodeships and from year to year. A comparison of the internal variability of the variables shows that the feature varies indirectly with the distribution of the commercial production sold in 2011-2013. The feature exhibited the greatest internal variation with distribution in the case of the SAP for the period under study. This means that the SAP exhibits the greatest deviation from the mean. This indicates that this variable plays the most important role in the variability of commercial production sold in the Polish agricultural sector for the period under study. It is almost twice the internal variation of the

feature in the distribution of the separate fruit, vegetable and sugar payment. This shows that this latter variable plays a significantly diminished role in the variation of sold commercial production in the agriculture in the years under study. The feature varies with the distribution of SAP almost three times more than with the distribution of special support in the sector. This shows that this latter variable plays an insignificant role in the variation of commercial agricultural production sold. The curvilinear regression dependence of the variables specified above, which constitute financial security in agriculture, is shown in Table 2.

Table 1

Parameters of the features of variables in voivodeships in the Polish agricultural sector, 2011-2013.

No.	Specification	Years	Measure unit	Symbol	Arithmetic average	Range, min.–max.	Coefficient of variation (%)
1.	Commercial production sold	2011–2013	PLN mln.	Y3	4,566.2	1,442.4–13,415.9	141.4
2.	Single Area Payment	2011–2013	PLN mln.	x1	581.1	185.8–1,361.8	191.3
3.	Separate fruit, vegetable and sugar payment	2011–2013	PLN mln.	x2	41.1	4.5–134.7	107.0
4.	Special support	2011–2013	PLN mln.	x3	15.5	1.0–135.0	67.7

Source: Rocznik statystyczny rolnictwa [The Statistical Yearbook of Agriculture], Central Statistical Office, Warsaw, 2012, 2013, 2014; Author's own calculations.

Table 2

Power regression of sold commercial production (Y3) vs. SAP (x1) and separate fruit, vegetable and sugar payment (x2) in Polish agriculture in 2011–2013.

a*	Regression coefficient		Standard error			T-test			As adjusted, R^2
	x1	x2	a	x1	x2	a	x1	x2	
4.641	1.074		0.462	0.074		3.3	14.6		0.82
1256.387		0.337	0.246		0.072	29.0		4.7	0.31

Source: Author's own calculations.
a* – de-logarithmized intercept.
The significance of all the regression coefficients is 0.00.

The data in Table 2 identify the regression dependence of sold commercial production (Y3), separately from the SAP (x1) and the separate fruit, vegetable and sugar payment (x2) in Polish agriculture in 2011–2013. The variables x1 and x2 explain the variability of sold commercial production in the 31%–82% range. The strength of the association, expressed as the correlation coefficient (R), between commercial production sold and the SAP and separate fruit, vegetable and sugar payments, is measured by the positive square root, R^2, which is in the range of 55.68%–90.55%. However, as correlation does not imply

causation, the regression dependencies were examined. The standard errors for the regression coefficients (parameters) are less than 50% of their absolute values. The absolute values of the t-test are several times higher than the regression coefficient values, and the significance of all the regression coefficients is 0.00.

These statistical evaluations of the regression coefficients (parameters) justify their use in the econometric analysis of the variability of sold commercial production vs. the SAP and the separate fruit, vegetable and sugar payment (financial security) in Polish agriculture in 2011–2013.

The regression coefficients, and the function parameters at x1 and x2, determine elasticity and are therefore the coefficients of elasticity of the commercial production sold relative to the SAP (x1) and separate fruit, vegetable and sugar payment (x2) (financial security) in agriculture. Solow's (1956) explanation is that these measure the elasticity of Y3 with respect to x1 and x2. According to J. B. Clark's marginal theory of distribution, they are the portions of the SAP (x1) and the separate fruit, vegetable and sugar payment (x2) in the sold commercial production in Polish agriculture in 2011–2013. The elasticity coefficient additionally expresses the relations between the relative change in sold commercial production and the relative change in the fund (payment) that causes it.

Sold commercial production (Table 2) is most elastic with respect to SAP in Polish agriculture in 2011–2013 (1.074). This regressive dependence is curvilinear and more than proportional. A 10% increase in the SAP, with no changes in the other funds, produced an increase of 10.74% in sold commercial production in 2011–2013. The elasticity of sold commercial production with respect to the separate fruit, vegetable and sugar payment in Polish agriculture in 2011–2013 was less than a third of that (0.337). This dependence is curvilinear and less than proportional. An increase of 10% in the separate fruit, vegetable and sugar payment, with no changes in the other funds, produced a 3.37% increase in sold commercial production in 2011–2013. This, however, is shaped by the agricultural environment (Rostásová and Chrenková, 2010). The EU payments specified above stimulate the multiplier effects in agriculture, in addition to providing financial security. The highest multiplier effects can be expected to appear with those outlays that diminish the costs of sold commercial production, thereby mobilising agricultural productivity.

With the assistance of J. B. Clark's marginal distribution theory, the structure of financial security in agriculture can be determined from the share of the SAP and the separate fruit, vegetable and sugar payment. The average sold commercial production is 76.12% shaped by the SAP and 23.88% by the latter payment. These determinations imply that the financial security of the average sold commercial production in the agricultural sector was more than 75% influenced by the SAP, and less than 25% by the separate fruit, vegetable and sugar payment in 2011–2013.

With the assistance of the theory of finance, on the other hand, a causal interpretation of financial phenomena and processes can be attempted in order to determine regressive links and dependencies. Sold commercial production in Polish agriculture in 2011-2013 should therefore be fixed within the range of variation of the SAP and the separate fruit, vegetable and sugar payment. This will enable the marginal and average productivity of financial security in agriculture to be determined. These are shown in Table 3.

The data shown in Table 3 imply that when SAP increases, its marginal productivity increases and exceeds average productivity, which increases more slowly, whereas sold commercial production grows at an accelerating rate. These dependencies held in the initial irrational management zone in agriculture in 2011–2013. The increasing SAP is justified as $E_y > 1$, and increasing this payment increases its marginal increments. This implies that increasing the SAP in the above zone is justified.

Table 3

Marginal and average productivity of the Single Area Payment (SAP) in Polish agriculture, 2011-2013

Commercial production sold (Y3), PLN mln.	SAP (x1), PLN mln.	Productivity:	
		Average PLN mln./PLN mln.	Marginal PLN mln./PLN mln.
7,849.6	315.8	24.9	26.7
11,367.2	445.8	25.5	27.4
14,962.6	575.8	26.0	27.9
18,619.2	705.8	26.4	28.3
22,326.2	835.8	26.7	28.7
26,076.2	965.8	27.0	29.0
29,864.0	1,095.8	27.3	29.3
33,685.2	1,225.8	27.5	29.5
37,536.6	1,355.8	27.7	29.7

Source: Tables 1 & 2 (above); Author's own calculations.

The causal dependencies related to the separate fruit, vegetable and sugar payment are shown in Table 4.

Table 4

Marginal and average productivity of the separate fruit, vegetable and sugar payment in Polish agriculture in 2011-2013

Commercial production sold (Y3), PLN mln.	Separate fruit/vegetable and sugar payment (x2), PLN mln.	Productivity:	
		Average PLN mln./PLN mln.	Marginal PLN mln./PLN mln.
3,125,832.8	18.5	168,963.9	56,940.8
3,779,493.2	32.5	116,292.1	39,190.4
4,264,425.4	46.5	91,708.1	30,905.6
4,659,941.2	60.5	77,023.8	25,957.0
4,998,567.2	74.5	67,094.9	22,611.0
5,297,229.1	88.5	59,855.7	20,171.4
5,565,995.1	102.5	54,302.4	18,299.9
5,811,399.2	116.5	49,883.3	16,810.7
6,037,951.5	130.5	46,267.8	15,592.3

Source: Tables 1 & 2 (above); Author's own calculations.

The data in Table 4 show that as the separate fruit, vegetable and sugar payment increases, its marginal productivity decreases, causing a decrease in mean productivity, albeit at a slower rate, while the sold commercial production increases. These dependencies hold in

the rational management zone. In this zone, the elasticity of sold commercial production, relative to the separate fruit, vegetable and sugar payment (x2), was greater than zero and less than one, i.e. $0 < E_y < 1.0$, in Polish agriculture in 2011–2013. The growth rates within the range of the individual variables are shown in Table 5 below.

Table 5

Average growth rates, within the range of variability of commercial production sold (Y3), SAP (x1), separate payment (x2), and marginal/average payment in the agricultural sector (in percent terms).

Specification	%, Table 3	%, Table 4
Commercial production sold	21.60	8.57
SAP (x1)	19.97	
Separate fruit, vegetable and sugar payment (x2)		27.66
Productivity:		
– marginal	1.36	–14.95
– average	1.36	–14.95

Source: Author's own calculations (using the geometric average).

The data in Table 5 show that the aggregate mean rate of sold commercial production (30.17%) was guaranteed by the average rate of increase in SAP (19.97%) and the separate fruit, vegetable and sugar payment (27.66%), with an identical growth rate of marginal and average SAP productivity (1.36%) and an identical negative growth rate of marginal and average productivity of the separate fruit, vegetable and sugar payment in the Polish agricultural sector in 2011–2013.

Conclusion

This study confirms the hypothesis that sold commercial production was most elastic with respect to the Single Area Payment applied in Polish agriculture in 2011–2013 (1.074). This direct EU payment substantially stabilised the relative level of commercial production sold in the sector. These processes occurred within the initial irrational management zone, while the separate fruit, vegetable and sugar payment (indirect payment) occurred within the rational management zone. The aggregate average growth rate of commercial production sold (30.17%) was ensured by the average rate of increase in direct (20%) and indirect (28%) payments. This indicates that EU payments were effective in ensuring financial security in the Polish agricultural sector in 2011–2013.

The aggregated features of the variables of the EU's separate fruit, vegetable and sugar payment and special support (indirect payments) (x2 and x3) only slightly increased their correlation with the commercial production sold (Y3), $r = 0.427$. The special support itself (x3) was not correlated with Y3; its parameter was not statistically relevant, which makes it impossible to determine the impact of special support on the relative increase in the sold commercial production in Polish agriculture in 2011–2013.

References

Abor, J., 2005. The effect of capital structure on profitability: an empirical analysis of listed firms in Ghana. *The Journal of Risk Finance*, vol. 6, no. 5, pp. 438-445. DOI: 10.1108/15265940510633505.

Aiginger, K., 2004. Introduction to the Special Issue: Economic Agenda for the Twenty-first Century. *Review of International Economics*, vol. 12, no. 2, pp. 175-177. DOI: 10.1111/j.1467-9396.2004.00440.x.

Brant, R., 1990. Assessing proportionality in the proportional odds model for ordinal logistic regression. *Biometrics.* Vol. 46, no. 4, pp. 1171-1178. [Online] Available at: https://www.ncbi.nlm.nih.gov/pubmed/2085632 [Accessed December 2016].

Brealey, R. A., Myers, S. C., 2003. *Principles of Corporate Finance*, International Edition, 7th ed, McGraw-Hill, Boston, MA.

Cameron, D., Chamala, S. A., 2004. Measuring impacts of a holistic farm business management training program. *Australian Journal of Experimental Agriculture* vol. 44**,** pp. 531-538. [Online] Available at: http://dx.doi.org/10.1071/EA02058 [Accessed December 2016].

Cannarella, C., 2002. Processes of marginalization of agriculture: the role of non-agricultural sectors to support economic and social growth in rural areas. *Journal of Central European Agriculture*, vol. 3, no. 3, pp. 205-216. [Online] Available at: http://dx.doi.org/10.5513/jcea.v3i3.131 [Accessed December 2016].

Carlaw, K. I., Lipsey, R. G., 2003. Productivity, Technology and Economic Growth: What is the Relationship? Megeformatinet. *Journal of Economic Surveys*, vol. 17, no. 3, pp. 457-495. DOI: 10.1111/1467-6419.00201.

Chambers, R. G., Quiggin, J., 2004. Technological and financial approaches to risk management in agriculture: an integrated approach. *Australian Journal of Agricultural and Resource Economics,* vol. 48, no. 2, pp. 199-223. [Online] Available at: http://dx.doi.org/10.1111/j.1467-8489.2004.00250.x [Accessed December 2016].

Cook, M. L., 1995. The Future of U.S. Agricultural Cooperatives: A Neo-Institutional Approach. *American Journal of Agricultural Economics*, vol. 77, no. 5, pp. 1153-1159. DOI: 10.2307/1243338.

Dahiya, S., Saunders, A., Srinivasan, A., 2003. Financial distress and bank lending relationships. *Journal of Finance*, vol. 58, no. 1, pp. 375-399. *DOI:* 10.1111/1540-6261.00528

Dercon, S., Krishnan, P., 2003. Risk Sharing and Public Transfers. *Economic Journal*, vol. 113, no. 486, pp. C86-C94. DOI: 10.1111/1468-0297.00116.

DiPietre, D., 2000. Transforming Commodity Animal Agriculture: How Easy?. *AgBioForum*, vol. 3, no. (2-3), pp. 127-131. [Online] Available at: www.agbioforum.org/v3n23/v3n23a09-dipietre.htm [Accessed December 2016].

Frost, F. M., 2004. Value orientations: Impact and implications in the extension of complex farming systems. *Australian Journal of Experimental Agriculture*, vol. 40, no. 4, pp. 511-517. [Online] Available at: http://dx.doi.org/10.1071/EA99078 [Accessed December 2016].

Gallacher, M., 2001. Education as an Input in Agricultural Production:Argentina CEMA Working Papers: Serie Documentos de Trabajo, 189. [Online] Available at: http://www.ucema.edu.ar/publicaciones/download/documentos/189.pdf [Accessed December 2016].

Gersbach, H., Schmutzler, A., 2003. Endogenous technological spillovers: causes and consequences. *Journal of Economics and Management Strategy*, vol. 12*,* no. 2, pp. 179-205. DOI: 10.1111/j.1430-9134.2003.00179.x.

Guellec, D., van Pottelsberghe de la Potterie, B., 2001. R&D and productivity growth: panel data analysis of 16 OECD countries. *OECD Economic Studies*, vol. 33, pp. 103-126. [Online] Available at: https://www.oecd.org/eco/growth/1958639.pdf [Accessed December 2016].

Hill, B., 2012. *Understanding the Common Agricultural Policy*. Earthscan, Oxon.

Innes, R., 2003, Stop and Go Agricultural Policies with a Land Market. *American Journal of Agricultural Economics,* vol. 85, no. 1, pp. 198-215. DOI: 10.1111/1467-8276.00113.

Just, R. E., Pope, R. D., 2003. Agricultural risk analysis: adequacy of models, data, and issues. *American Journal of Agricultural Economics*, vol. 85, no. 5, pp. 1249-1256. DOI: 10.1111/j.0092-5853.2003.00538.x.

Kropp, J. D, Katchova, A. L., 2011. The effects of direct payments on liquidity and repayment capacity of beginning farmers. *Agricultural Finance Review*, vol. 71, no. 3, pp. 347-365. [Online] Available at: http://ageconsearch.umn.edu/bitstream/164516/2/Beginning Farmers and Direct Payments.pdf [Accessed December 2016].

Huffman, W. E., 2004. Discussion: Off-Farm Employment, Government Policy, and the Structure of Agriculture-An International Perspective. *American Journal of Agricultural Economics*, vol. 86, no. 3, pp. 737-739. DOI: 10.1111/j.0002-9092.2004.00616.x.

Lynch, T., Gregor, S., Midmore, D., 2004. Intelligent support systems in agriculture: How can we do better? *Australian Journal of Experimental Agriculture*, vol. 40, no. 4, pp. 609-620. DOI:10.1071/EA99082.

MacDonald, J. M., Ahearn, M. C., Banker, D., 2004. Organizational Economics in Agriculture Policy Analysis. American Journal of *Agricultural* Economics, vol. 86 no. 3, pp. 744-749. [Online] Available at: https://pubag.nal.usda.gov/pubag/download PDF.xhtml?id= 38650 &content =PDF [Accessed December 2016].

Morrison, P. C. J., MacDonald, J. M., 2003. Tracing the Effects of Agricultural Commodity Prices and Food Costs. *American Journal of Agricultural Economics*, vol. 85, no. 3, pp. 633-646. [Online] Available at: http://www.jstor.org/stable/1244988 [Accessed December 2016].

