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Prof. dr hab. Janina Sawicka
Department of European Policy, Public Finances and Marketing
Faculty of Economic Sciences
Warsaw University of Life Sciences
Nowoursynowska 166, 02-787 Warsaw, Poland
tel.: (+4822) 593 40 70; fax: (+4822) 593 40 77

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THE APPLICATION OF ECO-COMPASS METHOD IN SUSTAINABLE PRODUCT DEVELOPMENT

Paweł Brzustewicz
Nicolaus Copernicus University

Abstract. The paper addresses the applicability of Eco-compass for sustainable product development process. The author makes the attempt to answer three fundamental questions: How to improve new product development in the context of sustainable products? What are the capabilities and limitations of Eco-compass? How can Eco-compass help with sustainable product development optimization? In responding to these questions, at first sustainable product development is described. Particular emphasis is put on early phases of new product development: idea generation and design. Afterwards, the methodology of using Eco-compass to compare two products or assess various options of one product in terms of its impact on the environment is presented. Next, considering the fact that in the era of sustainability the model of new product development must imply the integration of economic, environmental and social aspects, the potential of Eco-compass to improve eco-efficiency of the product is elucidated. Finally, conclusions are drawn from this paper.

Key words: sustainable development, eco-efficiency, sustainable marketing, sustainable product development, Eco-compass

INTRODUCTION

Strategic importance of new products is constantly growing. New product development is generally accepted as one of tools for business strategy execution and an important source of competitive advantage of the company. Business strategies that include the introduction of new products into the market help companies to match better to market forces thus increasing the odds of thriving.

In the era of transition from conventional to more sustainable economy based on three main pillars – economic, environmental and social – companies must turn their attention to sustainable products. Although the development of sustainable products

Corresponding author: Paweł Brzustewicz, Nicolaus Copernicus University, Gagarina 13a, 87-100 Toruń, Poland, e-mail: pbrzustewicz@umk.pl

needs a long-term investment and strategic view, consideration of environmental and social aspects is necessary nowadays. Due to the fact that sustainability is a priority for many clients and institutions, companies should strategically plan and invest in sustainable products to gain competitive advantage [Kerga et al. 2011].

Sustainable new product development requires a change in approach to organization and management of the entire process of innovation, including top management commitment, life cycle management and marketing [Brzustewicz 2013b]. Moreover, successful integration of sustainability into new product development implies the implementation of new tools and methods such as Eco-compass to respond to the growing complexity of environmental requirements that sustainable products must encounter.

Given the fact that relatively few studies to date have concerned sustainable new product development as well as the application of Eco-compass in the process of sustainable product development, the aim of this article is to answer three fundamental questions: How to improve new product development in the context of sustainable products? What are the capabilities and limitations of Eco-compass? How can Eco-compass help with sustainable product development optimization?

In order to support the thesis that Eco-compass is of primary importance for product eco-efficiency, the method of critical analysis of literature was used. Moreover, all three methods of reasoning – induction, deduction and analogy were employed. The study of selected textbooks, articles and reports allowed the author to provide a better understanding of the Eco-compass importance in sustainable product development as well as specifying certain key concepts and relationships vital from the viewpoint of the thesis of the article.

SUSTAINABLE PRODUCT DEVELOPMENT

A review of the existing literature indicates a wide variety of the definitions of sustainable products. Although there is no single and generally applicable definition, the majority of the publications refers to ecological and social aspects of a sustainable product [Peattie 1995, Edwards 2009, Martin and Schouten 2012, Brzustewicz 2013a]. The ecological dimension of a sustainable product refers to its positive ecological attributes that indicate what the productis made of, how it functions, how it is packaged, distributed, used and disposed. Green attributes of a sustainable product make the product environmentally friendly along its entire lifecycle. The social dimension is mainly associated with the conditions in which the product is developed. Nowadays more and more customers pay attention not only to whether the product satisfies their needs, is healthy, safe and environmentally friendly, but also whether employees involved in its development are fairly rewarded, employee rights are respected and local communities are supported by the company.

In addition to ecological and social aspects K. Peattie [1995] emphasizes that sustainable products should satisfy consumer needs and be at least as competitive as conventional products to survive in the marketplace in the long run. According to the author, sustainable products can be defined as “offerings that satisfy customer needs and significantly improve the social and environmental performance along the whole life cycle in compari-

son to conventional or competing offers" [Peattie 1995]. S. Edwards [2009] suggests that developing sustainable products is not just about transitioning to more benign materials and products. From his point of view "sustainable products minimize environmental and social costs throughout the product lifecycle and aim to maximize environmental and social benefits to communities, while remaining economically viable" [Edwards 2009]. A similar view of sustainable products is proposed by P. Brzustewicz [2013], who conceptualizes sustainable products as goods of a completely new environmental and social attributes, that exert considerably less pressure on the environment and people along the life cycle – from extraction of raw materials through production and use to disposal – compared to conventional products.

The analysis of the above definitions leads to a conclusion that sustainable products combine features of green (ecological) and ethical products. However, in addition to environmental and social attributes sustainable products have to meet customer needs and simultaneously be at least as competitive as conventional products.

From a firm's point of view every new product must go through a series of developmental stages. The existent literature contains a wide range of new product development models that differ from each other in terms of the number and the name of stages and other activities accompanying this process [Rutkowski 2007]. Today's models of new product development mainly belong to the methods of the second or third-generation [Cooper 1994]. The first generation process of new product development was sequential, i.e. going to the next phase depended on the fact if all activities in the previous phase had been completed. The second and third generation processes are integrated and are done simultaneously. Such processes also are divided into stages, but some activities which were traditionally done in the next stage, in the integrated process can begin before the previous stage is completed. Moreover, the entrance to each stage is preceded by a gate that is used to monitor the quality of the project and to make "go/kill" decisions. The number of the stages in new product development process largely depends on the industry in which the company operates and its strategic orientation.

Although many researchers [Cooper and Kleinschmidt 1986, Urban and Hauser 1993, Crawford and Di Benedetto 2003] have tried to develop the ideal scheme of new product development that covers all relevant stages and activities, the most widely known is Booz, Allen and Hamilton's model. According to the consulting company of Booz, Allen and Hamilton [1982], new product development process consists of seven sequential stages: new product strategy development, idea generation, screening and evaluation, business analysis, development, testing and commercialization.

Whereas sustainable products, like the traditional ones, must go through subsequent stages and gates to come on the market, the majority of the existing methods, techniques, tools and criteria for new product evaluation must be adapted to new conditions. New product development decisions that do not take into consideration environmental and social aspects result in unsustainable processes and unsustainable products. According to D.L. Varble [1972], "traditional economic criteria no longer appear to provide a sufficient basis for new product evaluation decisions. The implementation of a socially responsible attitude into new product development and evaluation is a task that is challenging business".

As conditions surrounding business have changed, the traditional approach to new product development must be revised. New product development requires more complex analysis and evaluation that include the potential impact of a new product on environment and society at each stage of the process. Additionally, sustainable model of new product development must reflect the life cycle thinking, including the physical product life cycle (Fig. 1). Such thinking, especially at the idea generation and design stage, helps understand environmental and social consequences of a new product.

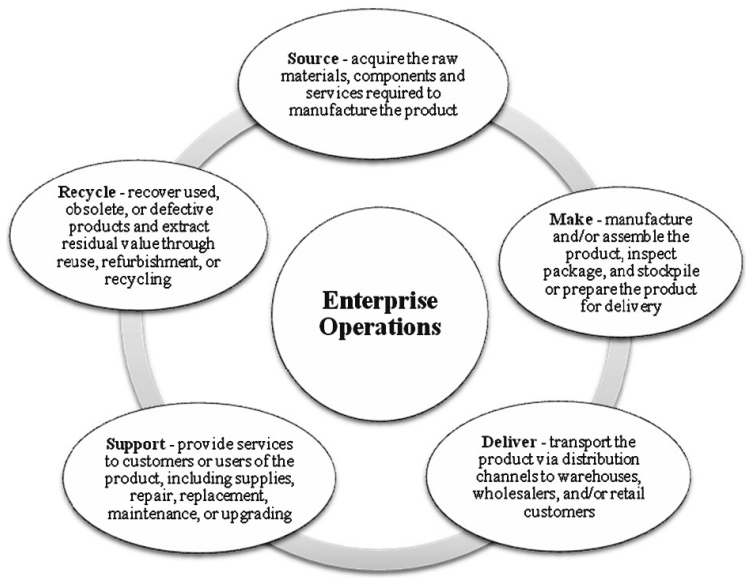

Fig. 1. The physical product life cycle
Source: Adapted from J. Fiksel [2009].

In order to integrate sustainability perspective in new product development, companies can use many solutions, methods, techniques and tools, such as:

- various checklist techniques that contains, except for economic aspects, environmental and social criteria;
- sustainable design strategies and life cycle assessment (LCA) method;
- life cycle costing (LCC) method for estimating socioenvironmental costs;
- sustainable production strategies, e.g. design for source reduction, design for servicization, design for recyclability or design for human capital;
- multifunctional teams;
- sustainable supply chain management;
- sustainable marketing orientation and marketing research at each stage of sustainable product development.

As the early stages of new product development are critical for the future impact of the product on environment and society, there is a great need for the new methods which can be used to create and select ideas for sustainable new products or assess the products

or various design options in terms of sustainability. Considering the fact that around 90% of the waste that can be attributed to many of products has been created before the consumer starts using a product [McAloone and Bey 2009], the methods such as Eco-compass seem essential to succeed in sustainable products development.