Platt, H. D., Platt, M., 2006. Company Financial Distress and Bankruptcy. *Review of Applied Economics*, vol. 2, no. 2, pp. 141-157. [Online] Available at: www.telford.ac.nz/Documents /Commerce /RAE/2006I/1-Harlan D Platt.pdf [Accessed December 2016].

Rostášová, M., Chrenková, A., 2010. Innovative potential of postal operators in logistics. *Logistyka*, vol. 2, p. 316. [Online] Available at: http://www.czasopismologistyka. pl/artykuly-naukowe/send/188-logistyka/834-artykul [Accessed December 2016].

Solow, R., 1956. A Contribution to the Theory of Economic Growth. Quarterly *Journal of Economics*, vol. 70, no. 1, pp. 65-94. [Online] Available at: http://piketty.pse.ens.fr/files/ Solow 1956.pdf [Accessed December 2016].

Weston, J. F., Brigham, E. F., 1992. *Essentials of managerial finance*. The Dryden Press, Hinsdale, IL. Furter reading.

Vanecek, D., Kalab, D., 2003. The material flow on agricultural farms. *Journal of Central European Agriculture,* vol. 4, no. 2, pp. 121-130. [Online] Available at: http://dx.doi.org/10.5513/jcea.v4i2.166 [Accessed December 2016].

Vasa, L., 2002. Behaviour patterns of farm-managing households after the restructuring of agriculture – a socio-economic analysis. *Journal of Central European Agriculture*, vol. 3, no. 4, pp. 313-320. [Online] Available at: http://dx.doi.org/10.5513/jcea.v3i4.143 [Accessed December 2016].

Vizvari, B., Bacsi, Z. S., 2002. Technological development and the stability of technology on crop production. *Journal of Central European Agriculture*, vol. 3, no. 1, pp. 63-72. [Online] Available at: http://dx.doi.org/10.5513/jcea.v3i1.115 [Accessed December 2016].

Yifu, J., 1999. Technological change and agricultural household income distribution: theory and evidence from China. *Australian Journal of Agricultural and Resource Economics*, vol. 43 no. 2, pp. 179-194. DOI: 10.1111/1467-8489.00075.

ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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ENSURING FINANCIAL SECURITY OF NON-GOVERNMENTAL PENSION FUNDS IN UKRAINE

The paper investigates the process of providing financial security of non-governmental pension funds by the example of Ukraine. The theoretical basis of the research contains a review of existing approaches including the governmental methodology of Ukraine in ensuring the financial security of the funds. By conducting diagnosis of financial security of non-governmental pension funds in Ukraine, as empirical results, a methodical approach to the evaluation was formed. It was offered four groups of indicators (yield and profitability; investment risks; solvency and liquidity; funds development) implementation of which will help to improve risk system management of the non-governmental pension funds and accomplish risk-based prudential supervision.
JEL: G20; G23; G28; G31; G32

1. Introduction

Conditions of environmental changes, which non-governmental pension funds (hereinafter – NPF) carry out activities in, increase funds vulnerability to domestic and external negative influences that can lead to failure of the financial interests of their members. To prevent this scenario, it becomes increasingly more important issues of NPF financial security.

The implementation of prudential supervision of NPFs presented in The concept of introducing prudential supervision of nonbank financial institutions and development program prudential supervision of nonbank financial institutions (2010) needs to find the most informative diagnostics instruments of NPF financial security for its support.

The realities of the present, which carry out the activities of national NPF in Ukraine characterized by socio-economic and political instability, lack of advances in the financial market that negatively affects the financial security of the funds and determine the necessity of developing measures for its ensuring.

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Rapidly changing and unpredictable market environment, which carry out activities of NPFs increase the vulnerability to internal and external negative influences that can lead to infringement of financial interests of their members.

It has increasing importance to identificate the key threats and risks that affect the state of the NPF financial security in order to avoid this scenario.

The article aims to develop the theoretical principles of NPF financial security, review the features to ensure the financial security of NPFs on the example of Ukraine.

To achieve the designated purpose in the work there were set and resolved following tasks: to determine the features to ensure the financial security of NPFs; examine the governmental approach to ensure financial security NPF in Ukraine; develop a methodical approach to diagnosing NPF financial security and make it tested.

The object of the research is the process of providing financial security of NPFs.

The subject of the study is theoretical, methodological and practical aspects of the mechanism to ensure the financial security of NPFs.

The main contribution of this paper is the formation of a methodical approach to the evaluation of ensuring the financial security of NPFs which includes four groups of indicators. The advantages of this approach are the following: the proposed list of indicators includes the most informative indicators of evaluation which gives a full description of the state of NPF financial security; it does not require experts to calculate the indicators; tt is easy to implement and does not require any specialized software. This is a useful contribution because given methodical approach intends to improve risk system management of NPF and accomplish risk-based prudential supervision of the NPF.

The remainder of the paper is structured as follows.

In Section 2, author positions the paper in the related existing literature including governmental approach in Ukraine.

In Section 3 it was given an explanation of the methodological approach improved by the author.

In Section 4, presents the evaluation of the financial security of NPFs by the example of Ukraine using data of three selected funds and the results of this approbation.

Section 5 summarizes the paper's main findings.

2. Literature Review

A variety of problems connected with non-governmental pension provision is a topic for discussion for foreign scientists and series of researches are devoted to ensuring the financial security of NPFs. For example, Miller and Funston (2014), Leisering (2004) and Mabbett (2009) examined the state regulation of private provision in different countries (USA, Germany, Sweden and UK) they offer solutions on how to improve the performance

of NPFs; Ellison (2012) held a global survey on EU pension policy and protection of NPFs' customers in particular, and so on.

The current state of non-governmental pension provision in Ukraine and ensuring the financial security of NPFs were described in the studies of domestic researchers which consider the following.

NPFs play an important role in the system of pension provision. Parfonova and Bikinina (2013) discovered that there is a slight increase in the number of private pension funds and growing amount of pension benefits.

Despite this pension system attracts big volumes of financial resources and contains numerous risks. That is why the government policy in this sphere has to be directed at using special approaches and methods of defining pension system's risks and adequate reaction at their negative demonstration.

The conditions of a volatile and unpredictable market environment in which NPFs operate, increase the vulnerability of funds to internal and external negative influences, which can lead to distress of the financial interests of their participants. In order to prevent such developments, issues of identifying key threats and risks that affect the financial security of the NPF become increasingly important.

It should be noted that according to the Law of Ukraine "On non-governmental pension provision" (2003), the NPF is a legal entity that has the status of a non-profit organization (non-entrepreneurial society), conducts activities solely for the purpose of accumulation of pension contributions in favor of members of the pension fund with the subsequent management of retirement assets , as well as carries out pension payments to the participants of the said fund in the manner prescribed by law.In economic literature, the definition of "financial security" is used quite often.

However, it should be noted that the only interpretation of its essence is absent. O. Baranovsky points out that "the concept of financial security is as wide as an interpretation of finance, and all existing formulations of" financial security "reflect only some aspects of this comprehensive category and cannot claim its unambiguous interpretation" (Baranovsky, 2010)

In the financial and economic dictionary, financial security is defined as "the protection of financial interests of economic entities at all levels of financial relations, the provision of households, enterprises, organizations and institutions with financial resources sufficient to meet their needs and fulfil their financial obligations" (Zagorodniy, Voznyuk, 2007).

Another approach is offered by A. Chupis, who explains financial security as a "set of financial and economic mechanisms that ensure the firm's resilience to natural and economic risks, sufficient level of creditworthiness and investment attractiveness, as well as positive return on invested capital."

I. Blank considers financial security as "a quantitatively and qualitatively determined level of its financial standing, which ensures the stable protection of its priority balanced financial interests from the identified real and potential threats of external and internal character, the parameters of which are determined on the basis of its financial philosophy

and create the necessary preconditions of financial support for its steady growth in the current and prospective periods" (Blank, 2004).

However, the peculiarity of the financial security of the NPF is that the financial condition of the fund reflects mainly the results of the asset management company, while the protection of the financial interests of NPF participants is a common result of several financial security entities – the fund's board, administrator, company asset management and custodian bank, so interpreting the financial security of the NPF as a deterministic level of the financial state of the fund will only partially disclose the content of this concept.

It should be noted that Y. Vitka interprets the NPF as: firstly, "the aggregate of assets representing the participants' cash flows are drawn up in the form of contributions to pension accounts and invested to increase the value of assets in order to pay pensions to participants"; and secondly, "a legal entity that collects and invests funds intended to pay pensions to fund members who have reached the retirement age" (Vitka, 2005).

Considering NPF as a "set of assets", the author specifies: the source of the formation of assets; directions of asset utilization; the purpose. At the same time, Y. Vitka notes that the assets of the NPF "represent the funds of the participants". Indeed, according to Ukrainian legislation, NPF assets are the property of the participants.

According to the second approach to the definition of the nature of the NPF, noted by Y. Vitka, the author highlights the main tasks of the NPF, such as the collection of contributions, investment of assets and payment of pensions.

However, the author includes the definition of such a basis for receiving pension benefits from the NPF, as the retirement age. This is not entirely accurate, since pension contract can mention several reasons, such as: in particular, the retirement age of the NPF member, the recognition of the invalid, the deterioration of health, death, etc. (Vitka, 2005).

When interpreting the essence of the NPF first of all it’s important to take into account the purpose and main objectives of the fund, since their wording is expressed by those for which the NPF is created, what is their purpose, than the NPF differ from other financial institutions. Thus, the purpose of NPF activity is to provide an additional source of income for fund participants after retirement.

The main tasks of NPF activities, aimed at achieving this goal, are the collection and accumulation of pension contributions; formation of pension assets by placing accumulated pension contributions on the financial market; pension payments.

At the same time, in an unstable economic situation, it is important to ensure the reliability of the source of income of NPF participants, which is achieved through the provision of pension funds from the negative impact of risks and threats.

Thus, according to the author, the financial security of NPFs is a level of its financial standing and efficient organization of investment policy that ensures stable protection of the priority financial interests of NPF members from identified real and potential threats to the external and internal environment, which creates the necessary prerequisites for financial support for sustainable growth in current and prospective periods.

The state of NPFs financial security effect negatively, on the one hand, the threat, which is defined as a set of destructive and destabilizing factors in the environment, and on the other hand, the risk implications of the NPFs, which depend on business decisions regarding management of NPF activity (Tsikanovska, 2013).

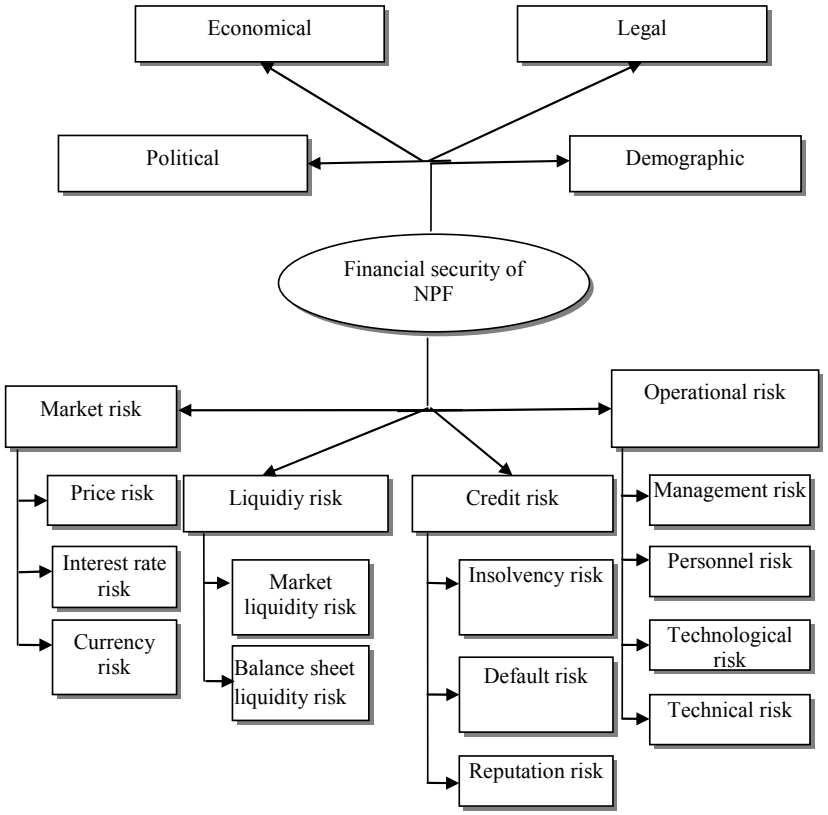
It should be noted that NPFs do not have an opportunity to influence political, economic, legal and demographic threats to the financial security; this is the sphere of competence of public authorities. In an unstable financial market conditions when the periods of dynamic development permanently change to a cyclical recession, the threats composition does not remain constant.

There are new threats, the impact of some threats have become extremely urgent matter, others – graded. Therefore, to ensure NPF financial security it is important for business management of the NPFs to be able to adapt activity of the fund to changing environmental conditions.

Regarding the risks of NPFs, the most important risks, such as market, liquidity risk, credit and operational, should be distinguished among their diversity (Figure 1).

Figure 1

Key threats and risks as a source of negative impact on the financial security of the NPF



As shown in Fig. 1 threats included: political, economic, legal and demographic.

Political threats play a particularly important role in emerging market economies, as the political systems of these countries are characterized by instability. The aggravation of the domestic political situation in the country may occur as a result of political measures such as a referendum or election, a change in the political course conducted by the state, which may lead to local conflicts, overthrows of the authorities, including hostilities, which adversely affects the general macroeconomic conditions of NPF activity.

The impact of economic threats depends on the general state of the economy, the phase of the economic cycle of the country. Unfavourable changes in the economic situation are negatively reflected in the rates of economic growth, solvency of economic entities, inflation, unemployment, household incomes, exchange rate of the national currency, etc. The state and conditions of the financial markets, in particular, the supply and demand of financial instruments, their yield and liquidity, the volatility of interest rates, etc., depend on financial stability. During the emergence of the crisis in the economy and financial sector, it becomes rather problematic to attract new NPF depositors, and existing depositors may temporarily suspend payment of contributions.

There are fewer options for investing pension funds NPF, the possibility of obtaining an acceptable investment income is limited, and the probability of non-fulfilment of obligations by counterparties NPF is increasing.

All this negatively affects the financial security of the NPF and the prospects for their further development.

The impact of legal threats may be caused by the imperfection of the legal system, in particular, the lack of regulation of legal issues, the existence of contradictions in legislation, its frequent change, incorrect application of separate legislative norms, the resolution of certain disputed issues of legislation through the courts, etc. The imperfection of the legislation on non-governmental pension provision may create administrative barriers to NPF activity.

Demographic threats are haracterized by adverse changes in the demographic situation, such as a reduction in the general population, a decline in fertility, a high level of premature mortality, resulting in a simple reproduction of the population. All this affects the age structure of NPF participants in order to increase the number of participants in retirement age, which should be taken into account during the formation of the investment strategy of the NPF.

Another important concept that needs to be addressed is the definition of risk.

Risk should be understood as the uncertainty of the final result of the choice among existing alternatives, which can lead to both positive and negative consequences, the probability of occurrence of which can be estimated.

In order to minimize the negative impact, it is necessary to identify the key risks inherent in NPF activities.

With regard to the risks of NPFs, among their diversity, the most important risks, such as market, liquidity risk, credit and operational, should be distinguished.

Market risk is the risk of occurrence of financial losses of NPFs as a result of changes in the market value of financial instruments in the composition of the investment portfolio formed by the asset management company during the management of pension funds.

Market risk is actualized when the stages of the economic cycle of the country's development or the cyclical cycles of financial market development change as the demand / supply ratio changes, as well as the level of prices for financial instruments both in the financial market as a whole and in its separate segments.

Within the framework of market risk, there are currency, interest and price risks.

Currency risk or exchange rate risk inherent in the activity of the NPF when the legislation allows investing part of funds in financial instruments denominated in foreign currency. Currency risk is realized during the unfavourable change in the foreign exchange rate, in which NPF assets are nominated, in relation to the national currency, which records the liabilities of the NPF.