THE MAIN PRINCIPLES OF ECO-COMPASS METHOD

Eco-compass, which was developed at Dow Chemical Company, is a useful method that allows a comparison between two products or an assessment of various options of one product in terms of its impact on the environment. Eco-compass measures life cycle impact of a product or its conceptual design along six dimensions which cover all relevant environmental issues. These six "poles" are defined as follows [Yan et al. 2001–2002]:

- mass intensity measures the total amount of the material consumption and mass burdens related to the product over its full life cycle;
- energy intensity refers to the consumption of the energy connected with the product over its full life cycle;
- health and environmental potential risk reflects the change in the environmental burdens associated with the product over its life cycle;
- revalorization indicates the ease with which remanufacturing, reuse, and recycling of the product can be accomplished;
- resource conservation reflects the change in the conservation of materials and energy associated with the product over its full life cycle;
- service extension depicts the extent to which the product throughout its life cycle can be completed with service.

It is worth noting that two of these dimensions, namely health and environmental potential risk, and resource conservation largely refer to the environment, while four others: energy intensity, mass intensity, revalorization, and service extension reflect a process of integration environmental issues into business decisions.

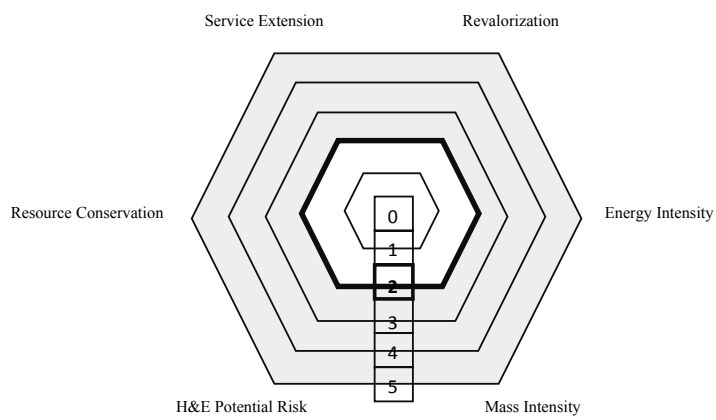

Fig. 2. Diagram of Eco-compass
Source: Yan et al. [2001–2002].

Each of these six dimensions is evaluated on 0–5 scale (Fig. 2). The base case (the product which is used as a reference point) always scores 2 in each dimension. The particular score depends on how different the compared product is from the base case in terms of each dimension. The values of the subsequent dimensions are interpreted as follows: 1 – at least half as good as the reference product; 3 – to two times better than the reference product; 4 – two to four times better than the reference product; 5 – at least four times better than the reference product [Kleiber 2011]. For example, when it is known that energy consumption associated with the new product at the stage of production amounts to 5 kWh per product and the base case uses only 15 kWh, the new product obtains three scores in the energy intensity dimension.

Eco-compass allows the visualization of data in the form of a spider web diagram. The closer the shape of the product is located to the outer part of the web, the better its environmental performance is. The creation of the spider diagram adapted to given product involves having environmental information. Companies can collect the data independently or use standards for environmentally preferable products wrought by national government agencies and independent third-party organizations. The useful sources of required indicators for Eco-compass, which allow the assessment of the environmental and social impact of technology, materials and processes, are LCA (life cycle assessment) databases.

According to UNEP [2011], LCA is a tool for the systematic evaluation of environmental performance of a product, process or a service through all stages of its life cycle. The importance of LCA results from the fact that it allows control environmental impact from raw material supply through to the point of use and disposal. Only with reliable LCA data environmental impact of processes, products or services can be measured. Data for the most popular materials and processes have been collected in advance and serve to calculate indicators from this [MHSPE 2000]. These numbers, which are available in some computer databases, such as Sima Pro, Gabi or Umberto, can be used as well by Eco-compass users to make comparative studies.

ECO-COMPASS AS A METHOD TO IMPROVE PRODUCT ECO-EFFICIENCY

As during the past few decades, the primary drivers of product value have shifted significantly, in the era of sustainability the model of new product development must imply the integration of economic, environmental and social aspects throughout the integrated product life cycle. The question that still remains open is what kind of targets should be set and actions should be taken to lead towards more sustainable products. Although there is still considerable confusion on this issue, WBCSD [2000] argues that every business should focus on the improvement of product eco-efficiency that means "creating more value with less impact or doing more with less".

According to WBCSD [2000], the creation of more value with less use of resources, waste and pollution can be achieved in seven various ways: by reducing material intensity, energy intensity, and dispersion of toxic substances, by enhancing recyclability, maximization of the use of renewables, extending product durability, and by increasing service intensity. In more recent time academic experts and practitioners extended the

term eco-efficiency to the synthesis of economic, environmental and social efficiency that refers among other things to employment practices, community relations, ethical sourcing and social impact of the product [Ranganathan 1998]. The attitude which does not embrace the society as the third pillar of eco-efficiency analysis is not a sufficient criterion for sustainability [Czymmek 2002]. The elements of sustainable efficiency analysis are depicted on Figure 3.

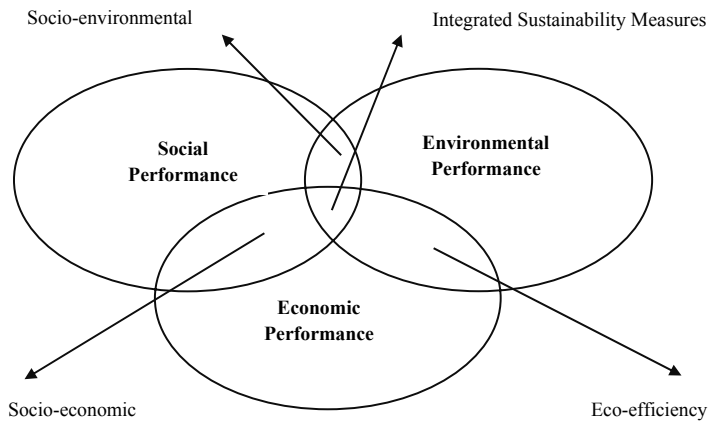

Fig. 3. Sustainability measurement schematic
Source: Ranganathan [1998].

As it was mentioned above, the early phases of new product development are of primary importance to its sustainability. The idea creation and evaluation are critical activities that have great influence on the later stages of the product innovation in terms of eco-efficiency [Tsai et al. 2011]. Selecting the right idea helps the team transform it into concepts of high environmental potential [Leroy et al. 2015]. In turn, the design phase is decisive for product eco-efficiency because as the product is designed, attributes are translated into specifications in attempt to achieve optimal form and function [Fuller 1999]. The power of design arises also from the fact that this initial phase of new product development plays a key role in its quality assurance in the next stages of life cycle (production, exploitation and liquidation) with reference to relation with the environment [Prabaharan 2012].

Sustainable features have positive influence on the demand for such products. The demand for socially responsible products, i.e. products with socially responsible characteristics (ethical products) and a price premium for primary product producers with respect to equivalent conventional products (fair trade products), has been growing steadily. According to The Ethical Consumer Markets Report [2014], the value of ethical spending in the United Kingdom grew by 9% in 2013, rising to 32.2 billion GBP. At the same time, the research results indicate that the rate of new product projects that are failures varies in the range of 38–45%, depending on the performance of the company [Edgett 2011]. It seems obvious that at the age of sustainability, ecological and social attributes of the product are one of the most important factors that influence its market success, which implies that it can radically improve the rate of successful products as well.

Design teams must be able to assess if certain design options will lead towards eco--efficiency and success on the market. Eco-compass, as a tool based on the indicators of eco-efficiency, provides decision makers with sufficient information about the product's environmental impact. Step by step, by applying the proposed Eco-compass, designers can select the optimal product design and its associated production, usage, and recovery processes [Yan et al. 2001–2002].

Although Eco-compass presents some gaps in the idea generation stage [Tyl et al. 2010], it seems that as a method for comparing different variants of the product can be also useful in the process of collecting ideas for new products. A new product optimization with Eco-compass is based on creativity regarding to potential ways for enhancing product eco-efficiency. Considering new areas, where the product could be improved, and solutions concerning such aspects as material replacement or reducing wastes, design teams can create a large number of valuable ideas for sustainable new products.

Dow Chemical is an example of a company that has had great achievements within the domain of eco-efficiency. As the company where Eco-compass has been developed and used, Dow has considerably improved its key indicators in human health, environment and sustainable chemistry dimensions. In the years 2005–2014 company reused 344 million GBP of by-product in manufacturing process, saved 110 trillion BTUs of annual absolute energy, reduced VOC, NO_x and priority compounds emissions more than by 30%, injuries more than by 1,300, spills by 9,000 and process safety incidents by 340 [Dow 2015]. Moreover, Dow delivered in 2014 22.4% (13 billion USD) of sales from products that are highly advantaged by sustainable chemistry [Dow 2015]. Given the fact that Dow's sales have steadily increased in all operating segments (net sales for 2014 exceeded 58 billion USD), this case demonstrates that being a leader in eco-efficiency is not only environmentally benign but also economically beneficial.

CONCLUSIONS

As consumer consciousness and demand for safe, healthy and green products increases, companies must integrate sustainability into new product development to gain competitive advantage. Although there is no single and generally applicable definition, sustainable products can be defined as goods that satisfy consumer needs, exert considerably less pressure on the environment and people along the life cycle, and are at least as competitive as conventional products.