In turn, the interest rate risk is related to the sensitivity of the current value of fixed-rate debt instruments to changes in market interest rates. Price risk is manifested in the volatility of prices for financial instruments in the securities market.

Liquidity risk is realized in case of impossibility of quick transfer of pension assets into their monetary equivalent without significant loss of value. The existence of liquidity risk is explained by the fact that the demand for certain financial instruments may change over time, including disappearing at all for a certain time. In addition, it is necessary to take into account the difficulty of realizing the asset over a short period of time at a price that suits the seller, since it takes longer to find the best counter-offers from potential buyers.

Liquidity risk includes components such as market and balance sheet liquidity risks.

The risk of market liquidity is the risk of the inability to realize a retirement asset in the financial market at certain times without significant losses.

The balance sheet liquidity risk is the risk that an NPF will become insolvent and will not be able to meet its obligations to participants and counterparties.

Credit risk is the risk of losses associated with the non-fulfilment or improper performance of obligations by the NPF to its counterparty (custodian, asset management company, administrator of the NPF, etc.) or the issuer of securities in which NPF funds are invested.

The components of credit risk are:

insolvency risk;

default risk (bankruptcy);

the risk of reputation, which is considered as the risk of deliberate default, which is not due to the deterioration of the financial and economic condition.

Realization of credit risk can lead not only to financial losses of NPF participants, but also to decrease their trust in the fund, transfer of pension savings to another NPF, problems with the attraction of new depositors funds, etc.

Operational risk is the risk of loss as a result of shortcomings or mistakes in the implementation of internal processes committed by employees, the operation of information systems or technologies.

Operational risk includes risks: managerial, personnel, technological and technical.

Management risk is a risk arising from wrong management decisions, implemented with the insufficient competence of managers in matters of retirement, management or personnel policy.

The personnel risk is related to conscious or unconscious mistakes in the work of the staff caused by the employee's dishonesty or negligence, their incompetence, insufficiency, or instability of the staff or criminal violations.

The technological risk is the risk associated with the technologies. Technology is considered as the technological processes in the NPF (from paper workflow to the use of software). Risk can be realized during the conclusion of a contract on non-governmental pension provision, receipt and registration of contributions, placement of funds, calculation of investment income, accrual and payment of pensions, etc.

Technical risk is the risk of losses associated with the imperfection or malfunction in the work of computer or telecommunication systems, software.

Since all or a part of these risks can be realized in the NPF at the same time, we can speak of the existence of a cumulative risk of NPFs.

At the same time, not least to ensure NPF financial security is effective risk management of the fund. Given the fact that several subjects of management of NPF (Fund council, administrator, asset manager and custodian bank), the cumulative risk of NPF depends on decisions taken at each of the marked subjects, so risk management of the NPFs must be layered.

Therefore, monitoring of current threats and risk management are essential elements of a mechanism to ensure NPF financial security, which also includes other tasks to protect the financial interests of the funds and the methods, instruments, leverages and types of provisions, the use of which in the aggregate subjects management of NPF allows to create a reliable source of additional income of the fund participants following their retirement.

NPFs, life-insurance companies and banks ensure non-governmental pension provision. In addition to these entities, a number of other agents delivering services to the key “players” in the non-governmental pension market such as administrators, asset management companies, custodian banks, auditors and other infrastructure entities carry out activities in the non-governmental pension provision sphere. Some of these entities have already existed in the Ukrainian economic area and conducted their activities in the financial market pursuant to the existing regulations (Romanenko, 2016).

Life insurance companies have been included as a party to the mandatory accumulation system and non-governmental pension provision system. Lapishko (2016) noticed that people in Ukraine prefer NPFs as the most reliable financial institutions connected with pension savings. The current situation is based on the strong governmental lobby of the NPFs and totally reflects world tendencies.

Gorbunova (2014) investigated that in previous years, the government of Ukraine has taken various measures to solve the problems of financial security pensions, but they were not sufficient because they were not systematic and did not bring effective results. During the whole period from the beginning of economic reforms, the government has failed to formulate a holistic approach to the regulation of pension provision.

The examined works built a theoretical framework for the research but there are still remained insufficiently developed questions to ensure NPF financial security and this confirms the relevance and practical significance of the topic.

2.1. Governmental approach to ensure the financial security of NPFs in Ukraine

The social importance of private pension causes a constant attention of state authorities to the activities of the NPF, as the loss of retirement savings could exacerbate the distrust of the population to pension reform and cause social resonance.

The main tasks of state supervision to ensure NPF financial security are: administrative regulation; monitoring compliance with laws and regulations; introduction of risk-based prudential supervision.

The instruments of administrative regulation of the NPF are: register, license, verifier, certificate, standards, requirements and recommendations.

The leverages of administrative regulation of the NPF include: requirements for the amount of share capital, equity capital, reserve fund, limiting tariffs and others.

Thus, the bodies of state supervision of NPF claim: standards of administrative services; licensing conditions: implementation of the administration business of NPF contain the requirements of the share capital, equity capital, reserve fund of the NPF administrator in particular; implementation of the professional activity on the stock market – asset management performance and depositary services, which establish the requirements to the size of the share capital, equity capital and reserve fund, staffing, technical, software and so on, support of asset management companies, custodian banks; requirements to: qualifications of NPF board members and experts on NPF administration; technical assistance and information systems for personified accounting of NPF members; entities engaged in professional asset management business regarding the composition and structure of NPF assets that they manage; recommendations about: NPF net asset value assessment; action sequences and organizational measures that need to be implemented during the termination of the NPF; provision of compensation to provide asset management services of NPF, arragement of tariffs calculation for custody services and their limit, maximum tariffs for the services on NPF administration (On approval of licensing activity of the administration of private pension funds, 2003).

The urgent task of the bodies of state supervision is the introduction of risk-based prudential supervision of the NPF and the institutions that serve its activities. This task involves the establishment of prudential standards and requirements of the NPF and its management subjects about:

presence of the efficient risk management system in the asset management companies;

diversification, asset quality and liquidity, in which can be invested pension assets;

prohibition of the transactions with the fund's assets with related parties;

criteria for the investment objects selection;

calculation of indicators characterizing investment performance and net value of pension assets;

information disclosure about the results of investment performance, pension assets and the risks inherent in those assets and others by fund councils.

use of early warning tests;

creating risk profiles of asset management companies based on which will be formed integrated risk assessment and decision will be taken to change the features of mode supervision of companies with different levels of risk and others (On approval of licensing activity of the administration of private pension funds, 2003).

According to the definition of NPF given in the Law of Ukraine (On non-governmental pension provision, 2003), we can conclude that:

firstly, the NPF is a nonprofit organization that does not aim at making a profit for its subsequent distribution among the founders of the fund. All profits earned by NPF should be distributed between the participants, making it impossible to use the funds for business purposes of its founders;

secondly, NPF carries out activities solely to the accumulation of pension contributions. Proceedings NPF of other activity is prohibited to protect retirement savings fund of its participants from their diversion for purposes not related to the private pension system.

To ensure its activity NPF uses the services of administrator, custodian bank and asset management company. This organization of the NPF activity provides transparency of financial transactions with facilities of funds and increasing control over the targeted use of pension savings.

It should be noted, that one of the strangest instrument of state control of business management professional readiness of NPF to work with pension savings of citizens have licensing requirements (On approval of licensing activity of the administration of private pension funds, 2003; On approval of the Administration business of private pension funds, 2004). Thus, the requirements for the share capital for asset management companies and pension fund administrators and the levels which should support equity and create reserves established to provide such entities with financial resources sufficient for professional work, and guarantee responsibility for the fulfilment of obligations to the NPF. In addition,

the need for investing significant resources in establishing administrator or asset management companies greatly reduces the attractiveness of private pensions to "financial schemes."

More details on how was varying the approaches to the application of the certain elements of the legal regulation of pension fund administrators and asset management companies of NPF are given in Table 1 based on the following instructions: On approval of maximum tariffs for the services of private pension fund administration (2004), On approval of licensing activity of the administration of private pension funds (2003), Approval of the peculiarities of the asset management of institutional investors (2013), On approval of the Administration business of private pension fund (2004), On the National Commission on Securities and Stock Market of Ukraine (2011) and Law of Ukraine (On non-governmental pension provision, 2003).

Table 1

Some elements of the legal regulation of activity of professional administrators and asset management companies of NPF in Ukraine

Elements of the system	2004 – 2010 years	2011 – 2015 years
Share capital of the professional administrator	The authorized capital shall be not less than the amount equivalent to 300 thous. euro	Specified the amount of authorized capital – not less than 2.5 mln. USD.
Equity capital of professional administrator	The size of the equity capital must be maintained at no less than an amount equivalent to 200 thous. euro	Specified the amount of equity capital – not less than the amount of registered capital
The share capital of the asset management company of NPF	The authorized capital shall be not less than the amount equivalent to 300 thous. euro	Specified the amount of authorized capital – not less than 7 mln. USD.
Equity capital of asset management company of NPF	The size of the equity capital must be maintained at no less than an amount equivalent to 200 thous. euro	Specified the amount of equity capital – not less than 25 mln. USD.
The reserve fund of professional administrator, asset management company of NPF	Must be maintained in the amount of not less than 25 % of the authorized capital. The amount of annual deductions to the reserve fund may not be less than 5% of the net profit	
Boundary tariffs for services on NPF administration	Marginal rate for open NPF is set at 6 % for corporate and professional NPF – 5% of the amount of pension contributions paid to the fund members during the year	The size of the tariffs for the services of the pension fund administration defined by the agreement of pension fund administration
The total remuneration of the asset management company of NPF	The total remuneration shall not exceed 0.35% of the arithmetic mean value of net asset value of NPF per month or 4.2 % per year	Specified the marginal rate NPF for any kind of 4.2% of NPF net asset value per year.

The results of data analysis in Table 1 show that from the beginning of the entry into force of the Law of Ukraine "On non-governmental pension provision" (2003) by bodies of state administration it was applied the instruments of legal regulation for the activity of administrators and asset management companies of NPF. In order to strengthen the financial capacity of institutions that serve the funds activity in 2011 it was updated requirements for the size of the share and equity of administrators and asset management companies of NPF.

It should be noted, that the amount of pension assets under management of these institutions, and the level of requirements to share and equity capital is sufficient, on the one hand, to ensure the protection of the financial interests of NPF, on the other hand, does not restrict competition between institutions engaged in fund management.

Law of Ukraine "On non-governmental pension provision" (2003) also limited the types of pension schemes that allowed to use for NPF. In particular, it does not provide the schemes with a defined benefit. This prevents the default of NPF in the case of insufficient retirement savings for the payment of pension fund to its participants.

In addition, NPFs are not allowed to offer pension schemes with paying lifetime pensions. Such a prohibition aims to protect NPF funds against the risk of "long life" persons who are appointed and paid lifelong pensions. Such restrictions to facilitate the planning of financial flows of NPF, which allow to create an investment portfolio with sufficient liquidity and contributes the fund to fulfil commitments to stakeholders on time.

Law of Ukraine (2003) and the Regulation on requirements for persons engaged in professional asset management of institutional investors (asset management) on concerning the composition and structure of NPFs that they manage (2012) established investment restrictions for the composition of assets in the investment portfolio of NPF. Percentages of different types of assets and asset quality requirements aimed at ensuring the diversification of investments funds (Table 2).

As can be seen from the Table 2 the types of assets such as: cash, bank deposit accounts, securities, settlement and acquisition of income for them are guaranteed by the Cabinet of Ministers of Ukraine, is the least risky for the allocation of funds, as they found the largest portion of the investment portfolio of NPF.

For NPF assets have not reached 500 thous. UAH, set several different investment requirements, but for not more than 18 months after inclusion the fund to the State Register of Financial Institutions (On approval of requirements for persons engaged in professional asset management of institutional investors (asset management) about the composition and structure of private pension funds that they manage, 2012; On non- governmental pension provision, 2003).

Table 2

The legal requirements for asset structure of NPF

Types of assets	Regulatory requirements to invest pension assets (shares of assets in the investment portfolio of NPF), %
Money on bank deposit accounts, savings certificates of banks	No more than 50
Securities of one issuer (other than securities, repayment and receipt of income guaranteed by the Cabinet of Ministers of Ukraine)	No more than 5
Securities, repayment and receipt of income guaranteed by the Cabinet of Ministers of Ukraine	No more than 50
Securities, repayment and receipt of income guaranteed by the Council of Ministers of the ARC	No more than 20
Shares of Ukrainian issuers	No more than 40
Securities of foreign issuers	No more than 20
Real estate objects	No more than 10
Banking metals	No more than 10
Other assets	No more than 5
Obligations of one legal entity	No more than 10
Securities (corporate rights) of one issuer	No more than 10

Asset management companies of NPF are not allowed: to form the pension assets at the expense of borrowed (credit) funds; to provide property guarantee secured pension assets, or any credits (loans) at the expense of pension assets; to conclude agreements of sale or barter of pension assets mandatory with condition of repurchase; to issue any debt and derivative securities. Pension assets may not include: securities that have not been listed on stock exchange; securities issued by a collective investment; bills; derivatives, etc. (On approval of requirements for persons engaged in professional asset management of institutional investors (asset management) about the composition and structure of private pension funds that they manage, 2012; On non- governmental provision, 2003).

In order to prevent the transformation of the NPFs, which are institutional investors in strategic investors, introduced the requirement to purchase no more than 10% of securities (corporate rights) of one issuer (On non-governmental pension provision, 2003).

The role of government regulation in ensuring the financial security of NPF is to create legal, administrative and economic conditions of assets acceptable to protect the financial interests of funds.

However, the task of ensuring financial security relies on Council of fund and institution that govern it – the administrator, the asset management company and the custodian as supporting the development of private pensions in general, the state does not provide special advantages for business NPF, thus supporting competition between NPFs, insurance companies and commercial banks.

Monitor the impact of regulatory measures applied by the bodies of state supervision in relation to the NPF and institutions that manage them allow the diagnostics of NPF financial security.

3. Methodology

In the solution of the tasks in the study used a set of general and specific research methods, techniques abstraction, generalization, induction, deduction, analysis, synthesis – when determining the characteristics to ensure financial security of NPF; systematic and functional approaches – for the development of methodical approach to diagnose the NPF financial security.

Information base of the study were laws and regulations which governing the activities of NPF official statistics, annual reports, financial controllers, accounting of the NPF.

3.1. Diagnosis of NPF financial security

Diagnosis is an integral part of the mechanism to ensure the financial security that provides for recognition of an object of research for certain characteristics. In case if there are signs of deterioration, it helps to determine the main factors that led to these features and also to develop the measures for rehabilitation and prevention development of negative trends in the future and so on.

To form the aggregate of indicators of NPF financial security to develop methodological approach, including the set of indicators proposed in the method (Analytical Reference on the development of private pensions, 2009; Methods of analysis and evaluation of pension funds and asset managers of private pension funds, 2006; Baranovsky et al., 2010); the author selected such that: calculate according to public financial statements; have established normative values; inform about the threat of the financial interests of the fund participants in the event of deviation from normative values.

Also for comprehensive diagnostics of NPF financial security, it was distinguished five groups of indicators characterizing: yield and profitability; investment risks; solvency, liquidity; fund development.

Using the hierarchy analysis method of T. Saati, which is a tool of system analysis and is based on the use of expert opinions, priority has been given to groups of indicators for the diagnosis of financial security of + NPFs. Experts came from academics and specialists in the field of NPF activity. The value of the index of coherence is less than 0.1, which indicates the consensus of expert opinions.

Hierarchy analysis method by T. Saati built on a gradual process of setting priorities and is systemic. The intensity of the interaction of the components of the hierarchy is estimated on the scale by T. Saati.

Priority group of indicators for the diagnosis of NPF's financial security is shown in Table 3.