New product development decisions that do not take into consideration environmental and social aspects result in unsustainable processes and unsustainable products. Sustainable products, like the traditional ones, must go through subsequent stages and gates to come on the market but most existing methods and tools for new product evaluation must be adapted to new conditions. Considering the fact that the early phases of new product development are of primary importance to its sustainability, design teams must be able to assess if certain design options will lead towards eco-efficiency and success on the market. In such a context Eco-compass as a method based on the indicators of eco-efficiency can provide decision makers with sufficient information about the product's environmental impact.

Although Eco-compass presents some gaps in the idea generation stage, it seems that this method can be also useful in the process of collecting ideas for new products. Despite

some limitations, the main advantage of Eco-compassis its qualitative and graphical character. Comparing new alternative against the current situation from an environmental perspective is relatively simple, on condition that all inputs and outputs of each process at various life cycle stages were identified correctly. Knowledge of the particular data enables teams to score the product in comparison to the base case in all six dimensions and thereby select the most optimal option in terms of eco-efficiency.

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WYKORZYSTANIE METODY ECO-COMPASS W PROCESIE ROZWOJU PRODUKTU ZRÓWNOWAŻONEGO

Streszczenie. W artykule podjęto rozważania nad problemem zastosowania metody Eco-compass w procesie rozwoju produktów zrównoważonych. Biorąc pod uwagę, że poruszane zagadnienia zostały do tej pory tylko częściowo opisane w literaturze, celem opracowania jest odpowiedź na trzy fundamentalne pytania z punktu widzenia rozwoju produktów zrównoważonych. Jak dostosować proces rozwoju nowego produktu do wyzwań związanych z rozwojem zrównoważonym? Jakie są możliwości i ograniczenia metody Eco-compass? W jaki sposób Eco-compass można wykorzystać do poprawy procesu rozwoju produktów zrównoważonych? Udzielenie odpowiedzi na powyższe pytania wymagało między innymi wyjaśnienia pojęć produktu zrównoważonego i procesu jego rozwoju, zaprezentowania głównych zasad metody Eco-Compass oraz ukazania jej potencjału odnośnie poprawy eko efektywności produktów.

Słowa kluczowe: rozwój zrównoważony, ekoefektywność, marketing zrównoważony, rozwój produktu zrównoważonego, Eco-compass

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POLISH OPEN-END PENSION FUNDS PERFORMANCE AND ITS PERSISTANCE

Andrzej Karpio, Dorota Żebrowska-Suchodolska
Warsaw University of Life Sciences – SGGW

Abstract. This paper deals with the assessment of the investment results achieved by 14 pension funds functioning on the Polish market in 2000–2013. Calmar, Omega, upside potential ratio (UPR) and Sortino ratios were used to estimate the fund performance in different time frames (two, three, four, five, six and seven years). The performance persistence was investigated by evaluating the Spearman's rank correlation for the above given sub-periods. The obtained results show randomness of ranking positions occupied by pension funds in successive periods. Almost all Spearman's correlation coefficients occurred statistically insignificant.

Key words: effectiveness, performance measures, pension funds ranking, correlations

INTRODUCTION

The investment results achieved by pension funds are of fundamental importance for future retirees. The current legislative framework has suggested measures to evaluate the effectiveness of pension funds. This study applies to methodology used to assess the collective investment institutions, which is not compatible with the methodology introduced by act on pension funds. The authors believe that pension funds should be treated as capital market participants on equal terms with open-end mutual funds, given the fact that the latter are often chosen by those who wish to save for their retirement within third pillar of the pension system. With regard to the legal changes that came into force in 2014, pension funds, from the point of view of the limitations imposed on investment portfolios were a sort of stable growth open-end mutual funds. Both types of funds might be compared as

Corresponding author: Andrzej Karpio, Department of Econometrics and Statistics, Warsaw University of Life Sciences – SGGW, Nowoursynowska 159, 02-787 Warszawa, Poland, e-mail: andrzej_karpio@sggw.pl

shown by Karpio and Żebrowska-Suchodolska [2012, 2013]. Today they should be compared with equity or balanced open-end mutual funds. However, the period of functioning of pension funds is too short to be able to make a reliable assessment of effectiveness after legislative amendments. Therefore, the study covers the years 2000–2013, and the rankings were used to create non-classical indicators of the investments efficiency, rather than relying on the classical measures of rates of returns or the Sharpe ratio. Volatility, as measured by standard deviation, is seen as less relevant as a risk measure than the potential losses on investments. The following indicators have been applied in this study: Omega [Shadwick and Keating 2002], upside potential ratio (UPR) [Sortino et al. 1999], Sortino [Sortino and Price 1994] and Calmar [Pedersen and Rudholm-Alfvin 2003] ratio considered to be the indicators of profits and losses. The above given factors are mostly used to assess the hedging funds, that is the reason they were constructed. According to the authors, there are no obstacles in using them to assess the investment effectiveness of the less risky subjects, in particular of the open-end mutual funds or open-end pension funds. The paper was devoted to this last funds existing on the Polish market. Among all the factors of gains and losses, the given four seem to be the most widespread in literature, and that is why it was decided to stick only to them. What is more, they do not demand the construction of the market factor, as for example it is with the Information ratio and Sharpe-Israelsen's indicators. They appeal to the commonly understood (by the clients of funds) notion of risk as the measure of loss. However, these losses are understood differently in every effectiveness measure. That is why it was decided to find out if different risk approaches in the factors of investment effectiveness lead to different rankings of funds. It is worth adding that the use of the Information ratio and Sharpe-Israelsen's indicators to construct rankings and to examine the persistence still remain in the area of interest of the authors. These coefficients are the subject of the studies and the results of which are being prepared to issue.

METHODOLOGICAL ASSUMPTIONS

Since 1999, the pension fund market in Poland has changed. It has experienced a consolidation through mergers and acquisitions reducing the number of pension funds from original 21 to 14. As a result of this, the studies will focus on their current number while the name of the acquiring entity is retained. They are: AEGON, Allianz, Amplico, Aviva, AXA, Bankowy, Generali, ING, Nordea, Pekao, Pocztylion, Polsat, PZU and Warta. Pension fund market in Poland was created by act on pension fund in 1997. Throughout the time it witnessed a consolidation since they started their operation in April 1999. The initial year of study is 2000. The whole period 2000–2013 was divided into: two-, three-, four-, five-, six- and seven-year sub-period. Later we create rankings of funds and check which funds were the leaders and which were the losers. That allows to draw conclusions about the effectiveness of operation both in short (two-, three-year) and long sub-periods

(six-, seven-year). In order to get information about the stability of the ranking positions, as well as the efficiency of the entire pension fund market, Spearman's rank correlation coefficients have been calculated for the sub-periods of equal length. The following formulas of the ratios have been used:

- Calmar ratio [Pedersen and Rudholm-Alfvin 2003]:

$$\text{Calmar} = \frac{R}{\left|MDD_T\right|}$$

where R – annual rate of return.
The maximum decrease in the rate of return is defined by the following formula:

$$MDD_T = \min_u \left\{ \frac{S_u - \max_t S_t}{\max_t S_t} \right\}$$

- Omega ratio [Shadwick and Keating 2002]:

$$O = \frac{\frac{1}{T-1}\sum_{t=1}^{T} \max\left\{R_t - m, 0\right\}}{\frac{1}{T-1}\sum_{t=1}^{T} \max\left\{m - R_t, 0\right\}}$$

- The ratio of the excess rate of UPR return [Sortino et al. 1999]:

$$UPR = \frac{\frac{1}{T-1}\sum_{t:R_t>m}\left(R_t - m\right)}{\sqrt{\frac{1}{T-1}\sum_{t:R_t<m}\left(R_t - m\right)^2}}$$

where m is the minimum acceptable rate of return, in the study, it is assumed that it is equal to zero. Such an assumption is dictated by the fact that the period of studies includes good and bad stock exchange situation. In order to have one and the same minimum acceptable rate of return in the entire period, its prudential value equal to zero is assumed.

- Sortino ratio [Sortino and Price 1994]:

$$S = \frac{\bar{R} - m}{\theta(m)}$$

- Risk measure is defined as follows:

$$\overline{\theta(m)} = \sqrt{\frac{1}{T-1}\sum_{t=1}^{T}\left[\left(R_t - m\right)^-\right]^2}$$

In the brackets, the following formula appears:

$$(x)^{-} = \begin{cases} x, \text{ when } x \leq 0 \\ 0, \text{ when } x > 0 \end{cases}$$

Owing to this, the risk only takes into account the rate of return lower than the minimum acceptable rate of return. Therefore, it clearly refers to the loss because, $m = 0$ is assumed, as was mentioned in the studies.

THE ANALYSIS OF RANKING POSITION BASED ON PERFORMANCE COEFFICIENTS

Detailed studies of the investment efficiency measured with profits and losses ratios were performed on the basis of all the measurements mentioned in the introduction. The basis of the assessment were the monthly percentage changes of the funds share units, the commission and the managing fees were not included. The following tables include the ranking positions of the pension funds in selected sub-periods for all used measures. The funds are put in the alphabetical order. Due to limited space, we use abbreviations for names of pension funds as follows: Aegon – Ae, Alianz – Al, Amplico – Am, Aviva – Av, AXA – AX, Bankowy – Ba, Generali – Ge, ING – IN, Nordea – No, Pekao – Pe, Pocztylion – Po, Polasat – Pol, PZU – PZ, Warta – Wa. Performance coefficients are abbreviated as well, namely: Omega – O, Calmar – C, UPR – U, Sortino – S. The detailed results are given in folloming tables (Tables 1, 2, 3, 4).