Table 3

Priority group of indicators for the diagnosis of NPF's financial security

Groups of indicators	Criteria			Global priorities
	Calculated according to public financial statements	Have set normative values	Inform about the threat to the financial interests of fund participants in case of deviation from normative values	
	0,79	0,14	0,07	
Indicators of yield and profitability	0,63	0,21	0,10	0,530
Indicators of riskiness of investments	0,09	0,09	0,57	0,123
Solvency indicators	0,03	0,03	0,04	0,035
Liquidity indicators	0,22	0,64	0,27	0,285
Indicators of development of the fund	0,03	0,03	0,03	0,027

It is determined (Table 3) that, according to the calculations, the highest priority group for the diagnosis of financial security NPF is a group of indicators of yield and profitability (0.53). Other groups of indicators have less priority, therefore, according to the author, are less important for the diagnosis of financial security. It is a group of indicators that characterizes yield and profits forming a methodical approach to the diagnosis of NPF's financial security.

Author proposed financial safety indicators characterizing yield and profitability of NPFs shown in Table 4.

Table 4

Indicators of financial security that characterize the yield and profitability of NPF

Indicator name, calculation formula	Criterion	Interpretation of indicator
Income-cost ratio $I E_{ratio} = \frac{E}{I}$, where: E – the total amount of costs (expenses) recoverable from pension assets; I – the investment income earned on pension assets for the period.	≤ 1	The indicator reflects the portion of the resulting investment income goes to cover the cost of the pension fund. Investment income exceeds total costs of services by pension assets
	> 1	The resulting investment income amount does not cover the cost of servicing the pension fund. It is necessary to audit expenses

Indicator name, calculation formula	Criterion	Interpretation of indicator
		and may take measures to reduce
	< 0	The resulting investment loss. Pension fund costs should be covered by the implementation of pension assets
The level of nominal income $LNIan = \left(\frac{NUV_1}{NUV_{i-1}} - 1\right) \times \frac{365}{N} \times 100, \%$ where: NUV- the net value of pension unit as of the last business day of the accounting period; NUV_i – the net value of pension unit as of the last business day of the previous accounting period; N – number of days in the accounting period.	> 0	Investing pension fund gives a nominal profit in the accounting period
	< 0	The resulting loss on the pension fund's accounting periods
	= 0	The net value of pension unit remains unchanged from its value as of the last business day of the previous accounting period
The level of real income $RIRan = \left(\frac{NUV_1 \times 100}{NUV_{i-1} \times I} - 1\right) \times \frac{365}{N} \times 100, \%$ where: NUV_1 – the net value of pension unit as of the last business day of the accounting period; NUV_{i-1} – the net value of pension unit as of the last business day of the previous accounting period; and I – the core consumer price index (inflation) in Ukraine in the accounting period,%; N – number of days in the accounting period.	≥ 0	Investing pension fund in the accounting period ensures the preservation of pension funds participants (the resulting level of investment income is greater than or equal to the inflation rate)
	< 0	Investing pension fund in the accounting period does not ensure the preservation of pension funds participants (pension funds devalued as a result of inflation)
Instant solvency ratio $R_{in} = \frac{C}{CL},$ where: C – cash and cash equivalents; CL – current liabilities.	≥ 0,8	Responsibility index your criteria NPF shows the ability to settle its current liabilities in the near future
	< 0,8	Holding current calculations can be problematic because of insufficient funds on current account
Quick liquidity ratio $R_{ql} = \frac{A_1 + A_2}{L_1 + L_2},$ where: A_1 – the amount of the most liquid assets; A_2 – the amount of assets sold quickly (receivables-fence hovanist); L_1 – the most urgent (immediate) liabilities (accounts-ness debts for goods, services, current liabilities for	≥ 1	NPF is able to meet its current liabilities, provided timely settlements with debtors

Indicator name, calculation formula	Criterion	Interpretation of indicator
calculation); L_2 – short-term liabilities (other current liabilities).		
Overall liquidity ratio $R_{ql} = \frac{A_1+A_2+A_3}{L_1+L_2}$, where: A_3 – the amount of assets sold slowly (inventories, other current assets).	≥ 2	NPF is able to meet its current liabilities by converting current assets in money (NPF describes the ability to avoid insolvency in the short term)
The ratio of pension contributions and pension payments $R_2 = \frac{C}{PP}$, where: C – the amount of pension contributions and the amount of pension funds transferred to the NPF from another fund; PP – the amount of pension payments of NPF, their heirs, spouses in case of divorce, and the amount of pension money fund participants transferred to another NPF (insurer, bank) in the accounting period.	> 1	The Fund is in the growth phase and collects contributions
	< 1	The Fund is in the phase of payments. There is the possibility of termination of the NPF in future periods
Extensive growth ratio $R_E = \frac{C}{NAV}$, where: NAV – the net asset value.	Increase	Effective NPF to attract pension contributions (new customers)
	Decrease	The slowdown or stagnation of NPF

The proposed list of indicators (Table. 4) includes the most informative indicators of evaluation which allows to fully describe the state of the NPF financial security. The methods of calculating indicators do not require experts to calculate the indexes. It is easy to implement and does not require any specialized software.

4. Empirical Results

To test the proposed methodological approach, including financial security indicators characterizing yield and yield of NPF it was conducted diagnostics of NPF financial security according to based on data for 2015 year.

To calculate the indicators it were selected NPFs "Social standard", NPF "Pershyy naftohazovyy", NPF "ARTA", which are different in terms of their activities. The diagnostics results are given in Table 5.

Table 5

Indicators of financial security of selected NPFs for 2015

Indicators	Normative values	"Social standard"		"Pershyy naftohazovyy"		"ARTA"	
		Actual value	Security situation	Actual value	Security situation	Actual value	Security situation
Nominal income level, %	≥ 0	0.00	+	8.10	+	3.64	+
Real income level	≥ 0	-1.19	-	6.89	+	2.44	+
Income-cost ratio	[0; 1]	0.86	+	0.35	+	0.48	+
Instant solvency ratio	≥ 0.8	56.99	+	34.42	+	17.04	+
Quick liquidity ratio	≥ 1	211.13	+	34.93	+	18.15	+
Overall liquidity ratio	≥ 2	211.13	+	34.93	+	18.15	+
Pension contributions and pension payments ratio	> 1	3.51	+	0.79	-	8.00	+
Extensive growth ratio	growth	0.03	-	0.01	-	0.01	+

According to the data of Table 5 the following conclusions are:

firstly, NPF "Social standards" unlike other funds, not received income from the investment of pension assets. This is because the asset management company of the fund implements an active investment strategy to benefit from increased profitability in the long term. Due to the fact that the share of equities in the investment portfolio of NPF "Pershyy naftohazovyy" is high enough (as of 2015 – 38,28 %, against 10,65 % in the NPF "Pershyy naftohazovyy" and 11,72 % in NPF "ARTA"), the yield of pension assets of the fund is characterized by increased volatility.

Because the investment strategies of the asset management companies of the last two funds were more conservative, it allowed them to get not only the nominal, but the real return on investment of pension assets, so using this strategy appeared justified in the post-crisis financial market conditions;

secondly, a common characteristic of financial security of all three funds is a significant excess of criterion coefficients of instant solvency, quick and overall liquidity, due to, on the one hand, a high share in total assets of the funds placed in bank deposits and current accounts (45,17 % of NPF "Pershyy naftohazovyy", 38,83 % in the NPF "ARTA" and 27,48 % in the NPF "Social standard"), on the other hand, the fact that these funds have not yet reached the stage of maturity, so the volume of their current obligations is small;

thirdly, the lack of growth values of the extensive growth of NPF "Social Standard" and NPF "Pershyy naftohazovyy" and very weak positive changes in the values of this ratio for

the NPF "ARTA" informs about the difficulties of the funds to attract pension contributions as a result of development slows down. In addition, the low ratio of pension contributions and pension payments of the NPF "Pershyy naftohazovyy" indicates the probability of transition of this fund from the development stage to the stage of maturity.

Thus, the financial interests of the participants are better protected in the NPF "ARTA" as meaning of the all evaluated indicators of the financial safety of the fund, characterized positively.

To summarize, we note that financial security diagnostics of NPF allows to evaluate the performance of the fund in terms of the protection of the financial interests of its members. Auditing the effectiveness of measures to ensure NPF financial security allows to conduct monitoring of the fund's activities, which is making by government supervision.

5. Concluding remarks

1. To the question of provision of NPF financial security paid more and more attention, due to the specific activity of funds as specialized financial institutions, the main purpose of which is to provide an additional source of income fund participants following their retirement, which is achieved by securing retirement savings from negative exposure risks and threats in the process of accumulating pension contributions of pension assets and pension payments.

2. It is determined that the financial security of NPFs is a level of its financial standing and efficient organization of investment policy that ensures the stable protection of the priority financial interests of NPF members from identified real and potential threats to the external and internal environment, which creates the necessary prerequisites for financial support for sustainable growth in the current and prospective periods.

3. Governmental approach to ensure the financial security of NPFs in Ukraine is to create legal, administrative and economic conditions of funds activity to protect the financial interests of their members. However, supporting the development of private pensions in general, the state does not provide the special advantages for NPF activity, thus supporting the NPF competition between insurance companies and banks.

4. Diagnosis of the NPF financial security offered to perform on the basis of evaluation of five groups of indicators (forming a methodical approach to assessment) which describe: yield and profitability; investment risks; solvency, liquidity; funds development. Implementation of proper indicators evaluation of risky investments and liquidity and solvency of NPF will help to improve risk system management of NPF and accomplish risk-based prudential supervision of the NPF.

References

Analytical Reference on the development of private pensions as of 30.06.2009 (2009). The National Commission for State Regulation of Financial Services Markets of Ukraine. https://nfp.gov.ua/files/OgliadRinkiv/NPF/npf_%206_%202009.pdf. [Access: 30th March, 2017].

Approval of the peculiarities of the asset management of institutional investors (2013). The National Commission for State Regulation of Financial Services Markets of Ukraine. [Access: 30th March, 2017].

http://zakon2.rada.gov.ua/laws/show/z1486-13/print1443091282280930. [Access: 30th March, 2017].

Baranovsky, O. I., Baranovska, V. G., Bagel, E. A., Bruce, S. I. & Varnaliy, Z. S. (2010) The stability of financial markets in Ukraine and mechanisms to ensure it: monograph. Kyiv: Institute of Economics and Forecasting, 492.

Zagorodniy, A.G., Voznyuk, G. L. (2007) Financial and Economic Dictionary. Kyiv: Knowledge, 1079 p.

Blank, I. A. (2004) Management of financial security of the enterprise. Kyiv: Elga, Nika-Center, 240.

Vitka, Ju. V. Private pension funds: theoretical and practical aspects (2005). Scientific Proceedings of the National University of «Kyiv-Mohyla Academy» – Juridical Sciences, 38, 19–20.

Ellison, R. (2012) The European Union and pensions: policy, state aid and other issues. The Allianz-Oxford Pensions Conference: Frontiers and dilemmas of pension investment and management, [online] Oxford 27/28, 1-40. Available at: http://www.geog.ox.ac.uk/events/120927/rellison.pdf [Access: 30th March, 2017].

Gorbunova, E. (2014) Strategic directions for the reform of pension provision in Ukraine. The 4th International Academic Congress "Science and Education in the Modern World", 683-687.

Guidelines for assessment base investment of private pension funds (2011). The State Commission for Regulation of Financial Services Markets of Ukraine. Available at: http://www.dfp.gov.ua/fileadmin/downloads/dsrnfu/metod_31.12.pdf. [Access: 30th March, 2017].

Lapishko, Z. Y., Yevtukh L. B., Blazhivska Y. Y. (2016) Life insurance companies in the pension system of Ukraine. Ekonomichnyi forum, 2, 373-377.

Lazebna, M. V. (2004) Organizational-economic mechanism of state regulation of private pension funds: author. dis. for obtaining sciences. degree candidate. sc. Science, Kiev, 23.

Leisering, L. (2003) Regulating Private Old-Age Pensions as a New Challenge in Ageing Societies. 4th International Research Conference on Social Security, № 3, 1-28.

Mabbett, D. (2009) The regulatory politics of private pensions in the UK and Germany, 1-16. Available at: http://www.bbk.ac.uk/politics/our-staff/academic/deborah-mabbett/documents/regulatorypoliticspensionsLeisering.pdf [Access: 30th March, 2017]

Methods of analysis and evaluation of pension funds and asset managers of private pension funds (2006). Ukrainian Association of Investment Business. Available at: www.uaib.com.ua/files/articles/369/29_4.doc. [Access: 30th March, 2017].

Naumenkova, S. V. (2010) Functioning of private pension funds in financial services in Ukraine. Finance of Ukraine, 4, 3–16.

On approval of licensing activity of the administration of private pension funds (2003). The State Commission for Regulation of Financial Services Markets of Ukraine. http://zakon0.rada.gov.ua/laws/show/z0025-04. [Access: 30th March, 2017].

On approval of maximum tariffs for the services of private pension fund administration (2004). The State Commission for Regulation of Financial Services Markets of Ukraine. http://zakon4.rada.gov.ua/laws/show/z0871-04. [Access: 30th March, 2017].

On approval of requirements for persons engaged in professional asset management of institutional

investors (asset management) about the composition and structure of private pension funds that they manage (2012). The National Commission for State Regulation of Financial Services Markets of Ukraine. Available at: http://zakon3.rada.gov.ua/laws/show/z0787-12. [Access: 30th March, 2017].

On approval of the Administration business of private pension fund (2004). The State Commission for Regulation of Financial Services Markets of Ukraine. Available at: http://zakon4.rada.gov.ua/laws/show/z0990-04. [Access: 30th March, 2017].

On non-governmental pension provision (2003). Law of Ukraine. Available at: http://zakon4.rada.gov.ua/laws/show/1057-15. [Access: 30th March, 2017].

On the National Commission on Securities and Stock Market of Ukraine (2011). Decree of the President of Ukraine. Available at: http://zakon0.rada.gov.ua/laws/show/1063/2011. [Access: 30th March, 2017].

Parfonova, L. G., Bikinina A. O. (2013) Pension funds: investment risk management. Economic Bulletin of Donbas, № 4 (34), 86-90.

Miller, R., Funston, R. (2014) Public Pension Governance That Works. Funston Advisory Services LLC, 1-18. http://www.nasra.org/Files/Topical%20Reports/Governance%20and%20Legislation/Funston Governance1403.pdf [Access: 30th March, 2017].

Romanenko, Y. A. (2016) The structural issues of using project and program management within the system of non-governmental pension provision. Scientific bulletin of Polissia № 3(7), 38-44.

Smovzhenko, T. S., Tkachenko, N. V. & Tsikanovska, N. A. (2012) State pension funds in the structure of modern pension systems: monograph. Kyiv: University of Banking of National Bank of Ukraine, 310.

Tereshchenko G. M. (2009) Formation and development of private pensions in Ukraine. Scientific papers of Scientific Research Financial Institute, 1, 51–57.

The concept of introducing prudential supervision of nonbank financial institutions and development program prudential supervision of nonbank financial institutions (2010). The State Commission for Regulation of Financial Services Markets of Ukraine. http://zakon.nau.ua/doc/?uid=1156.449.0. [Access: 30th March, 2017].

Tkachenko, N. V. & Tsikanovska, N. A. (2010) The role of private pension funds in the financial market of Ukraine. Finance of Ukraine, 12, 69–79.

Tsikanovska, N. A. (2016) Classification of private pension funds in the context of ensuring their financial security. Bulletin of the University of Banking, № 1–2 (25–26), 64-70.

ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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COMMERCIAL INSOLVENCY IN BULGARIA THROUGH THE EYES OF GENERATIONS AT WORK: CHALLENGES AND POSSIBLE SOLUTIONS

The article presents the findings of a social survey on generations at work, conducted in October-November 2016 and focused on the prewar/war generation of people born 1925-1944, the generation of transition from patriarchy to modernity of people born 1945-1964, the generation of growth comprising people born in 1965-1980, and the digital generation of people born in 1981-2000. The author argues that, due to the small degree of institutionalization of commercial insolvency in Bulgaria after 1989, generations at work tend to externalize rather than internalize the possibilities of insolvency as an institution and as a social process. The author identifies nine challenges facing the executive and legislative branches of government and outlines possible solutions for achieving the transition from externalization to internalization of insolvency in Bulgarian society.
JEL: A14; G33

Introduction

The scientific interest in commercial insolvency[2] displayed by researchers in various scientific and professional fields (jurists, economists, sociologists, psychologists, managers, etc.) stems foremost from the social importance of the phenomenon as an institution and a social process. This interest arises mainly in connection with the social order provided by the institution in question as it regulates the mutual relations and interaction between debtors and creditors in cases of permanent insolvency and/or over-indebtedness of traders (sole traders and commercial companies). ***On the other hand***, this interest stems from the variety of the phenomenon (corporate, bank, insurance, consumer, civil insolvency), its temporal and spatial range (with its century-long traditions throughout the world) and its constantly growing topical importance under conditions of market relations and fair or unfair competition. ***Thirdly***, an important factor of this interest is the hardly avoidable stigma attached to it and the accumulated stereotypes connected to it in Bulgarian and other

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[2] In Bulgarian social and legislative practice, the concept of *insolvency (nesastoyatelnost*) is synonymous with business failure, concourse, krida, insolvency, while the concept of bankruptcy means culpable insolvency.