As we can see in Tables 1, 2, 3 and 4 that Bankowy Fund relatively often appears in the 14th position in the rankings, especially in the longer sub-periods. As it is well known, that fund subsided with assets as a result of very poor investment results. Quantitative evaluation allows to express a very unflattering opinion about this fund. Pocztylion is in a little better condition. At the beginning of its operation, it most frequently occupied the penultimate, the 13th or 12th place. In the following periods those funds began to occupy a better position, but their positions were still quite low on the market. We can also see rather chaotic distribution of funds on the first position. Table 1 provides exceptions for two-year sub-periods. In 2000–2001 and 2002–2003 Polsat Fund was on the first position in the rankings. The some happened for the Generali Fund in 2006–2007 and 2008–2009. However such situation has not occurred for longer sub-periods. We may conclude that the funds are not able to maintain their high marketing ranking position for too long. They lose their leadership positions and quickly experience fall in the rankings. For example in 2000–2006 (six- and seven-year sub-periods) Polsat Fund held the first position in the rankings while in the remaining years, until 2013, it dropped to the last position. Our conclusions apply also to other funds, but the ranking position change is not as extreme as in the case of Polsat Fund. It should be remembered that saving in second pillar of the retire system by definition and character, should be long-term – dozens or tens of decades. The results indicate that in 2000–2013 there were no pension funds, which would be able to ensure the stability of the ranking position in the periods longer than two years.

Table 1. Coefficients of pension fund performance for two year sub-periods (desciptions of all symbols are in the text)

Item	2000–2001				2002–2003				2004–2005				2006–2007			
	O	C	U	S	O	C	U	S	O	C	U	S	O	C	U	S
Ae	9	9	10	9	9	11	10	9	9	10	9	9	8	7	10	8
Al	6	4	9	7	2	1	3	2	13	12	11	12	3	5	2	2
Am	13	13	14	13	7	9	6	6	4	1	2	2	4	4	5	3
Av	3	5	5	3	14	12	12	12	5	2	3	5	6	2	6	6
AX	4	2	6	6	12	14	13	13	1	5	6	4	7	6	7	7
Ba	14	14	13	14	4	4	5	4	12	11	10	10	13	13	14	13
Ge	5	6	4	5	10	8	9	11	6	7	4	6	1	1	1	1
IN	8	8	7	8	8	7	11	10	10	3	8	8	12	8	12	12
No	2	7	1	2	3	5	4	3	11	8	13	13	11	10	11	10
Pe	10	10	12	10	5	6	1	5	7	14	12	11	2	11	8	5
Po	12	11	11	12	13	13	14	14	8	9	7	7	10	9	9	9
Pol	1	1	2	1	1	2	2	1	3	4	1	1	9	14	13	11
PZ	7	3	3	4	6	3	8	7	14	13	14	14	5	3	3	4
Wa	11	12	8	11	11	10	7	8	2	6	5	3	14	12	4	14

Item	2008–2009				2010–2011				2012–2013			
	O	C	U	S	O	C	U	S	O	C	U	S
Ae	4	4	4	4	12	11	10	11	13	12	11	11
Al	2	1	2	2	8	6	4	7	5	5	7	7
Am	8	8	10	8	5	8	5	5	1	2	2	2
Av	14	14	14	14	7	7	7	8	10	13	13	13
AX	3	3	5	3	1	1	1	1	7	10	10	10
Ba	5	5	3	5	6	4	6	6	8	8	5	5
Ge	1	2	1	1	9	9	9	9	12	11	12	12
IN	13	12	12	13	4	3	8	4	3	4	8	8
No	7	7	11	7	2	2	2	2	2	1	1	1
Pe	11	10	8	10	11	12	12	12	11	6	9	9
Po	6	6	7	6	13	13	13	13	6	3	3	3
Pol	10	13	13	12	14	14	14	14	14	14	14	14
PZ	9	9	9	9	10	10	11	10	9	9	6	6
Wa	12	11	6	11	3	5	3	3	4	7	4	4

Table 2. Coefficients of pension fund performance for three year sub-periods (desciptions of all symbols are in the text)

Item	2000–2002				2003–2005				2006–2008				2009–2011			
	O	C	U	S	O	C	U	S	O	C	U	S	O	C	U	S
Ae	6	8	8	8	13	14	11	12	9	9	8	9	11	10	8	11
Al	3	3	7	4	8	3	8	8	1	1	1	1	10	9	9	10
Am	11	9	13	13	6	9	6	5	6	6	9	6	3	4	7	5
Av	8	8	5	6	7	8	5	6	10	10	12	10	9	7	10	8
AX	9	7	9	9	4	7	7	7	4	4	5	4	1	1	1	1
Ba	14	12	14	14	12	12	10	10	13	13	13	13	2	3	3	2
Ge	7	6	6	7	5	6	4	4	2	2	2	2	4	2	4	4

Table 2, cont.

Item	2000–2002				2003–2005				2006–2008				2009–2011			
	O	C	U	S	O	C	U	S	O	C	U	S	O	C	U	S
IN	5	13	4	5	14	13	14	14	11	11	11	11	8	6	11	9
No	1	10	1	1	11	10	13	13	8	8	7	8	7	5	5	6
Pe	10	1	12	11	3	1	3	3	3	3	3	3	12	12	12	12
Po	13	11	11	12	9	11	9	9	7	7	6	7	14	14	13	14
Pol	2	2	3	2	1	2	1	1	14	14	14	14	5	13	2	3
PZ	4	5	2	3	10	5	12	11	5	5	4	5	13	11	14	13
Wa	12	4	10	10	2	4	2	2	12	12	10	12	6	8	6	7

Table 3. Coefficients of pension fund performance for year sub-periods (desciptions of all symbols are in the text)

Item	2000–2003				2004–2007				2008–2011			
	O	C	U	S	O	C	U	S	O	C	U	S
Ae	7	8	9	8	9	7	8	9	9	6	6	8
Al	3	3	5	3	7	8	5	5	2	1	1	2
Am	11	12	13	13	2	3	2	2	6	8	11	7
Av	9	5	6	6	5	2	3	4	12	13	13	13
AX	8	4	10	9	3	5	4	3	1	2	4	1
Ba	14	14	14	14	14	12	14	14	5	5	3	5
Ge	5	6	4	5	1	1	1	1	4	4	2	3
IN	6	9	7	7	12	6	10	11	8	7	12	9
No	2	7	1	2	13	10	12	13	3	3	5	4
Pe	10	10	11	11	4	13	9	6	13	12	9	12
Po	13	11	12	12	11	9	6	7	11	10	8	11
Pol	1	1	2	1	6	14	11	10	14	14	14	14
PZ	4	2	3	4	8	4	7	8	10	11	10	10
Wa	12	13	8	10	10	11	13	12	7	9	7	6

Table 4. Coefficients of pension fund performance for five-, six-, seven-year sub-periods (desciptions of all symbols are in the text)

Item	Five-year sub-period								Six-year sub-period							
	2000–2004				2005–2009				2000–2005				2006–2011			
	O	C	U	S	O	C	U	S	O	C	U	S	O	C	U	S
Ae	7	7	7	6	8	6	7	7	7	7	6	8	8	6	7	7
Al	3	3	6	5	3	3	2	2	3	4	8	6	2	1	1	2
Am	12	12	13	13	2	4	4	3	11	12	13	12	4	4	5	4
Av	9	5	5	8	12	11	14	14	8	5	5	5	12	12	13	12
AX	5	4	9	7	4	2	6	5	4	3	9	7	3	3	3	3
Ba	14	14	14	14	14	13	11	13	14	14	14	14	10	11	10	10
Ge	6	6	4	4	1	1	1	1	5	6	3	3	1	2	2	1
IN	10	9	10	10	11	8	13	12	10	9	10	9	11	10	12	11
No	2	8	1	2	10	10	10	10	2	8	2	2	6	5	6	6
Pe	8	10	11	9	7	9	5	6	9	10	11	11	5	9	4	5
Po	13	11	12	12	6	5	3	4	13	11	12	13	9	7	8	9

Table 4, cont.

Item	2000–2004				2005–2009				2000–2005				2006–2011			
	O	C	U	S	O	C	U	S	O	C	U	S	O	C	U	S
Pol	1	1	2	1	5	14	12	8	1	1	1	1	14	14	14	14
PZ	4	2	3	3	9	7	9	9	6	2	4	4	7	8	9	8
Wa	11	13	8	11	13	12	8	11	12	13	7	10	13	13	11	13

Item	Seven-year sub-period							
	2000–2006				2007–2013			
	O	C	U	S	O	C	U	S
Ae	9	7	8	9	8	6	7	7
Al	3	4	6	4	2	1	1	1
Am	12	12	13	13	1	3	4	2
Av	10	5	5	6	12	11	13	13
AX	7	3	10	8	4	4	6	5
Ba	14	14	14	14	6	8	5	6
Ge	4	6	3	3	5	5	2	4
IN	5	9	11	11	7	7	12	8
No	2	8	2	2	3	2	3	3
Pe	6	10	9	7	9	12	8	9
Po	13	11	12	12	11	9	9	10
Pol	1	1	1	1	14	14	14	14
PZ	8	2	4	5	10	10	10	11
Wa	11	13	7	10	13	13	11	12

THE PERSISTENCE OF PENSION FUNDS

The precise support of applications at the quantitative level, according to the study of persistence, i.e. stability of the ranking position of funds, is measured with Spearman's rank correlation coefficient:

$$r_s = 1 - \frac{6\sum_{i=1}^{n} d_i}{n\left(n^2 - 1\right)}$$

where: d_i – difference between the ranks assigned to both characteristics for i and $i + 1$ observation unit;
n – sample size.