European societies. ***Fourthly***, it is due to the need for *expanding the circle of economic actors/subjects* (Bulgarians and foreigners in Bulgaria) with regard to whom insolvency proceedings may be initiated.[3] ***Fifthly,*** a serious and unavoidable challenge arises from the *enhanced institutionalization and internalization of insolvency* due to the unification of Bulgarian legislation on insolvency with that of the EU member states.[4] Official statistical information and social surveys have demonstrated that, desired or not, insolvency is a fact and is constantly displaying its functional possibilities and viability both in Bulgarian and European practice. According to Eurostat data (1994-2006), an average of 50% of the newly created enterprises in EU-25 did not survive the first five years of functioning and an annual average of 7% of existing firms become insolvent.[5] In the period 2008-2015, the dynamics of corporate failures in EU-17 marked growth as a result of the global financial-economic crisis.[6] The data in Table 1 show that this growth was highest in 2013, increasing by nearly one fifth compared with 2008, and then commenced decreasing –by 5.5% in 2014 compared with 2013 and by about 3% in 2015 compared with 2014.

The annual Coface Report (2013) on Central and Eastern European countries (CEE) indicated a 5% average annual growth of companies declared insolvent. Of the observed 13 countries, in 2012 Bulgaria had the largest growth of failed companies – nearly twice the number in 2011. Next in order were Czech Republic with a growth of 32.4%, and Slovakia with 12.2%.[7] In Table 2, we see that, according to official European statistics, in the post-crisis period (2010-2015), commercial failures in the 12 CEE countries observed nearly doubled in number. The most drastic increase in 2015 was in Croatia, where it was nearly triple compared with 2014, and in 2014 in Hungary – nearly 1.3 times compared with 2013; while in 2013 the greatest increase was in Rumania – 1.3 times compared with 2012. In 2015, there was a general decrease in the number of failures in nearly all countries in the region.[8]

[3] So that it would comprise not only *traders, which has been the case until now, but also non-traders* (for instance, physical entities conducting commercial activities); it is also necessary to define with greater precision the *specific insolvency proceedings* for traders going into liquidation, auxiliary insolvency proceedings for foreigners, for public enterprises (under state monopoly or created by special law), for banks, insurance companies, as well as for the equally important *exceptions to the principle of commercial insolvency*, including hidden complicity (through a figurehead, a company with co-participation, or an indirect representative), the unlimited liability partners in commercial partnerships (CP), comandite companies (CC) and comandite companies with stocks (CCS); insolvency after the death of a physical entity, etc.

[4] Regulation EC № 1346/2000 and the Lisbon Strategy for overcoming stigmatization of companies declared insolvent and for the elaboration of "second chance" policies regarding already stigmatized companies.

[5] Insolvencies in Europe 2005/2006, Creditreform Economic Research Unit.

[6] Insolvencies in Europe 2012/2013, p.2, 17; Insolvencies in Europe 2014/2015, p. 2, 20.

[7] Coface insolvencies survey. The situation in the countries of Central and Eastern Europe, 15.05.2014, http://www.chambersz.com/pdf/Coface.pdf

[8] Coface on Bulgaria, Annual Report (2013) – data for 2008 и 2009; Insolvencies in Europe 2012-2013, p. 2, 17; Insolvencies in Europe 2015-2016, p. 2, 20.

Table 1

Insolvencies in Western Europe in the period 2008-2015 (by number of cases)

Countries	2008	2009	2010	2011	2012	2013	2014	2015
Austria	6500	7076	6657	6194	6266	5626	5600	5422
Belgium	8476	9382	9570	10224	10587	11739	10736	9762
Denmark	3709	5710	6461	5468	5456	4993	4059	4029
Finland	2612	3275	2864	2944	2956	3131	2954	2574
France	49723	53547	51060	49506	48340	60980	60853	61379
Germany	29580	32930	32060	30120	28720	26120	24030	23180
Greece	359	355	355	445	415	392	330	189
Ireland	773	1406	1525	1638	1684	1365	1164	1049
Italy	6498	8354	10089	10844	12311	14272	16101	16015
Luxembourg	590	698	918	961	1033	1016	845	873
Netherlands	4635	8040	7211	6176	7373	8375	6645	5271
Norway	3637	5013	4435	4355	3814	4563	4803	4462
Portugal	3267	4450	5144	6077	8605	8131	6773	7288
Spain	2528	4984	4845	5910	7799	8934	6564	4916
Sweden	6298	7892	7546	7229	7737	7701	7158	6432
Switzerland	4222	5215	6255	6661	6841	6495	5867	6098
United Kingdom	16268	19908	17468	18467	17748	18935	17660	15952
Total	149675	178235	174463	173219	177685	192769	182132	174891

Source: Insolvencies in Europe 2012-2013, p. 2; Insolvencies in Europe 2015-2016, p. 2.

Table 2

Insolvency in CEE in the period 2010-2015 (by numbers)

Counties	2008	2009	2010	2011	2012	2013	2014	2015
Bulgaria	239	312	700	685	1285	1232	1031	1083
Croatia	-	-	1501	4878	7000	9019	7776	20531
Czech R.	-	-	5559	5880	7723	6021	3563	3004
Estonia	-	-	504	623	558	469	428	376
Hungary	-	-	36274	30757	17487	46397	60596	47131
Latvia	-	-	862	813	2402	-	-	-
Lithuania	-	-	1354	1302	1496	1561	1594	2012
Poland	-	-	881	762	665	926	864	846
Rumania	-	-	21974	22650	21692	27924	20696	10269
Serbia	-	-	-	-	-	-	2062	2072
Slovakia	-	-	830	870	866	880	831	715
Slovenia	-	-	510	675	595	941	1302	1154
Total	-	-	53351	69895	79407	96188	101707	90069

Sources: Coface for Bulgaria, annual report (2013) – data for 2008 and 2009; Insolvencies in Europe 2012-2013, p. 17; Insolvencies in Europe 2015-2016, p. 20.

According to social surveys conducted by the author (Stoyanova, 2002)[9], during the whole transition period in Bulgaria (1989-2000), i.e., over a period of eleven years, the total number of declared insolvencies was 765, or an average of 70 companies per year. For comparison, in the year 2015 alone, the number of failures in our country was 1,083, which is 15 times more than the average annual number for the entire transition period and over four times as much as at the start of the world crisis (2008).

The objective of this article is to study the degree of internalization of commercial insolvency and its functional possibilities by the generations at work, and to offer recommendations for social practice.

The thesis I argue is that, due to the low degree of institutionalization of commercial insolvency in Bulgaria after 1989, the generations at work[10] – including the prewar/war generation, the generation of the transition from patriarchy to modernity, the growth generation, and the digital generation – tend to externalize rather than internalize the possibilities of insolvency as an institution and a social process. This empirically established fact is a serious *challenge facing the executive and legislative branches/organs of government in Bulgaria*. In support of this thesis, two *questions* have been addressed: what is commercial insolvency as an institution and social process, and how are the various generations internalizing its functional possibilities?

Insolvency as an Institution and a Social Process

In the age of modernity and postmodernity, insolvency[11] is a regulator of relations between debtors and creditors in a competitive market environment. According to *economists***,** insolvency is "an extreme incapacity of debtors to pay their obligations to creditors" (Stefanova, 1994; Petrov, 1999; Timchev, 2010). *Legal experts* define it as a total set of norms applied to debtors in judicial and extra-judicial insolvency proceedings – specifically, the initiation of insolvency proceedings and declaring insolvency, and the interruption of insolvency proceedings in order for the companies to implement rescue

[9] All empirical data come from the author's personal surveys; it is explicitly pointed out when other data have been used.

[10] The classification of *generations at work* has been elaborated by the author of this article. It is based on the results of the author's social surveys conducted in the period 2008-2010 using the case study method, the accessibility principle and the responding persons principle. This classification offers a snapshot picture of actual social practice of employment in Bulgaria during the period under study; with certain conventions and some approximation, it may be said to reflect the picture of the Bulgarian transition from socialism to capitalism and from central planned economy to market economy after 1989. The author is continuing her studies of generations at work in different aspects – those of mobility, conflict, continuity, inheritance of business, internalization/externalization of insolvency, etc.

[11] The concept of insolvency is a Bulgarian term used as synonymous with business failure, insolvency, concourse, krida. The term used in the Anglo-Saxon legal system is bankruptcy, which in our country means culpable insolvency. In the present article, the concepts of insolvency and business failure are used synonymously.

programs, take part in privatization deals or achieve out-of-court settlement with creditors (Madanska, 2010; Stefanov, Topchieva, Miteva, Nikolova, 2015). *Sociologists* view insolvency in three aspects: *first*, as an interactive model, i.e., as interactions (primary and secondary) between market and non-market contractors and partners of insolvent entities; *second*, as an *institution* that establishes public behaviour patterns by means of values, norms and principles, and *third*, as a social process in which behaviour patterns are followed or violated but also undergo change and development under the influence of various factors (internal and external to the entities) and especially under the impact of society's need for a fair social order for creditors and debtors, an order whereby the interaction between them will be regulated and their interests will be brought in mutual harmony. Hence, insolvency is simultaneously an institution and a social process. Its functional possibilities are presented in these two aspects (Stoyanova, 2002, 2003, 2005, 2011, 2013).

The functional possibilities of insolvency as a social institution refers to the *establishing of behaviour patterns, preserving the material basis of insolvency, affirming the special symbolism of the debtor, providing means for transmission.* The first of these, *establishing behaviour patterns* for society, signifies that, by means of a system of norms, principles, values and status roles, a special social order is provided for the fair resolution of conflicts of interest between debtors and creditors. The behaviour patterns include *norms* (formal and informal rules), *principles* (for fair satisfaction of the interests of debtor and creditor), and *values* (related to economic expediency and effectiveness, economizing, enterprise, justice, responsibility, bona fide relations, purposiveness, honesty). These patterns are legally established and obligatory; their violation entails penalties. A second characteristic is *preserving the material basis of insolvency,* or more precisely, preserving the debtor's property in order to turn it into cash with which to cover the debts to creditors. *Affirming the special symbolism of the debtor* is the third characteristic, which refers to the rule that, in the Trade Register, the sign "insolvency" is inscribed at the name of the trader in order to serve as a warning to creditors, contractors and business partners. The fourth functional possibility, *providing means for transmission,* means *having knowledge* (of the theory and practice of insolvency) and *sharing and transmitting* from generation to generation the norms, principles, values, traditions and legislation of insolvency. Empirical research on insolvency practice in our country shows such continuity is lacking between the first Trade Act (1898), Decree № 56 (1989) and the second Trade Act (1994); on the contrary, there has been a social substitution of the institution of insolvency across these laws.

The functional possibilities of insolvency as a social process consists in *providing recovery of the debtor's enterprise, satisfying the claims of creditors, penalizing the trader who is in debt, and providing information that warns people about the consequences of ignoring the theory and practice of insolvency.*

Rescue of the debtor's enterprise and restoring the trader's rights is effectuated by means of a judicial procedure for initiating insolvency proceedings. This is possible under *three* preconditions: the debtor is a trader; is insolvent and has stopped making payments on liabilities related to commercial deals or public liabilities to the state and municipalities; and is over-indebted, the debtor's property being insufficient to cover monetary obligations to creditors. The ruling of the court to initiate insolvency proceedings stimulates the trader

to seek new solutions for recovery of his/her enterprise, such as *achieving out-of-court settlements with creditors and making a rescue plan for the enterprise* .[12] In order to permit out-of-court settlements and the implementation of the rescue plan, the court discontinues insolvency proceedings for a certain period of time. The successful implementation of the out-of-court settlement and/or the rescue plan ensures the rescue (continuation of commercial activity) and restoring of the rights of the indebted trader. On the contrary – the failure to carry these out leads to a declaration of insolvency. Empirical survey data show that, in the last two decades, rescue proceedings in Bulgarian social practice are most often used for single-member companies (SMC) with over 50 percent state or municipal participation, but they are used for a reversed purpose – not in order to continue their activity, but so as to privatize them more quickly (SMLLC Okeanski ribolov, SMLLC Konstruktsionni izdelia, SMLLC Biomash, etc.) (Stoyanova, 2003). Importantly, in recent years rescue proceedings are often replaced by various other practices that border on premeditated failures – such as transference of the assets of a non-profitable firm or declaring the company insolvent, whereby the creditors' claims remain unsatisfied. Thus, this is a substitution for what should be rescue proceedings, and points to the presence of speculative interests and poor knowledge of the application of rescue measures for the recovery of the debtor's enterprise.

The next characteristic refers to ***satisfying the creditors' claims*** by means of liabilities acknowledged/confirmed by the court of justice. The means of satisfying them is defined by a judicial decision, which decrees cashing the debtor's property and dividing the sum between different categories of creditors – those with backed claims, without backed claims, workers and employees in the debtor's enterprise, etc. Survey data show that when single member limited liability companies (SMLLC) with over 50% state and municipal ownership are declared insolvent, creditors receive satisfaction to 100 percent. To the contrary, in the case of private companies (limited liability companies – LLC, joint stock companies – JSC, and commandite companies with stocks – CCS) satisfaction is between 0 percent and at most 20-25%. The low degree of satisfaction of claims has negative consequences both for the creditors (banks, suppliers, the state) and for the workers and employees, whose wages, when the employer is declared insolvent, remain unpaid or are partially paid from the liability insurance fund.

Penalties for the indebted trader is the third possibility implemented by judicial declaration of insolvency. Declaring the indebted trader insolvent is done in ***three*** cases – when the available assets of the company are insufficient to cover debts to creditors; when continuation of activity may harm the property, and when the trader has not succeeded in fulfilling his obligations under an out-of-court settlement or under a rescue plan. The basic *consequences of the court ruling* are related to discontinuing the company's activities, discontinuing the trader's functions as employer, and public stigmatization of the trader.

[12] Rescue proceedings is a modern means for settling obligations of insolvent traders or non-traders. It is present in the current French legislation as "judicial recovery", which is meant as a substitute for insolvency, in American legislation, where it is known as "reorganization" (Ch. 11 of the Federal Insolvency Code), in German legislation, where it is included in the Insolvency Act in force since 1999, and in Bulgaria, where it is defined in the Commerce Act, Part 4 "Insolvency", Chapter 44 "Rescue proceedings for insolvency".

The judgment of the court is inscribed in the trade register, whereby it is publicly acknowledged that *the trader is barred* as a legitimate legal and organizational entity/actor. Regardless of the initiative or willingness the trader might show to make a "new start in business", he/she is under legal restrictions: not having the right to be a commercial manager, sole trader, manager of LLC, member of boards of directors, of managing or supervising committees of JSC; all this limits the trader's possibility to restore or renew his/her business. All these measures stigmatize the trader declared insolvent. In Bulgarian society, the declaration of insolvency is considered a stigma for the indebted traders, a stain on their names and a loss of their social identity. On the other hand, dissolving the enterprise of such a trader tends to "purge" and sanitize the economy as a whole. Surveys have indicated differences between the economic cultures of EU countries and the US and UK: stigmatization in Bulgarian society is identical with that in European societies, where the stigma of being declared insolvent has a negative connotation, unlike British and American societies, where a bankrupt person gets a second chance. Most recently, the Lisbon Strategy regulations formulate ideas for the complete overcoming of stigma in the EU and giving "a second chance" to traders and others declared insolvent (for the sake of reference, the same philosophy underlies the first Bulgarian Trade Act, of 1898, but not the second, of 1994).

The provision of warning information as a functional possibility of insolvency refers, on the one hand, to the preliminary informedness of traders as to the consequences that await them if they do not manage their economic activity rationally and, on the other, to the warning that knowledge must be internalized regarding insolvency, the functional possibilities of insolvency as a social process and institution, and that it must be internalized before the eventual risk (permanent insolvency or over-indebtedness) has actually become a fact.

Data from a number of social surveys conducted in 2008-2010, 2011, 2015 and 2016 reveal ***deficits*** in respondents' familiarity with the functional possibilities of insolvency as a social process and with the application of these possibilities for rescuing the trader and rehabilitating the economy by dissolving insolvent and non-competitive sole traders and single member commercial enterprises in our country.

Internalization and Externalization of Insolvency by the Generations at Work

The functional possibilities of insolvency in both aspects indicate their large scale and multi-layered character, which entails the need for their systematic institutionalization and internalization by society. From a sociological viewpoint, *internalization* of insolvency as an institution represents a *process of acceptance* of the set of norms, principles and values (established by tradition and by insolvency legislation) as obligatory equally for debtors, creditors, syndics, judges, market and non-market partners and contractors, for the various generations and society as a whole. This internalization begins with *learning* about the norms, principles and values concerning insolvency, and passes through the *understanding* of their meaning and importance, until they ultimately become a *conviction* (a personal viewpoint) and a set of *standard (stable patterns*) of conduct before, during and after the

insolvency proceedings. *Externalization* is the reverse process whereby the norms, principles and values concerning insolvency (as posited from the outside) are justified and defended by the subjects of insolvency proceedings, by different generations and society in general, as being necessary and useful before, during and after the insolvency proceedings; yet they have not yet become inner convictions and standards (stable patterns) of conduct. The transition from externalization to internalization requires a continuous and systematic education in the theory and practice of insolvency and the transmission of knowledge and experience from generation to generation.

Research has provided empirical proof of the low level of internationalization in Bulgaria regarding insolvency (Stoyanova, 2005). Hence follows the ***conclusion*** that the degree of internalization of the basic principles, norms and values of insolvency in society is also low, as demonstrated by the fact of the social substitution of insolvency as an institution (Stoyanova, 2013). What is occurring in our country is rather an externalization of insolvency, where the norms, principles, and values are justified and defended as necessary and useful rather than accepted on trust and with conviction as being obligatory legal rules for insolvency.

The thesis that insolvency is externalized by four generations at work has been confirmed by the results of surveys conducted in 2011, 2015 and 2016.[13] The ***four generations at work*** are the prewar/war generation, the generation of the transition from patriarchy to modernity, the generation of growth, and the digital generation; these have been empirically identified in Bulgarian social practice (Stoyanova, 2011). The respondents were asked the following *questions:* 1) What do you understand by "insolvency", "failure", and "bankruptcy"? 2) If you were a manager, what would you do to avoid your company's falling into insolvency? 3) Would you undertake a new business (a second time) if you were declared insolvent? 4) Would you invest in an enterprise that has financial difficulties? 5) Would you place orders with an enterprise that had previously undergone failure? ***The first generation****,* called *prewar/war generation,* includes those born in the period 1925-1944. With respect to social and biographical time, this is the eldest generation that is still active, mostly in private business. The life and work course of this generation has passed through two important *transitions* – from capitalism to socialism (after 1944) and from socialism to capitalism (after 1989). The representatives of this generation took part in the construction of socialism and worked in state and municipal enterprises and cooperatives, which is why they are unfamiliar with insolvency. Some of them associate insolvency with small and middle entrepreneurs, who were occupied in small artisan activities before 1944. After 1989, the people of this generation found it hard to undergo

[13] The latest social survey was conducted in October-November 2016 and was focused on four generations at work. The data were collected by means of in-depth interview. The sample consisted of 204 respondents selected randomly according to the principle of accessibility of the units; the respondents included 51 representatives of each generation at work. This was the third survey in a panel series, of which the first was conducted in 2011, the second in 2015 and the third in 2016. It is a non-representative study and the conclusions cannot be generalized. The survey results offer a snapshot of the state of the problem during the period under study. In addition, the results may be compared with those of the two preceding periods, which allows tracing the changes in the degree of internalization and/or externalization of insolvency in our country over the last 5 years.

the mass-scale transformation and restructuring of state and municipal enterprises, their privatization, liquidation, isolation, financial recovery, declaration of insolvency, and the breakdown of the economy, the elimination of whole branches, professions, the change in the nature, content and quality of labour, the motivation to work, etc. This makes them tend to associate the declaration of traders as insolvent with the transition to market economy, the rapid nationalization of property, corruption and "highway robbery" of state and municipal property. The representatives of this generation have undergone serious negative consequences from the transformation processes – some of them have fallen into prolonged unemployment, poverty, and social isolation; others have retired prematurely; still others have lost their skills and continue to work at "anything that turns up"; still others have undergone "personal incapacity", meaning loss of identity, stress and marginalization; others have adapted to the new economic life and have taken part in the restitution of property and privatization, becoming new proprietors, creating personal firms, etc. The new proprietors from this generation display a painful sensitivity towards topics related to insolvency, failure, and bankruptcy. They have a fear of "failing in life" and are ashamed of the eventuality of becoming indebted to the following generations after them. This is because their first notion of insolvency was formed before their working life began, at a time when their parents and grandparents could not accept the thought of being debtors and carrying the stigma of people who had failed at their craft or in agriculture and had left a bad name for their family despite their daily struggle for survival. Their notions and thinking has been corrected for a second time before and/or during their retirement, in the time of transition to a market economy, when the change of ownership provoked a sharp decapitalization of state enterprises and their subsequent privatization, declaration of insolvency or liquidation.

The present study makes it possible to trace the degree of familiarity (or lack of it) with regard to insolvency by representatives of generations at work.

Table 3

Responses to the question "What do you understand by 'insolvency', 'failure', and 'bankruptcy'?" (%)

Generation	Familiar with it	Not familiar	Total
First	13.7	86.3	100.0
Second	21.6	78.4	100.0
Third	37.3	62.7	100.0
Fourth	39.2	60.8	100.0

Source: empirical survey from 2016.

The data in Table 3 show that 86% of the respondents from the first generation are not familiar with the concept of insolvency, failure and bankruptcy – *"they have no clear idea about the content of the concept, do not know about the legal definitions and do not distinguish between them"*. At the same time, they are clear about the fact that underlying these concepts are negative processes in the economy at the national, corporate and individual level – *"enterprises have no gains; production is being stopped; workers are being laid off; they are not able to pay their bills, they become more indebted every day; liquidation of enterprises and the government's failure"*. The respondents are inclined to

believe that the existence of laws in this field helps add clarity in the management of enterprises and the economy, so long as the laws are obeyed. It is especially important in this connection that the managers be knowledgeable about the laws, that they have the necessary legal culture to seek for the competent opinion of legal experts when the need arises. According to the respondents, *"besides insolvency legislation, what is also necessary is researches and scientific publications on the topic. The shortage of publications on insolvency, especially regarding its sociological interpretation, only partially explains the disdainful attitude to the current legislation and to the court practice regarding insolvency, as well as the allowing of bad practices, whereby some enterprises are rescued in order not to become insolvent while others, to the contrary, are isolated in order to fail. No less important is the fact that the role of science is disregarded, the role of new knowledge, of the power of modern education in economic development".* In addition to these comments, respondents also point out the insufficient public light shed on the procedures, media manipulation regarding the role of insolvency in the market environment and the stigmatization of traders declared insolvent (as people who are worthless, having lost the trust of creditors and partners), the lack of civic engagement, etc. These assertions provide a serious basis for explaining the low degree of institutionalization of insolvency in our country.

Only 14 % of the respondents from this generation connect insolvency with *"the lack of any means for existence of the enterprises; the impossibility to pay back credit; the large size of debts in proportion to the available long-term assets and current assets",* though they are unable to define the concept in economic terms as the inability of traders to service their debts toward creditors and the state. Hence, the new proprietors of the pre-war/war generation are stigmatized by insolvency as an institution and are not familiar with its possibilities; all they want is not to burden their heirs with a bad name and debts.

In answer to the question: *"If you were a manager, what would you do to avoid your enterprise's falling into insolvency?" half of the representatives of this generation feel that "they would have to insist that the staff be effective and would have to reduce costs to a minimum"***.** The answers prompt the conclusion that the respondents are not familiar with the functional possibilities of insolvency and do not know how they might use them to put the over-indebted enterprise "back on its feet". They look for the causes primarily in the insufficient effectiveness of the staff and in high production costs. This conclusion is confirmed by previous studies. The other half of the respondents are inclined **"***to draw loans, and to even do the impossible so that the enterprise may continue to work***".** Some of the measures they point out are: studying the market for their produce in the short, middle and long term; studying the behaviour of the competitors; hiring young highly skilled specialists with an innovative spirit; restraining current insurance practice ("hooking people", and in the case of risk, trying to avoid paying indemnities); a precise selection of specialists and constant care for their qualification; constant observation on the dynamics of the labour, commodity, and financial market; constant modernization; in-depth study of the possibilities for implementing new entrepreneurial strategies, especially those that are based on sufficient reliable and original resources in the context of our geographical conditions (for instance, *"we have a unique resource – leucojum – and this is a basis for undertaking a profitable entrepreneurial strategy for the production of nevaline*"). Also interesting is

the intention to observe novelties in technology and in the organization of labour in our country, in Europe and in the world; to stimulate the creativity of workers in the enterprise; build an information system for registering innovative ideas and creating conditions for these ideas to be assessed objectively and implemented in order to achieve higher efficiency; establish contacts with universities and national research centers; constantly probe the opinion of management teams on the financial-economic indicators and on the business environment.

When asked **"*Would you undertake a new business (a second time)*?"** in case you are a trader declared insolvent, more than two thirds of respondents firmly declare they would not: ***"I would not, there is a great risk that the same thing may happen again; no, wise people say 'a burnt child dreads the fire'"*** (Table 4).

Table 4

Responses to the question "Would you undertake a new business (a second time)?" (%)

Generation	Yes	No	Total
First	25.4	74.5	100.0
Second	35.3	64.7	100.0
Third	45.1	54.9	100.0
Fourth	47.1	52.9	100.0

Source: an empirical survey from 2016.

Representatives of the first generation are afraid that if a business has undergone a "failure" once, this could happen again. Less than one third of these respondents are inclined to begin over again and to give themselves a "second chance", and they would do this only under certain conditions: *"the presence of an innovative team; state policy that stimulates the national economy and national capital; investment banks stimulating innovative business among traders, even though it is not as profitable as the gambling business for instance"*.

In answer to the question, "***Would you invest in enterprises that have financial difficulties? (Table 5),*** 90.2% of representatives of this generation have answered in the negative, explaining this attitude by their lack of trust and the fact that they are afraid to lose the money they would invest. They believe that this ***"investment has no returns – it is a loss, an uncalculated risk".***

Table 5

Responses to the question "Would you invest in enterprises that are experiencing financial difficulties?" (%)

Generation	Yes	No	Total
First	9.8	90.2	100.0
Second	25.5	74.5	100.0
Third	47.1	52.9	100.0
Fourth	60.8	39.2	100.0

Source: an empirical survey from 2016.

Only about one-tenth of the respondents are inclined to invest in this case, feeling they would be doing a good thing, "*for the common good"*, i.e., they would be helping the enterprise get out of the "financial trap". Though wanting to be useful, these respondents also declare they are prepared to invest only under certain conditions: *"the financial difficulties should not be connected with party politics; the owners and economic teams of the enterprise should be familiar; the concrete cause of the financial difficulties should be known; there should be a clear intention regarding what is being invested in and what the results will be; there should be a possibility to exercise some control over the use of investments".* Some opinions expressed by respondents of the first generation display a market-oriented viewpoint: "*in general, one avoids investing in an enterprise experiencing financial difficulties, but if you are interested, you investigate and buy for 1 dollar, or you buy separate parts of the enterprises that have been declared for sale…".* This shows a willingness to continue a business even if it breaks down at some period of its development. Such a way of thinking is characteristic of the transition period, when a significant mass of state and municipal enterprises are declared insolvent and purchases may be made at liquidation prices, which are far lower than the market prices.

The mistrust felt by people of this generation is apparent in the answers they give to the question: "***Would you place an order with an enterprise that has undergone failure in the past?"***

Table 6

Responses to the question "Would you place an order with an enterprise that has undergone failure in the past?" (%)

Generation	Yes	No	Total
First	25.4	74.5	100.0
Second	51.0	49.0	100.0
Third	62.7	37.3	100.0
Fourth	64.7	35.3	100.0

Source: an empirical survey from 2016.

Three-fourths of the respondents would not take this risk. The remaining one fourth is equally divided between those who definitely agree they would and those who hesitate on the matter: ***"I might, but it depends on the circumstances; on condition that the failure is not provoked on purpose in order to help the enterprise advance".*** These respondents explain their inclination to take a risk by referring to the fact that, when the managers of such an enterprise have undergone insolvency once, they have "learned a lesson" and will be more careful in managing their enterprises: "*why not?, the new president of the US was insolvent twice, but he acquired new experience and learned a lesson from the mistakes he made; yes, at times you can expect prospects from such a firm – improved quality; yes and no – on the one hand, it would be fair to support it, on the other hand, it presents a risk for myself as well".*

Consequently, the representatives of the first generation are the ones least informed about the functional possibilities connected with insolvency, since they worked at a time of state monopoly and the non-existence of enterprise failures. This explains their negative attitudes

to starting a new business after failure, their unwillingness to invest in enterprises undergoing financial difficulties or place orders with an enterprise that has previously undergone failure.

The second generation at work is the ***generation of the transition from patriarchy to modernity,*** which includes those born in the period 1945-1964. The representatives of this generation lived under socialism with guaranteed employment, equal access of all to public healthcare, an equal chance of education, professional training and labour realization. The working life of this generation passed through a period of economic growth and an upward trend of socialism. People of this generation define themselves as *"successful builders of socialism"*, as highly educated and as having surpassed their parents by far in terms of education and professional career. This generation grew up and worked mostly in a centralized plan economy, but also "*bore the burden of the transition to democracy and a market system"*. During the time of socialism, some of these people occupied important positions of leadership in the economy and politics, so it experienced strong shocks after 1989. A large part of the representatives of this generation became unemployed after the transformation of the economy and the change of economic actors. Some were forced to retire (people in the military, miners, airplane pilots), others took part in the privatization and became proprietors, and still others entered politics and/or serviced the political sphere. This generation underwent many metamorphoses: at first, they had been building the institutions of socialism, later they took part in dismantling or destroying them, and then they participated in creating a new type of *"institutions of democracy and market relations"*. That is why the generation is highly stressed, stagnant, stigmatized by everything it has experienced, and especially by the clash between *"building and destroying", "public and private", "ours and yours"*, which it has found difficult to come to terms with. It has experienced a "personal failure", similar to that of its parents of the prewar/war generation.

The data in Table 3 show that the degree of informedness of the surveyed representatives of the second generation as to the concept of insolvency, business failure and bankruptcy is higher by 8 percentage points (21.6%) than that of their parents and grandparents (13.7%) even though part of their professional life had passed during the times of plan economy and the absence of failures of state and municipal enterprises. Most generally, they relate the concept to an abrupt deterioration of the financial condition and the impossibility of paying debts to creditors, suppliers and the state: *"The incapacity of continuing normal commercial activity; debts to the banks; they are not able to pay their costs; indebtedness to creditors; a trader who is insolvent or indebted; the impossibility of functioning; being unsuccessful, a failure, downfall"*. The transition to market economy has enabled some of them to develop a business of their own (not rarely, a business in parallel with state enterprises where they work or that they manage) and, in the course of activity, to run up against privatization procedures, isolation, financial recovery, liquidation, insolvency. The familiarization with the phenomenon of insolvency takes place directly in practice, due to the new political and economic environment in Bulgarian society, the new system of legal regulations for private property, which was unknown to the representatives of this generation in the time of their childhood and previous professional activity. The data show that 78.4% of the respondents are not familiar with the concepts of insolvency, failure, and bankruptcy. Of these respondents, 15.7% offer no interpretation but only point out the

supposed causes of the existence of these things: *"bad management, bad firm policy, faulty relations between firms";* they even metaphorically relate the concepts to "the Bulgarian state at present", while 62.7% declare they understand nothing; they are not clear about what to do; "they are seized with panic" when they find out that their companies are accumulating bigger debts than in the preceding periods, while the gains are decreasing and they cannot service their obligations to the state and to creditors. Some people hasten to sell their companies: *"they bought them cheap and can easily part with them"*; others attempt to make "*agreements with creditors for rescheduling of payments"* and continuing their activity; a third group look for partners in order to *"merge the companies and escape the crisis";* a fourth group are prepared *"to voluntarily dissolve the companies "* and escape from their problems; as a last resort, when all else has been tried, "*they ask the court to initiate insolvency proceedings".* Thus, nearly two-thirds of the representatives of this generation are not familiar with insolvency and its functional possibilities; in their opinion, this is because of their insufficient theoretical and practical knowledge and skills. Ignorance, in turn, determines their low willingness to make fast and correct decisions when insolvency and/or over-indebtedness arise.