In order to get an answer to the question about the stability of ranking positions of the fund, the following hypotheses were tested:

- H_0: $r_s = 0$ – rank correlation coefficient is statistically insignificant (not significantly different from 0);
- H_1: $r_s \neq 0$ – rank correlation coefficient is statistically significant (significantly different from 0).

The test statistic $t = \frac{r_s}{\sqrt{1-r_s^2}}\sqrt{n-2}$ has the t-Student distribution with $v = n - 2$ degrees of freedom. The null hypothesis rejection area is determined by the value of read from the tables with critical values of t-Student distribution. In all cases, a significance level was equal to 0.05. It should be noticed that the Spearman's correlation ratio is used with the small amount of data, as it is in the above case (14th ranking positions). That is the reason why more complex methods of evaluating the persistence for example based on regression were not used.

The following tables (Tables 5, 6, 7) contain the results obtained for all the performance ratios (Omega, Calmar, UPR and Sortino measures).

Table 5. Spearman's rank correlation coefficients between performance measures for two-year sub-periods

Coefficient	2000–2001 / / 2002–2003	2002–2003 / / 2004–2005	2004–2005 / / 2006–2007	2006–2007 / / 2008–2009	2008–2009 / / 2010–2011	2010–2011 / / 2012–2013
Calmar	0.2176	–0.4110	0.1604	0.2703	0.1780	0.3011
Omega	0.1429	–0.4462	–0.0066	0.3143	–0.0549	0.7011[a]
UPR	–0.0066	–0.2112	0.0704	0.3608	0.1956	0.3802
Sortino	0.1385	–0.2527	–0.1692	0.4198	0.0857	0.5429[a]

[a] Statistically significant results.

Table 6. Spearman's rank correlation coefficients between performance measures for three- and four-year sub-periods

Coefficient	Three-year sub-period			Four-year sub-period	
	2000–2002 / / 2003–2005	2003–2005 / / 2006–2008	2006–2008 / / 2009–2011	2000–2003 / / 2004–2007	2004–2007 / / 2008–2011
Calmar	0.4022	0.3319	0.1121	0.2220	0.1912
Omega	–0.1341	0.1209	–0.2088	0.1209	–0.0066
UPR	–0.2747	–0.0637	–0.2879	–0.0286	0.0462
Sortino	–0.2132	0.0330	–0.2571	–0.0330	0.1253

Table 7. Spearman's rank correlation coefficients between performance measures for five-, six- and seven-year sub-periods

Coefficient	Five-year sub-period	Six-year sub-period	Seven-year sub-period
	2000–2004 /2005–2009	2000–2005 /2006–2011	2000–2006 /2007–2013
Calmar	0.1912	0.1648	0.0198
Omega	0.3495	0.2967	0.1254
UPR	–0.2044	–0.1560	–0.1033
Sortino	0.1516	0.0505	–0.0637

Grey shaded areas in Table 5 show statistically significant results. As it is seen, it concerns only two of the four ratios and only the last two-year sub-periods. It confirms the results conducted in the previous section. Apart from that there is no correlation between the ranking positions occupied by pension funds in various sub-periods both short (two-, three-year sub-periods) and long (six- to seven-year sub-period). We therefore may conclude that on the Polish pension fund market there are no strong leaders who, through their investment policy, become especially attractive entities for its customers. It is definitely the situation that shows the managers of investment portfolios in a bad light. High ranking position is motivating for managers, who want to improve their results. This is not the case here. According to the authors, the reasons could be found in the two aspects of the pension fund market. Firstly, the principles of assessment of fund performance, established by the legislative body, were (up to the end of 2013) based on the benchmark constructed by funds themselves, and not on the parameters independent of them and related to the capital market. From the enigmatic interviews incidentally appearing in the press, we may get the impression that the managers were trying to achieve the results only slightly higher than the projected benchmark so as not subsidize the assets. On the other hand, good results, different from the results achieved by other pension funds, would increase the "bar", which could hardly translate into the profits of the fund itself. The level of the fee, which, in the meantime, had changed and was made dependent on fund performance, had to motivate the managers to manage portfolios better. However, they proved to be inefficient. Another explanation for the results obtained, related to some extent to the first one, is the fact that the vast majority of new fund participants have not had chosen a pension fund in a conscious and well-thought manner, but rather submitted to the result of the lottery-drawing. The choice of open-end pension fund by new participants appears random, and not based on previous performance. If so, the managers have not had to lobby for their company, because new participants of the funds were not interested in their performance.

CONCLUSIONS

The profits of fund owners depend on the number of fund participants, but they do not have a significant impact on how many people decide to choose a particular fund. The reason is probably low investment awareness of young people, at least in the context of pensions, i.e. payments that occur in 30 or 40 years. Hence, their decision leave the choice of pension funds to blind fate. However, the situation seems to be improving, which can be seen by a choice of pension funds instead of ZUS, which was made by the end of July 2014 by more than 2.7 million people. It showed a conscious belief that the capital market will "take care" of their pensions rather than politicians, on whom the first pillar of pension system in Poland is based.

The authors are aware of the fact that the presented analysis is far from being complete, in particular, the impact of the financial crisis on the results of pension funds was not taken into account. This is a separate issue, which was partially analyzed in the previous works and mainly concerned equity, balanced and stable growth open-end mutual funds. Therefore, taking into account the impact of the financial crisis on the pension fund

market constitutes the next step in the market analysis of these entities. The second aspect, currently researched, is the persistence based on the Information ratio and Sharpe--Israelsen's ratios. Both of these measures include the market factor independent of the pension funds themselves but refer to the capital market. Thus, the assessment of the effectiveness of the investment is then deprived of deficiency, as mentioned above. Here, the case is the evaluation based on the benchmark constructed on the basis of the results achieved by the funds themselves, and not the market indicator independent of them.

In conclusion, it should be mentioned that, in the previous work [Karpio and Żebrowska-Suchodolska 2012] it was shown that the markets of pension funds and open--end stable growth mutual funds are very similar. However, the studies related only to the period 2005–2010 and were carried out on the basis of different methods. The basis of earlier deliberations of the authors was the alpha coefficient in the characteristic line, where the market factor was the WIG index. The application of the three methods used for assessing the investment policy yielded similar values in the case of pension and stable growth mutual funds, and two of the three methods showed a variable activity prevailing in the stable growth and pension fund markets. It should be noted, however, that the methods used presented only joint-stock part of the portfolio of funds. Therefore, the results for the years 2000–2013 obtained in the present study little differ from those formulated for the years 2005–2010.

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WYNIKI INWESTYCYJNE POLSKICH OTWARTYCH FUNDUSZY EMERYTALNYCH I ICH PERSYSTENCJA

Streszczenie. Praca dotyczy oceny wyników inwestycyjnych osiąganych przez 14 funduszy emerytalnych funkcjonujących na polskim rynku w latach 2000–2013. Do oceny wykorzystano współczynniki: Calmara, Omega, potencjał nadwyżkowej stopy zwrotu (UPR) oraz Sortino, biorąc pod uwagę różne okresy czasu (dwa, trzy, cztery, pięć, sześć i siedem lat). Persystencję osiąganych wyników zbadano, obliczając współczynnik korelacji rangowej Spearmana dla wspomnianych podokresów. Uzyskane wyniki wskazują na przypadkowość pozycji rankingowych zajmowanych przez fundusze emerytalne w kolejnych okresach. Prawie wszystkie współczynniki korelacji Spearmana okazały się statystycznie nieistotne.

Słowa kluczowe: efektywność, miary wyników inwestycyjnych, rankingi funduszy emerytalnych, korelacja

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COMPARISON OF EUROPEAN CAPITAL MARKETS

Krzysztof Kompa
Warsaw University of Life Sciences – SGGW

Dorota Witkowska
University of Łódź

Abstract. Financial systems in European post-communist countries have been developing for two decades of market transformation, and in majority of Central and Eastern European states capital markets were created. Therefore the aim of the paper is to compare the level of development of these stock exchanges to the ones in developed economies. In the paper the analysis of capital markets, affiliated with the Federation of European Securities Exchanges (FESE) is provided. Investigation concerns the situation on stock exchanges in Europe in the time span 2000–2011, with the special emphasis on the stock exchanges operating in the post-communist states. The research is provided on the basis of FESE data, using single and multidimensional analysis. The European stock exchanges are classified to the homogenous groups applying synthetic measure of development.

Key words: capital market, FESE, taxonomic measure, capitalization, turnover, liquidity

INTRODUCTION

Transformation in Europe's former communist countries, which started over 25 years ago, results in their reintegration into the global economy, and – in most cases – major improvements in living standards. Liberalization of trade and prices was relatively easy and came quickly but institutional reforms in such areas as governance, competition policy, labor market, privatization and changes of the enterprise structure seem to be very difficult tasks since they often faced opposition from vested interests.

During the communist era, financial systems in Central and Eastern Europe (CEE) had a purely passive role. During transformation the structural changes were launched to

Corresponding author: Krzysztof Kompa, Warsaw University of Life Sciences – SGGW, Financial Engineering Chair, Nowoursynowska 166, 02-787 Warszawa, Poland,
e-mail: krzysztof_kompa@sggw.pl

set up capital markets to facilitate ownership changes; to modernize and strengthen the banks; to improve regulatory and accounting standards; and to modernize the tax system based on income tax and VAT.