In answer to the question: "***If you were a manager, what would you do to avoid your company falling into insolvency?"*,** one-third of the respondents of the second generation believe they would seek "***loans, new possibilities to attract fresh money; they would design projects for applying for European programs; they don't exclude selling the company, the business".*** One-fourth of the respondents in this generation believe that, in order not to fall into insolvency, their company needs to "***improve management; reduce staff; increase control over production activity; training and stimulating the staff".*** Over 40% of the respondents believe constant training is necessary. The generalized answers of the respondents indicate that there are shortages in the following scientific areas: enterprise management; trade legislation (concerning insolvency); economics, finance, accountancy, organizational culture and leadership. In their view, the universities should train specialists for a master's degree in the practice of risk, risk capital and risk management, in insolvency and voluntary liquidation, in sociology and psychology of crises, etc.

The data in Table 4 show that, in answer to the question: "***Would you undertake a new business (a second time)?***" after insolvency is declared, nearly two-thirds of the members of the second generation definitely answer that they would not give themselves "a second chance". About one third believe they might risk starting a new business. We see that characteristics such as fear, inexperience, ignorance, insecurity, and unwillingness to assume new risks in business, appear among the second generation, as among the generation of their parents, though to a lesser degree.

The answers to the question: "***Would you invest in a company that is undergoing financial difficulties?*** (Table 5), are divided thus: nearly three-fourths of the second-generation respondents would not invest. The reason they point out is that they are not educated enough and cannot assess whether this would be a correct step and how risky such a venture would be. About one fourth are motivated to make investments in a company undergoing financial difficulties so as for help it "***get back on its feet".***

In answer to the question: "***Would you place an order with an enterprise that has undergone business failure in the past*?** (Table 6), half of the respondents believe this would be good for the enterprise while the other half "***do not want to take any risks".***

Thus, the answers of the second-generation respondents clearly show lack of familiarity with insolvency as an institution and a social process. "*They do not know the functional possibilities of insolvency; if they are obliged to, they will seek help from lawyers; they prefer to reach an out-of-court settlement with creditors before insolvency is declared; they would undertake recovery proceeding only to continue their activity and find fresh money, because they have a fear of stigmatization in the eyes of their relatives, acquaintances, clients; undertaking steps for a court procedure for insolvency would be a last measure for them".* Despite their lack of familiarity, they are not motivated to study insolvency before the time comes when they are unable to pay creditors and the state or before the risk of insolvency appears. They are not sensitive to business failure, they do not want to provoke destiny, they lack the necessary education, and they cannot assess the degree of risk involved in starting a new business after failure or investing in enterprises undergoing financial difficulties. They are inclined to place orders with a company that has recommenced activity after a business failure, in order to help it function better.

The third generation at work, the *growth generation*, includes people born in the period 1965-1980. Its representatives grew up under conditions of security in the time of the economic growth of socialism and look upon guaranteed employment, education, and healthcare as a given. The specific thing about these people is that they are highly educated, know foreign languages and are mobile in the world. After the changes following 1989, some of them began to look for "new principles", "a new modernity", represented in their view by a democratic society and a market economy (at least in terms of transitology). Although the representatives of this generation grew up in conditions of social security, their professional biography is situated in the time of restored capitalism. This generation is familiar with market principles but not with the defects of the market.

The data in Table 3 show that over one third (37.3%) of these respondents define the concepts of insolvency, failure and bankruptcy as "*a severe financial state of the enterprise; with permanent insolvency and the impossibility to pay creditors; indebtedness towards the state, suppliers, workers and employees; sale of assets; sinking; falling to the bottom; the impossibility of independent existence due to lack of resources, crisis"*. They are aware that the impossibility to cope would lead to the application of the law: submitting a judicial claim for opening insolvency proceedings and/or declaring insolvency. Their correct orientation allows them to strive to manage their companies in a modern way and not to allow declaration of insolvency. They do not consider out-of-court settlement and recovery proceedings to be a rescue measure, because they are not well acquainted with them: "*if necessary, they will study them and apply them"*. According to them, once it has been declared insolvent, the company loses "*its good name and the trust of creditors, clients, users, suppliers. Erasing it from the market provokes public losses – the company provides employment and income, it makes social security payments for the employed and pays taxes, charges, and duties to the state"*. Importantly, the generalized answers of respondents from the growth generation clearly show that, similar in this to their parents

and grandparents, they have not become free of the perception of insolvency as a "moral downfall", as a "loss of image in society".

Nearly two-thirds of these respondents (62.7%) cannot define the concept and stress the causes of aggravated financial-economic indicators of the enterprise. What is new and different in comparison with their parents' and grandparents' generations is that they look upon insolvency as a crisis of the enterprise and as a stage in its life cycle. The causes of this crisis they relate to bad (not good) management, to managerial deficits of the new owners, to fraudulent practices and diverting funds for prestigious consumption rather than for investment; to misjudgment of the business environment and disregard and/or inability to react to the ongoing transformations in the country, as well as to external impacts, such as the impact of unfair competition, regional or world crises, etc.

Answering the question: "***If you were a manager, what would you do to avoid your company's falling into insolvency*?,** over one fourth of the respondents of the third generation share that, in this case, they would undertake quick and urgent measures: *"they would seek financial aid from partners, friends and relatives in order to save the business, and only in the extreme case would draw a loan".* Nearly three-fourths of the respondents emphasize they would attend to improving and modernizing the management of the company, they would strive to make a transition "*from bureaucratic management to management based on trust".*

The generalized opinions of respondents refer to seeking new ideas and ventures; perfecting labour organization; decreasing expenditures to a minimum; seeking investments through projects under European programs; studying the degree of satisfaction of their clients; asking their workers/employees about what can be improved; reducing the variety of produce if necessary; restructuring the enterprise, shutting down the unprofitable units, looking for new partners, new markets; rigorous planning of profits and expenditures. The people of this generation are motivated to do their utmost not to fall into insolvency, not to lose their financial autonomy, not to allow "*large material and social losses*" and their "*moral downfall*" in society.

Even though the respondents of this generation consider themselves successful businesspersons, entrepreneurs and managers, they "*would not imagine even for one second*" they might be declared insolvent. The data in Table 4 show that more than half (54.9%) of the respondents have given a firmly negative answer and less than half (45.1%) a positive one: ***"this is a second chance", "one should give it a try".*** The members of the third generation, unlike their parents' generation, are more self-confident, and strive to surpass their parents in terms of a social status, income, education, mobility, and even to take their place in power positions as soon as possible. At the same time, their level of competence regarding the understanding of insolvency and its possibilities for rescuing the enterprise, continuing business activity and avoiding stigmatization, is still low.

According to the data in Table 5, more than a half (52.9%) of the respondents in the third generation answer that they would not invest in an enterprise that is having financial difficulties, because they are afraid "***they would lose the invested resources; due to a feeling of uncertainty".*** Although they show understanding with respect to serious financial difficulties, they are not willing to give such enterprises support either through

between-company loans or by merging with such unsuccessful companies in order to rescue their enterprises. Less than half of the respondents are willing to do so: one in ten (9.8%) is hesitant, saying *"yes, but it would depend on the enterprise, on its financial condition, in case they see the enterprise has a future*", while 41.2% answer definitely "yes", "*because it is optimistic – this will help them continue their activity; the risk is calculated, because it opens new horizons, and hope dies last; after failure comes success; some profit may be drawn from this situation".*

Unlike their parents and grandparents, the people of the third generation show much greater understanding and willingness to place an order with an enterprise that has previously undergone failure. The data in Table 6 show that nearly two-thirds of these respondents (62.7%) have answered positively: *"yes, the enterprise might be more motivated to fulfil my order quickly and with good quality, since it is striving to restore the clients' trust and to attract new [clients]".* Certain respondents are somewhat hesitant: "*I doubt I would, but if I see it has potential and has changed the thing that pulled it back, then yes; I would support it but with some reservation, only if this were profitable for me; if it is standing firmly on its feet and is advancing".* A little more than one third (37.3%) are firmly against making such orders and purchases.

Hence, the third-generation respondents with a more correct understanding of insolvency and its synonymous forms are three times as many as the respective respondents in their grandparents' generation and twice as many as in their parents' generation. Nevertheless, the majority in all three generations are not familiar with the functional possibilities related to insolvency. Nearly one out of two persons of the third generation, one out of four in the first, and one out of three in the second generation, would undertake a new business after a previous business has undergone insolvency, but most of the people in all three generations refuse to try again. One out of ten, one out of four, and nearly one out of two of the respondents in the first, second, and third generation respectively are willing to invest in enterprises undergoing financial difficulties, but again, the major part of all three generations refuse to invest in such an enterprise. The situation is almost the same as regards placing orders with an enterprise that has undergone failure in the past. The highest share of people willing to order and to buy from such enterprises, knowing this is a good cause, are to be found among representatives of the third generation.

The fourth generation, ***the digital generation***, is that of people born in the period 1981-2000. Its members grew up and became socialized at the time when democracy and the market economy were being built. This is the generation that grew up with new communication and information technologies. Data from the social survey of 2011 show that its representatives have an entirely instrumental orientation and are disloyal to employers and colleagues, and at the same time are firmly set on achieving positions of power and high income. The results of the 2016 survey reveal that people of this generation are not bothered by the idea of insolvency, business failure or bankruptcy. According to the data in Table 3, for 78.4% of the respondents, these are identical concepts which refer to insolvency and over-indebtedness of the enterprise. "*This is a state of breakdown, crisis, financial ruin; the enterprise hasn't the possibility to cover its financial obligations regarding credits, wages, taxes and duties to the state; it cannot work – there is no turnover money; its assets have "grown thin" and are not liquid; complete sinking".* They assume

that in the competitive market environment nobody is safe from insolvency. They are confident they would cope with a state of insolvency of their enterprises, although they are not familiar with the details of legal regulations. They assert they would quickly learn them if they need to, but at this stage, and in view of the positions they hold, "*not they, but others, should take care of rescuing the enterprise in case it falls into a crisis"*. Even if the enterprise in which they work was declared insolvent, they are not afraid they might lose their work position because they identify themselves as people with "*competitive capacity on the labour market"* and who are capable of taking part in management, being prepared to replace "*as soon as possible their parents and/or grandparents in managerial positions"*.

More than one fifth of the respondents believe that the basic cause of the critical condition of the enterprises on the market is primarily "*bad management, faulty organization of labour, failure to cope with competition on the market, the lack of strategic thinking among owners and managers, as well as the lack of innovative ideas on the development of the enterprise; finally, they emphasize the unsatisfactory business environment in the country, especially after the crisis of 2008; the big bureaucracy, which kills the spirit of enterprise and puts the fatal end to quite a few enterprises"*. The respondents from this generation are confident in their own capacity, and define themselves as modern, as people with prospects, expressing a willingness to occupy power positions and to manage successfully, "without commercial failure".

Regarding the question: "***If you were a manager, what would you do to avoid your company's falling into insolvency?"***, the generalized answers of half (49%) the representatives of the fourth generation tend towards "***wise management, selection of good, competent, qualified employees; expanding the presence on the market through new clients; a new type of organization of labour and organizational culture; a new morality; socially responsible management; attracting new capital by merging with partners in the branch".*** The other half of the respondents admit they do not know, and have never thought about what they would do: "***perhaps the solution lies in selling the enterprise and the business and putting an end to the problems".*** They look upon insolvency as a crisis and a stage in the life cycle of the company, similar in this attitude to the growth generation. They acknowledge that they are not yet prepared to occupy management positions; they have yet "to train a lot and for a long time".

According to the data in Table 4, less than half (47.1%) of the respondents in the fourth generation give an affirmative answer to the question "*Would you undertake a new business (a second time)?***"** , their arguments being: "*this would be a second chance, experience and knowledge have been accumulated and the same mistakes would not be made a second time, the stigma of insolvency has been overcome, there is optimism regarding a new start and the future"*. The others, a little more than half of the respondents, express uncertainty and unwillingness to undertake a risky venture: "*I am not a risk player; I don't have the necessary financial resources, but above all, I lack the necessary knowledge and skills"*.

According to the data in Table 5, 60.8% of the respondents have given an affirmative answer to the question as to whether they would invest in an enterprise undergoing financial difficulties, but they would do so under certain conditions: *"Yes, if I were certain that through my funding, the enterprise would grow strong and would be successful; if I*

were clear about the company's activity and had a clear idea of its further development; if I saw that my investments would help, that I would give the company a boost; in case there is a correct management of profit/expenditure, the company might improve its condition and this might bring dividends; yes, if it is a proven brand, because it is more difficult to start something new from scratch; yes, because I might find myself in such a situation at any moment." Negative answers were given by 39.2% of the respondents. They indicate the reasons for their answer as lying in the existing risk of losing their invested financial resources; the uncertainty of effective returns on investments; the unwillingness to pay other people's debts; pessimism as to being able to help a "sinking enterprise".

Nearly two thirds (64.7%) of the respondents have positive attitudes towards placing orders with an enterprise that has undergone failure (see Table 6). According to them, "*if what the enterprise is producing is of good quality and satisfies their interests currently, it does not matter that it failed in the past, because failure does not at all mean the enterprise did not work well, it could have been provoked on purpose"*. Negative attitudes are expressed by 35.3% of the respondents. They share that "*they do not trust such an enterprise, its reliability with regard to fulfilling the order, the quality of the invested materials, the adequacy of the price"*. The people of the digital generation are not interested in the past; what is important for them is the present and the future.

Thus, similar in this to the growth generation, the representatives of the fourth generation interpret insolvency more broadly: both as a regulator and as a crisis and stage in the company's lifecycle. As managers, they believe they can predict coming crises, but they need to acquire training in the field of insolvency if they are to have better knowledge of its functional possibilities and react adequately to lack of liquidity and the loss of financial adequacy of their companies. They do not exclude the option of consulting competent legal experts, financial experts, and accountants, which indicates their higher managerial culture compared with that of the generation of their parents and grandparents. Their orientation to the new and unknown causes them to quickly forget failures, lack of success, losses, without having learning a lesson about what lies ahead. This confirms they have a way of thinking that is similar to that of the growth generation and different from the parents and grandparents' generation.

Challenges and Possible Solutions

The analysis of official statistical data from the author's social survey leads to the conclusion that, whether it be desired or not, insolvency does exist, and the members of the four generations at work, in their role of market and non-market actors, as well as society in general, must take this into account. The conducted social survey has identified the following ***challenges*** that insolvency raises for our society. ***First***, the active working generations do not have deep knowledge and understanding of insolvency and its functional possibilities, so they hardly perceive it as an institution that regulates mutual relations between debtors and creditors or as a social process that resolves conflicts of interests between these two categories. They tend to justify the existence of this phenomenon as something objectively necessary and useful for the health of the economy inasmuch as it

frees the economy from losing enterprises; but they have not turned this attitude into personal knowledge and a conviction that this is an obligatory rule for society. ***Secondly***, the ones least familiar with the meaning of the concepts of insolvency, business failure and bankruptcy are members of the first and second generation; better knowledge is displayed by the digital generation (though only in theory) and by the growth generation (both in theory and practice). At the same time, none of the respondents in all four generations can distinguish between bankruptcy and culpable insolvency. For comparison, in British and American legislation, bankruptcy is used in the sense of what Bulgarian legislation refers to as insolvency and EU legislation refers to as failure or insolvency. ***Third*****,** the members of all four generations fear social stigmatization at the declaration of insolvency. ***Fourth*****,** the members of the growth generation display confidence that they can manage their companies successfully and not allow business failure, unlike the members of the parents' and grandparents' generations, who lack this confidence. The difference with respect to the digital generation consists in their understanding that it is not them but the people in government who bear the responsibility for the insolvency of enterprises, and secondly, that they have a broader and more modern conception of insolvency as being not only a regulator and stigma but also an inevitable stage in the life cycle of enterprises. ***Fifth*****,** the representatives of the third and fourth generation show a greater willingness than the parents' and grandparents' generations to begin a new business again and overcome the stigma of insolvency. ***Sixth*****,** representatives of all four generations display understanding and are motivated to invest in enterprises experiencing financial difficulties, and do so in order to help their recovery and successful functioning. ***Seventh***, the members of the digital generation are more inclined to place orders or buy from enterprises that have undergone insolvency; this generation is only interested in the present market situation of the enterprises, not their past. ***Eighth*****,** members of all four generations are afraid of social stigmatization in case of insolvency; they disregard the risk of insolvency, thinking "let's hope it doesn't happen to me"; this too supports the view that there is a low degree of institutionalization of insolvency in society. ***Ninth*****,** all the surveyed respondents admit that they lack knowledge and skills relevant to insolvency, and that they need university training for bachelor's and master's degrees in this sphere.

Consequently, the survey results support the thesis that there is a prevailing externalization, not internalization, of insolvency. This empirically proven fact is a serious challenge facing the government of the country. The basic ***conclusion*** that must be drawn is the need for increasing the degree of institutionalization and internalization of insolvency in Bulgarian society. It is necessary to work for this, since synchronization of insolvency legislation in the EU member states is now in course.

Possible solutions that might help accelerate the internalization of insolvency can be drawn from empirical social data: ***firstly*****,** preparing specialized courses for the study of the functional possibilities related to insolvency; the courses should target a broader audience, including people in practice, media representatives, various categories of the population interested in the problem of insolvency as an institution and as a social process; this would help overcome the limited practice that currently exists of maintaining the level of competence only of syndics, who are given annual refresher training; ***secondly*****,** expanding training on insolvency in some of the universities not only in the legal aspect but also in the

economic (financial, accountancy-related), sociological, psychological, managerial, and political aspects; such courses are recommendable not only at the bachelor's degree level but also at master's and doctoral levels; ***thirdly***, organizing parallel practical training in the actual working environment of insolvent enterprises, or among syndics, insolvency judges, and creditors, organizing student internships at the Ministry of Justice, the National Revenue Agency and other institutions dealing with insolvency; ***fourthly***, expanding research on the topic, increasing the number of publication, creating an accepted media image of insolvency as a public necessity and a regulator of the economic life of society.

The expected effects of enhancing training in the theoretical, practical and research aspect, and of enlarging the range of the audience of trainees, are related to raising society's cultural level in this sphere and achieving a natural transition from externalization to internalization and institutionalization of insolvency. This could be brought about through concrete government measures: assigning expert activities for assessing what has been done so far, highlighting the problem areas, designing an action plan for overcoming the problems, and preparing a strategy for perfecting the theory and practice of insolvency in Bulgaria.

References

Madanska, N. (2010). Insolvency Proceedings. Sofia, 272 p. (in Bulgarian) [Маданска, Н. (2010). Производство по несъстоятелност. С., 272 с.].

Petrov, G. (1999). Bankruptcy Procedures as a Way of Collecting Duties. – In: Foundations of Company Finance, Sofia, p. 171-172 (in Bulgarian) [Петров, Г. (1999). Процедурите за банкрут като начин за събиране на вземанията. – В: Основи на финансите на фирмата, С., с. 171-172].

Coface Study on Insolvency. The Situation in Central and Eastern European Countries, 15.05.2014 (in Bulgarian) [Проучване на Кофас относно несъстоятелността. Ситуацията в страните от Централна и Източна Европа, 15.05.2014]. [Electronic document: http://www.chambersz.com/pdf/Coface.pdf].

Stefanov, S., Topchieva, R., Miteva, D., Nikolova, B. (2015). Topical Issues of Insolvency Proceedings. Sofia, 855 p. (in Bulgarian) [Стефанов, Ст., Топчиева, Р., Митева, Д., Николова, Б. (2015). Актуални въпроси на производството по несъстоятелност. С., 855 с.].

Stefanova, P. (1994). Bank Failures. – In: Banks, Profitability, Liquidity, and Capital Adequacy, Sofia, p. 163-177 (in Bulgarian) [Стефанова, П. (1994). Банкови фалити. – В: Банки, рентабилност, ликвидност и капиталова адекватност, С., 1994, с. 163-177.].

Stoyanova, M. (2002). Sociological Conceptualization and Its Social Effects. A Dissertation, Sofia, 194 p. (in Bulgarian) [Стоянова, М. (2002). Социологическа концептуализация и нейните социални ефекти. Дисертационен труд. С., 194 с.].

Stoyanova, M. (2003). From Financial Recovery to Insolvency: A Model for the Transformation of Property in Bulgaria after 1989. – Alternativi N 5, p. 15-19 (in Bulgarian) [Стоянова, М. (2003). От финансово оздравяване към несъстоятелност – модел за трансформация на собствеността в България след 1989 г. – Алтернативи, N 5, с. 15-19].

Stoyanova, M. (2005). Insolvency: An Institution of Social Change. – In: Sotsiologiya i ikonomika, Sofia, p. 195-202 (in Bulgarian) [Стоянова, М. (2005) Несъстоятелността – институция на социалната промяна. – В: Социология и икономика, С., с. 195-202].

Stoyanova, M. (2011). Business Failure: The Old New Demon. Troyan, 317 p. (in Bulgarian) [Стоянова, М. (2011). Фалитът – старият нов демон. Троян, 317 с.].

Stoyanova, M. (2011). The Stigma of People Declared Insolvent: On of the Forms of Diversity in Unity (Through the Eyes of Generation at Work). – In: Diversity in Unity. History and Theory Sofia, p. 53-62. (in Bulgarian) [Стоянова, М. (2011). Стигмата на обявените в несъстоятелност – една от формите на многообразие в единството (през погледа на поколенията в труда). – В: Многообразие в единството. История и теория, С., с. 53-62.].

Stoyanova, M. (2013). Social Substitution of "Insolvency" as an Institution in Bulgaria after 1989. – Statistika, 1-2, 90-97 (in Bulgarian) [Стоянова, М. (2013). Социалната подмяна на институцията „несъстоятелност" в България след 1989 г. – Статистика, 1-2, с. 90-97].

Timchev, M. (2010) Analysis and Protection of Enterprises from Financial Insolvency. – Ikonomika, N 2, p. 82-86 (in Bulg.) [Тимчев, М. (2010). Анализ и защита на предприятието от финансова несъстоятелност. – Икономика, N 2, с. 82-86].

Commerce Act. Part 4. "Insolvency" (in Bulgarian) [Търговски закон – част IV"Несъстоятелност"].

Stoyanova, Maria. (2011). Generations at Workplace (on the Example of Three Concrete Cases of Agricultural Companies in Bulgaria). – In: Diversity and Inequality in Rural Europe – the Bulgarian Case, Sofia, 321-333.

Insolvencies in Europe 2005/2006, Creditreform Economic Research Unit. [Electronic document:https://www.google.bg/?gws_rd=ssl#q=Insolvencies+2005-2006].

Insolvencies in Europe 2012/2013. [Electronic document: http://www.businesscreditreports.com/documents/analysis_corporate_insolvencies_in_europe_2013-14.pdf].

Insolvencies in Europe 2015/2016. [Electronic document: https://www.google.bg/?gws_rd=ssl#q=insolvencies+2015-2016].

SUMMARIES

Vasil Stoyanov

EMPIRICAL TESTING OF THE NON-SATIATION AXIOM IN THE CONSUMER CHOICE THEORY

The aim of this study is to test the empirical validity of the non-satiation axiom in the consumer choice theory. And to achieve this aim, we decide to use statistical data providing information about the average amount of expenditure per capita in the USA for the consumption of several goods and services that we selected for this study throughout the period 1959-2016, and statistical data providing information about the level of the real disposable income per capita in the USA for the same period. Then, we build up a theoretical model that is based on the Engel curves presented in Luigi Pasinetti with three different shapes, each displaying satiation in the form of zero or even negative slope from a certain level of income onwards. We use this theoretical model as the methodology by which to conduct our empirical study and to obtain the best as possible results from it. And particularly in our empirical study, we conduct a non-linear regression curve fitting analysis between the independent variable level of real disposable income and the dependent variable amount of expenditure for the consumption of a particular good or service. The results from this study show empirical evidence that there is an upper limit on the amount of expenditure that is allocated by a consumer to anyone particular good or service, regardless of how much his income grows. Finally, we reach to the conclusion that this empirical study produces evidence which rejects the validity of the non-satiation axiom in the neoclassical consumer choice theory.
JEL: D11; D12

Yanica Dimitrova

THE CULTURE OF INNOVATION MODEL

The article examines the possibility of creating, implementing and managing a culture of innovation in modern business organizations. The author did a brief review of innovation landscape included theories on unique resources and core competencies, the creation and dissemination of organizational knowledge, learning organization and organizational learning, the types of innovation and the emphasis on the concept of open innovation. Researchers have not fully elucidated the search for a link between corporate culture and innovation. For this study, the relationship between some of the main components of the organization – leadership, structure, strategy – is outlined to feature the main characteristics of the innovation culture domain, according to the views of the author. By previous theoretical and empirical studies, the author draws the main dimensions of the culture of innovation and emphasizing the trinity strategy-structure-culture and has created a model of the culture of innovation with concrete indicators. The conclusions are related to the complexity and varied manifestations of the impact of corporate culture on innovation in the company as well as on the complexity of defining a certain and very specific typology of the culture of innovation. The essence of the model represents the interrelationship between strategy and corporate culture, but with the appropriate structure, as well as leaders, for understanding the overall positive importance of the culture of innovation.

The guiding principle for managing the culture of innovation in the discovery of specific features to encourage members of the specific organization for framing, sharing and act by the values that support the realization of innovation and implementation of innovative processes.

One of the most important features of the culture of innovation identifies it as associated with change and perception, and as a set of possibilities. The culture of innovation is in line with the realization of experiments, risk-taking, the redefinition of parameters from the work activities. It is an interaction – amongst all the stakeholder groups, the conditions of maximum transparency, ensuring distribution, sharing, generating knowledge, like trust, as a construct that brings together the members of the organization in the realization of its future.
JEL: O30; M14

Hristo Prodanov

POLITICAL ECONOMY OF ROBOTIZATION

This article is about robotization and its consequences that are to become a precondition for serious social conflicts and contradictions. To prove this thesis, I first examine the process of robotization during past decades and especially during the past few years in order to illustrate the scale of the problem, which is on its earlier stage today, but is expected to change the economic and political reality of all societies in the years to come. After that, I examine two main views about the contradictions and conflicts that robotization brings. Firstly, attention is paid to the vision of techno-optimists, which corresponds mainly to the theories of neoliberalism and neoclassic. After that, the view of techno-pessimists is examined, related mainly to realistic and Marxist tradition in political economy. Several aspects of the contemporary discussion about the overcoming of the contradictions of robotization are addressed – mainly through reduced working hours, unconditional basic income and taxing robots instead of humans. The idea is that replacing people with robots will raise growing problems to all human societies, so steps must be taken to overcome the emerging contradictions. The important thing here is the need to address the education, innovativeness and the ability of the modern man for a fast reaction to the quickly changing economic and social environment. Everything now is about adjusting economies for the rising "Industry 4.0", which brings the question about the need of a new political economy to mitigate the contradictions of the transition from the Third to the Fourth industrial revolution.
JEL: H2; I3; O3; L5

Igor Britchenko
Ana Paula Monte
Igor Kryvovyazyuk
Lidiia Kryvoviaziuk

THE COMPARISON OF EFFICIENCY AND PERFORMANCE OF PORTUGUESE AND UKRAINIAN ENTERPRISES

This article intends to analyze the performance and the efficiency of companies and to identify the key factors that may explain it. It was selected a sample with 15 enterprises: 7 Portuguese and 8 Ukrainian ones, belonging to several industries. Financial and non-financial data was collected for 6 years, during the period of 2009 to 2014. Research questions that guided this work were: Are the enterprises efficient/profitable? What factors influence enterprises' efficiency/performance? Is there any difference between Ukrainian and Portuguese enterprises' efficiency/performance, which factors have more influence? Which industrial sector is represented by more efficient/profitable enterprises?
The main results showed that in average enterprises were efficient with low level of profitability. According to gained results several indicators were highlighted so that companies would pay more attention to them.
JEL: D21; D24; D29; D 51; F15; F22

Borislava Galabova
Nedialko Nestorov

STATE AND TRENDS OF BULGARIA'S FOREIGN TRADE WITH ORES AND CONCENTRATES

The paper presents the results of a study of the state and dynamics of the foreign trade of Bulgaria with some of the commodities of the country's trade list – the ones from class "Ores and Concentrates". It covers the period 2000-2016. Foreign trade situation is defined on the basis of processing and analyzing data published by national and international organizations. State and trends of Bulgaria's foreign trade with these strategic products of the mining industry are assessed in the context of the rapidly changing national, European and global market situation. The geographic concentration and sustainability of exports and imports are determined by developing specific coefficients. On this methodological basis, summaries have been made about the current foreign trade situation.
JEL: F14; F16; F50; L70

Jan Zwolak

SOLD COMMERCIAL PRODUCTION AND ITS FINANCIAL SECURITY IN POLISH AGRICULTURE

The hypothesis that sold commercial production was most elastic with respect to the Single Area Payment Scheme (SAPS) in Polish agriculture in 2011–2013 (1.074) has been confirmed.
This research was based on the Cobb-Douglas power model with one dependent variable, applied in order to identify the regression dependence for commercial production sold under the SAPS (direct payment) and for a separate payment for fruit, vegetables and sugar (indirect payment) in Polish agriculture in 2011–2013. The models were used to calculate marginal and average productivity as a measure of the effectiveness of financial security in the sector. The correlation of sold commercial production with direct/indirect payment(s) in terms of the financial security under discussion was also examined. It was determined that direct payments remain within the irrational management zone, while indirect payments are within the rational management zone.
JEL: G23, Q14, R51

Svitlana Achkasova

ENSURING FINANCIAL SECURITY OF NON-GOVERNMENTAL PENSION FUNDS IN UKRAINE

The paper investigates the process of providing financial security of non-governmental pension funds by the example of Ukraine. The theoretical basis of the research contains a review of existing approaches including the governmental methodology of Ukraine in ensuring the financial security of the funds. By conducting diagnosis of financial security of non-governmental pension funds in Ukraine, as empirical results, a methodical approach to the evaluation was formed. It was offered four groups of indicators (yield and profitability; investment risks; solvency and liquidity; funds development) implementation of which will help to improve risk system management of the non-governmental pension funds and accomplish risk-based prudential supervision.
JEL: G20; G23; G28; G31; G32

Maria Stoyanova

COMMERCIAL INSOLVENCY IN BULGARIA THROUGH THE EYES OF GENERATIONS AT WORK: CHALLENGES AND POSSIBLE SOLUTIONS

The article presents the findings of a social survey on generations at work, conducted in October-November 2016 and focused on the prewar/war generation of people born 1925-1944, the generation of transition from patriarchy to modernity of people born 1945-1964, the generation of growth comprising people born in 1965-1980, and the digital generation of people born in 1981-2000. The author argues that, due to the small degree of institutionalization of commercial insolvency in Bulgaria after 1989, generations at work tend to externalize rather than internalize the possibilities of insolvency as an institution and as a social process. The author identifies nine challenges facing the executive and legislative branches of government and outlines possible solutions for achieving the transition from externalization to internalization of insolvency in Bulgarian society.
JEL: A14; G33