There have been numerous studies, which examined the development of capital markets however investigation concerning the transition markets in the CEE region has been provided rather rarely. The research describing and comparing financial markets in European countries in transition are presented by: Koivu [2002], Gilmore and McManus [2002], Voronkova [2004], Gunduz and Hatemi [2005], Syriopoulos [2007], Foo and Witkowska [2008a, b], Gilmore et al. [2008], Krawczyk [2008], Shostya et al. [2008], Witkowska and Zdziarski [2008], Kompa and Witkowska [2011], Witkowska et al. [2012] to mention some examples.

The aim of the paper is to compare the level of development of emerging capital markets to the developed ones in Europe. The analysis of stock exchanges, operating in the post-communist states, against the securities exchanges, created the developed markets, is provided for the years 2000–2011. The research concerns only stock exchanges affiliated with The Federation of European Securities Exchanges (FESE), and is provided on the basis of FESE data. The position of selected stock exchanges is evaluated employing synthetic measure of development, which is also used to classify European stock exchanges to the homogenous groups. Section 1 discusses capital markets in Europe, Section 2 describes methods used for empirical analysis, Section 3 compares European capital markets, Section 4 contains the empirical analysis provided with application of the synthetic measure of development, and Section 5 concludes.

CAPITAL MARKETS IN EUROPE

According to the general tendencies on capital markets, after the Second World War stock exchanges were present in all market-oriented economies, and they created domestic capital markets that are represented by one (like in Austria) or more stock exchanges (for instance there are four stock exchanges in Spain). Intensification of the integration process and financial market globalization in recent years, cause creation of regional stock exchanges in Europe like Euronext, OMX Exchanges being Pan-European institutions and CEE Stock Exchange Group (CEESEG). Euronext bases on Amsterdam, Brussels, London, Lisbon and Paris Stock Exchanges. OMX Exchanges operates eight stock exchanges in Nordic (i.e. Copenhagen, Stockholm, Helsinki and Iceland Stock Exchanges) and Baltic countries (i.e. Tallinn, Riga and Vilnius Stock Exchanges), together with Armenian Stock Exchange. While CEESEG is a holding company comprising the stock exchanges in Vienna, Budapest, Ljubljana and Prague.

In the years 2004, 2007 and 2013, eleven post-communist states (together with Malta and Cyprus) became members of European Union. Financial systems in transition countries in Europe have undergone for over two decades of market transformation. Among emerging capital markets one can distinguish) four groups presented in Table 1.

Table 1. Stock exchanges inception dates

Early reformers		Laggards		Late reformers		Countries without stock exchange
Slovenia	(1989)	Kazakhstan	(1993)	Belarus	(1998)	Albania
Serbia	(1989)	Latvia	(1993)	Georgia	(1999)	Bosnia and Herzegovina
Hungary	(1990)	Lithuania	(1993)	Azerbaijan	(2000)	
Bulgaria	(1991)	Kyrgyzstan	(1994)	Armenia	(2001)	Tajikistan
Croatia	(1991)	Estonia	(1995)	Ukraine	(2002)	Turkmenistan
Poland	(1991)	FYR of Macedonia	(1995)			Uzbekistan
Slovakia	(1991)	Moldova	(1995)			
Czech Republic	(1992)	Romania	(1995)			
		Russia	(1995)			

Source: Shostya et al. [2008].

The first group contains eight countries, which – except Serbia – became European Union members in 2004 (Slovenia, Hungary, Poland, Slovakia and Czech Republic), in 2007 (Bulgaria) and in 2013 (Croatia). Six countries that belonged to the former Soviet Union (USSR) and three from South-Eastern European countries create the second group of countries. Among them Baltic states (Latvia, Lithuania and Estonia) joint EU in 2004 while Romania became the EU member in 2007.

All countries in the third group together with Kazakhstan, Kyrgyzstan, Moldova and Russia from the second class, and Tajikistan and Turkmenistan from the last group were USRR republics in the past. These states have been members of the Commonwealth of Independent States (CIS), although Ukraine has never been a formal member of CIS and in March 2014 the Ukraine's Parliament decided to withdraw from CIS. While Georgia made such decision in August 2008 and the withdrawal was effective in August 2009.

It is worth mentioning that even in states, which are classified by Shostya et al. [2008] to the fourth group, the capital markets have been created. In Bosnia and Herzegovina the Sarajevo Stock Exchange (SASE) has been operating since 2002, but with 5-day a week trading only from 2007. Tirana Stock Exchange was established in 1996 as department of Bank of Albania. Since 2002 it has been operating with full license working 2-day a week (two hours a day). In Turkmenistan only the State Commodity and Row Materials Exchange exists. The stock exchange in Uzbekistan – Toshkent Republican Stock Exchange (TRSE) was formally founded in the year 1991 with target closely to the performance of the market – selling shares of privatized enterprises (especially to the foreign investors). Real financial impact of TRSE shifts this exchange to the last group since in the year 2005 only 5,814 transactions with the shares of 643 join-stock companies were carried out.

Development of computer sciences and telecommunication together with legislation changes caused globalization of financial markets, i.e. investors from any place in the world may make transactions on every market (to some extend of course since there are limitations on some markets and states). Thus the role and range of financial market have been changed. Considering capital markets, we observe that they lost their traditional functions such as reallocation of capital from investors to companies or evaluation the market value of companies listed on the stock exchange. It is the result of introduction of

new electronic platforms, trading systems and techniques (high frequency trading, mass trading, black-box or algo-trading, farming etc.), as well as new investment instruments, which cause the increase of the role of big – institutional investors and decrease (or even practically elimination) of individual ones. In such a case financial institutions are focused on high profits regardless the risk of transactions, and do not pay attention enough to the situation of their clients and/or the shareholders earnings. In result, in recent years we have been observing several financial crises, which had not their sources in economic problems but are caused by taking too high risk by investors.

METHOD DESCRIPTION

In socio-economic research phenomena and objects, being under analysis, are usually described by many features, which may influence the development of the phenomenon (or the object) in different way. Therefore among descriptive variables we distinguish stimulants and destimulants. The increase of former is conductive to the development of the phenomenon while the increase of the latter negatively influences the level of development.

The methods that allow comparing different markets can be divided into two groups: descriptive and evaluative. The former consists in description and comparison the objects, that are described by many features, using simple statistical tools as index numbers or averages and dispersion measures. The latter consists in construction of the synthetic measure that describes objects in multi-dimensional space.

In our investigation the synthetic measure of development is applied. The taxonomic measure *SM* is evaluated for each security exchange for the years 2000–2011, and it defines the distance between the benchmark and analyzed stock exchange in the level of development. The benchmark is defined as the hypothetical object that is characterized by maximal values of stimulants and minimal values of destimulants. Maximal and minimal values are estimated for every year separately, taking into consideration all analyzed stock exchanges. A detailed description of the methodology is presented in Kompa [2012].

The synthetic measure informs about the distance of the object from the benchmark, i.e. $SM_{it} \in [0; 1]$. Since the position of the certain capital market changes in time it is convenient to create classes of homogenous objects. Therefore after evaluation of synthetic measures SM_{it}, we classify the stock exchanges into four groups according to the different levels of development, from the least developed belonging to the Class 1 to the most developed – Class 4, i.e.:

Class 1: $SM_{it} < SM_t - S_{SMt}$ Class 3: $SM_t + S_{SMt} > SM_{it} \geq SM_t$

Class 2: $SM_t > SM_{it} \geq S_{Mt} - S_{SMt}$ Class 4: $SM_{it} \geq SM_t + S_{SMt}$

where for each period *t*: SM_t and S_{SMt} are average and standard deviation of the synthetic measure SM_{it}, respectively.

COMPARISON OF CAPITAL MARKETS

Our investigation concerns 22 selected stock exchanges from: European Union member states, Armenia, Iceland, Norway, Switzerland and Turkey (Table 2), being members of Federation of European Securities Exchanges. Since the research concerns 12 years, not all necessary data are available in FESE database thus in cases of missing observations data are imputed[1] (for instance in 2007 Borsa Italiana merged London Stock Exchange and seceded from FESE thus for these Securities Exchanges there is lack of data concerning last years). The analysis is provided in two stages. The fist one concerns the selected features that describe capital markets while the second one consists in construction and evaluation of aggregated measures of development.

Table 2. List of stock exchanges

Stock Exchanges	Abbreviations	Stock Exchanges	Abbreviations
Athens Stock Exchange	ATEX	Deutsche Börse	DBAG
BME (Spain)	BME	Irish Stock Exchange	ISE
Borsa Italiana	Borsa	Istanbul Stock Exchange	BIST
Bratislava Stock Exchange	BSSE	London Stock Exchange	LSE
Bucharest Stock Exchange	BVB	Luxembourg Stock Exchange	BdL
Bulgarian Stock Exchange	Sofia	Malta Stock Exchange	MSE
CEESEG – Budapest	BSE	NASDAQ OMX Nordic	OMX
CEESEG – Ljubljana	LJSE	NYSE Euronext	NEXT
CEESEG – Prague	PSE	Oslo Børs	OSE
CEESEG – Vienna	VSE	SIX Swiss Exchange	SIX
Cyprus Stock Exchange	CSE	Warsaw Stock Exchange	WSE

Source: Own elaboration.

Tables 3 and 4 contains values of the market capitalization that are observed at the end of the year. The world financial crisis is visible by declining of capitalization of all stock exchanges after the year 2007, except Istanbul Stock Exchange, which has been intensively developing, obtaining in 2011 the increase of the market capitalization by 97% in comparison to the base from the year 2007. FESE average capitalization decreased in 2008 by 47%, in 2009 by 28%, in 2010 by 16.5% and in 2011 by 27% in comparison to the year 2007. The biggest loses are observed at Cyprus Stock Exchange: 72, 64.5, 75 and 89% from the capitalization in the years 2007–2011, respectively. Full recovery from the crisis is visible in 2010 for three securities exchanges: SIX Swiss Exchange (which capitalization increased in 2010 by 5.4% in comparison to 2007), London Stock Exchange (which capitalization increased in 2010 by 2.2% in comparison to 2007), and Warsaw Stock Exchange (which capitalization in 2010 was smaller only by 1.4% in comparison to 2007). However the situation in 2011 was not as good as in the previous year, and capitalization of the majority of European markets essentially decreased.

[1] We employ data from other sources such as the websites of stock exchanges, as well as from Eurostat and World Bank.

Table 3. Market capitalization – end of the year 2000–2005 (million EUR)

Stock Exchanges	2000	2001	2002	2003	2004	2005
Athens SE	117,956	96,950	65,760	84,547	92,140	123,033
BME (Spain)	537,044	525,840	443,097	575,766	692,053	813,812
Borsa Italiana	818,384	592,319	457,992	487,446	580,881	676,606
Bratislava SE	3,556	3,890	2,514	2,204	3,239	3,729
Bucharest SE	451	1,361	2,646	2,991	8,819	13,535
Bulgarian SE	145	572	704	1,397	2,062	4,312
CEESEG – Budapest	12,810	11,565	12,493	13,228	21,039	27,586
CEESEG – Ljubljana	3,335	3,839	5,355	5,660	7,115	6,697
CEESEG – Prague	12,313	8,999	9,796	12,288	21,720	31,059
CEESEG – Vienna	31,884	28,307	32,235	44,811	64,577	107,036
Cyprus Stock Exchange	12,402	6,572	4,505	3,807	3,588	5,580
Deutsche Börse	1,352,936	1,203,681	627,283	802,224	849,717	1,019,171
Irish Stock Exchange	87,212	84,567	57,540	67,444	83,933	96,722
Istanbul Stock Exchange	199,029	123,950	137,327	73,145	56,164	33,783
London Stock Exchange	2,744,691	2,413,272	1,708,260	1,923,168	2,071,775	2,592,623
Luxembourg SE	36,231	26,711	23,569	29,598	36,891	43,448
Malta Stock Exchange	2,169	1,528	1,319	1,467	2,090	3,474
NASDAQ OMX Nordic	786,479	580,449	385,247	468,199	542,290	704,678
NYSE Euronext	2,483,040	2,122,048	1,477,108	1,646,178	1,796,036	2,294,828
Oslo Børs	70,477	78,372	65,271	75,779	104,051	161,934
SIX Swiss Exchange	845,865	591,961	521,560	576,462	609,929	793,019
Warsaw Stock Exchange	33,761	28,846	27,055	29,350	51,888	79,353
FESE average	463,281	387,982	275,847	314,871	350,091	438,001

Source: Own elaboration on the basis of www.fese.be.

Table 4. Market capitalization – end of the year 2006–2011 (million EUR)

Stock Exchanges	2006	2007	2008	2009	2010	2011
Athens SE	152,208	181,233	64,737	78,505	50,379	26,020
BME (Spain)	1,003,299	1,231,086	680,632	999,875	873,329	794,170
Borsa Italiana	778,501	733,614	374,702	457,126	425,099	332,374
Bratislava SE	4,214	4,555	3,907	3,614	3,380	4,183
Bucharest SE	18,858	21,524	6,474	8,402	9,776	10,818
Bulgarian SE	7,830	14,821	6,371	6,031	5498	6,358
CEESEG – Budapest	31,687	31,528	13,326	20,888	20,624	14,630
CEESEG – Ljubljana	11,513	19,740	8,468	8,462	7,028	4,873
CEESEG – Prague	34,693	47,987	29,615	31,266	31,922	29,203
CEESEG – Vienna	151,013	161,731	54,752	79,511	93,944	65,683
Cyprus Stock Exchange	12,254	20,160	5,733	7,157	5,094	2,198
Deutsche Börse	1,241,963	1,439,955	797,063	900,772	1,065,712	912,420
Irish Stock Exchange	123,824	98,431	35,519	42,720	44,999	83,495
Istanbul Stock Exchange	53,440	77,463	85,279	163,576	229824	152,453
London Stock Exchange	2,876,986	2,634,577	1,352,327	1,950,048	2,693,178	2,516,122
Luxembourg SE	60,303	113,597	47,809	73,219	75,381	52,093
Malta Stock Exchange	3,416	3,854	2,567	2,844	3,222	2,641
NASDAQ OMX Nordic	851460	849,923	404,137	569,604	776,821	648,670

Table 4, cont.

Stock Exchanges	2006	2007	2008	2009	2010	2011
NYSE Euronext	2,812,261	2,888,313	1,508,423	1,999,967	2,184,076	1,884,745
Oslo Børs	212,272	241,683	101,982	157,774	219,512	170,048
SIX Swiss Exchange	919,342	869,377	616,234	738,707	916,707	835,090
Warsaw Stock Exchange	112,826	144,323	65,178	105,157	142,272	107,483
FESE average	521,553	537,704	284,783	382,056	448,990	393,444

Source: Own elaboration on the basis of www.fese.be.

Another important feature describing capital market is turnover. As one can notice (Fig. 1), the biggest turnover is observed for London Stock Exchange, NYSE Euronext and Deutsche Börse. Again the world financial crisis is visible beginning from the year 2008 when turnover declined dramatically till 2009 and 2010, with the exception of Istanbul Stock Exchange. Observing capital markets in post-communist states we notice that the biggest turnover is observed in Poland, Hungary and Czech Republic (Fig. 2).

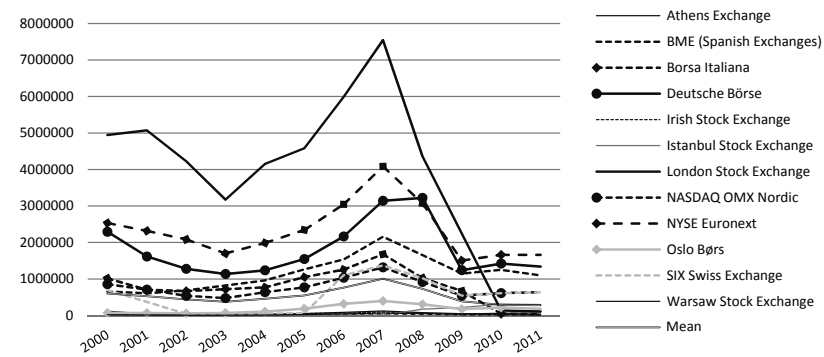

Fig. 1. Turnover of European markets (million EUR)

Source: Own elaboration on the basis of www.fese.be.

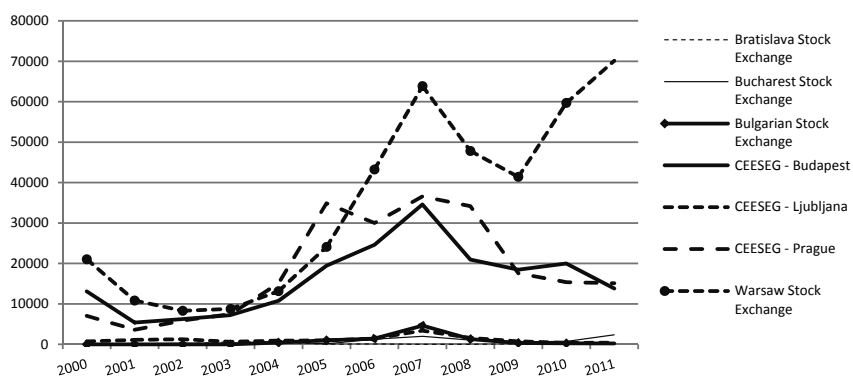

Fig. 2. Turnover in post-communist states (million EUR)

Source: Own elaboration on the basis of www.fese.be.

Another important information about the capital market is number of companies listed on the stock exchange (Fig. 3), which is the biggest for Spanish Exchanges (beginning from 2002), London Stock Exchange, Euronext and German market. Malta Stock Exchange has the smallest number of companies listed (from 10 in 2000 to 21 in 2011).

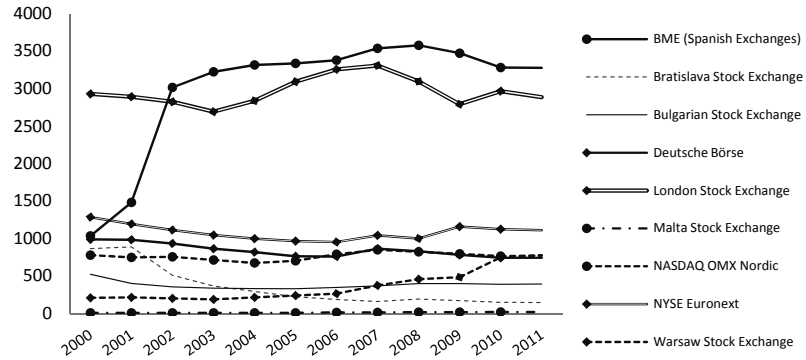

Fig. 3. Number of companies listed for selected stock exchanges

Source: Own elaboration on the basis of www.fese.be.

However, number of companies listed does not inform about the economic potential of the enterprises and institutions listed on the stock exchange. Therefore the average capitalization per company ratio (in million EUR) is often used in analysis. The smallest firms are observed in Bulgarian and Bratislava Stock Exchanges (0.28 in 2000 to 16.18 in 2011) while the biggest in Borsa Italiana in 2000–2005 (from 1,555 to 2,755.5), Euronext in 2006–2007 (from 2,769 to 2,948), and SIX Swiss Exchange in 2008–2011 (1,908 to 3,251). The smallest FESE average was observed in 2002 (411) and 2008 (489), while the biggest in 2006 and 2007 (923 and 924). New capital markets are characterized by smaller than average value of this ratio with the exception of Czech market for which the ratio has been exceeding the FESE average since 2005 (Fig. 4).

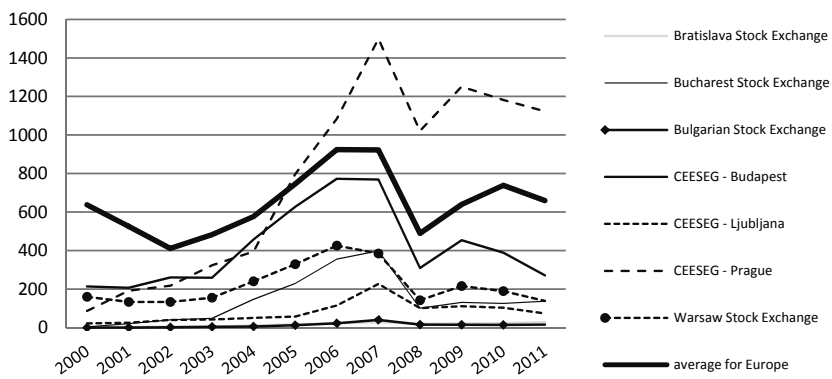

Fig. 4. Average per company capitalization ratio (million EUR) for transitional economies

Source: Own elaboration on the basis of www.fese.be.

Number of IPOs informs about "popularity" of the certain stock exchange, which assures gaining capital via public offering. This feature is often used as an essential descriptor of the capital market development. Unfortunately data regarding this variable is not available for many stock exchanges. The biggest number of IPOs has been observed in London Stock Exchange, Euronext and Warsaw Stock Exchange, which became a leader in 2011.

The most accepted definition of liquidity is ability to convert stocks into cash and vice versa without affecting the price or with minimal impact on price [Bogdan et al. 2012]. Liquidity is the ease of trading a security [Amihud et al. 2005] that just makes it one of the key elements upon which the investor will decide whether or not to invest. Since quick execution of orders and ability to convert in cash at the lowest costs are very important. Selling an illiquid stock quickly can be difficult or even impossible without accepting a lower price. The least liquid (i.e. ratio not bigger than 0.003) stock exchanges were in Bratislava in years 2000 and 2008, in Bulgaria 2001–2002 and Luxemburg in years 2003––2007 and 2009–2011. While the most liquid stock exchanges obtained the ratio value from 1.4 (in 2010) to 4.0 (in 2008). The first place was hold by London Stock Exchange in years 2000–2007, the capital market in Germany in 2008, Italy in 2009, Spain in 2010 and Istanbul Stock Exchange in 2011. Among post-communist economies (Fig. 5) the most liquid markets are in Budapest and Prague for which liquidity ratios oscillate around the FESE average, and Warsaw (below FESE average).

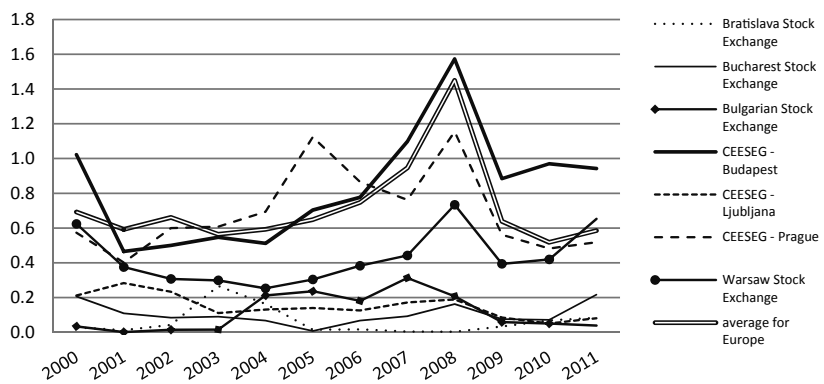

Fig. 5. Liquidity ratios evaluated for transitional economies

Source: Own elaboration on the basis of www.fese.be.

The role of capital market in the economy is measured by the ratio describing the share of market capitalization in GDP is used. This ratio is not less than 0.2 for the most developed capital markets (Fig. 6), and it obtains value from 1.65 to 3.25 for the SIX Swiss Exchange and Luxembourg Stock Exchange. While for the economies in transition this ratio is much smaller (Fig. 7) obtaining the biggest value for stock exchanges in Budapest in years 2000–2001 (0.20–0.25), Ljubljana in years 2001–2004 and 2007–2008 (0.23–0.61), and Warsaw in years 2005–2006 and 2009–2010 (from 0.31 to 0.44).

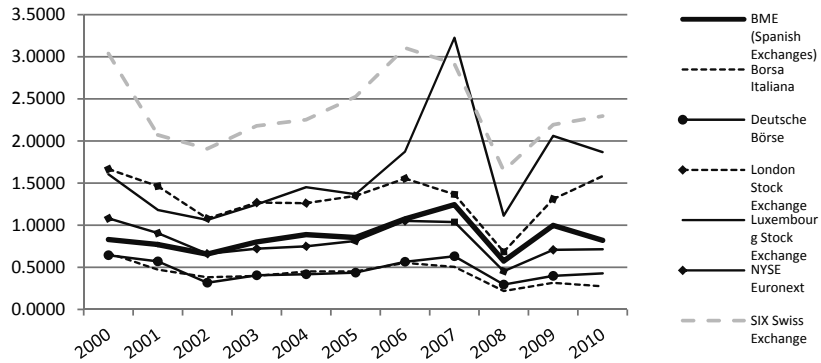

Fig. 6. Market capitalization to GDP ratio on developed markets

Source: Own elaboration on the basis of www.fese.be.

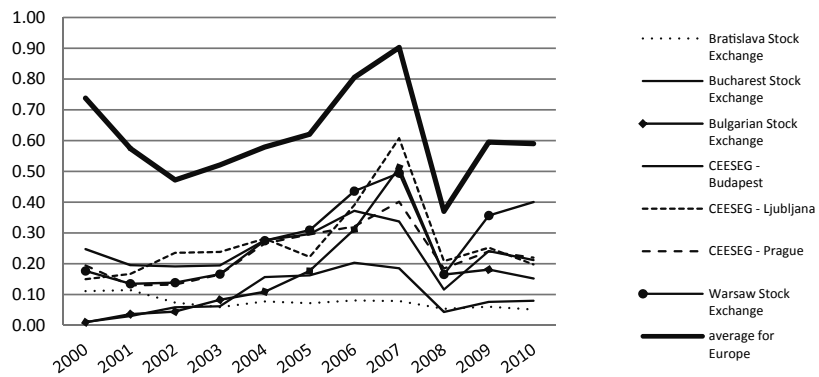

Fig. 7. Market capitalization to GDP ratio in post-communist states

Source: Own elaboration on the basis of www.fese.be.

SYNTHETIC MEASURE OF DEVELOPMENT

To construct synthetic taxonomic measure six, described above, variables are applied: capitalization, number of companies listed, turnover, liquidity ratio, i.e. turnover to capitalization, capitalization to GDP ratio, average capitalization of the company, i.e. capitalization/number of companies listed[2]. All of them are stimulants, i.e. the increase of them, positively influences the development of the analyzed capital market. Thus the benchmark is the hypothetical object, defined for every year separately, that consists of the maximal values of each variable observed in every year of investigated period. The bigger value of SM_{it} means the smaller distance to the benchmark, and higher position in the ranking of capital markets. Values of the measure *SM* are presented in Table 5.

[2] To construct the aggregated measure all available FESE data are used.

Table 5. Values of taxonomic measures SM_{it} for markets in years 2000–2011

Exchange	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
ATHEX	0.279	0.272	0.243	0.256	0.239	0.241	0.243	0.243	0.221	0.233	0.197	0.209
BME	0.377	0.423	0.429	0.474	0.466	0.458	0.453	0.474	0.476	0.539	0.477	0.496
Borsa	0.398	0.391	0.387	0.395	0.389	0.379	0.375	0.380	0.363	0.388	0.251	0.246
BSSE	0.202	0.218	0.180	0.188	0.168	0.149	0.140	0.132	0.135	0.145	0.129	0.146
BVB	0.163	0.176	0.165	0.168	0.167	0.159	0.158	0.154	0.140	0.152	0.135	0.161
BSE-Sofia	0.178	0.188	0.169	0.175	0.175	0.173	0.170	0.178	0.164	0.166	0.145	0.155
BSE	0.215	0.217	0.210	0.214	0.216	0.217	0.215	0.214	0.200	0.226	0.204	0.214
LJSE	0.174	0.201	0.191	0.187	0.179	0.165	0.166	0.174	0.162	0.164	0.139	0.145
PSE	0.196	0.208	0.205	0.217	0.221	0.236	0.224	0.229	0.240	0.253	0.225	0.241
VSE	0.191	0.210	0.199	0.213	0.218	0.232	0.243	0.242	0.222	0.236	0.223	0.218
CSE	0.255	0.246	0.205	0.191	0.174	0.174	0.203	0.205	0.172	0.182	0.152	0.149
DBAG	0.497	0.504	0.437	0.456	0.434	0.424	0.434	0.470	0.484	0.471	0.466	0.517
ISE	0.242	0.278	0.274	0.284	0.274	0.265	0.261	0.248	0.227	0.235	0.216	0.243
BIST	0.237	0.247	0.260	0.223	0.193	0.182	0.165	0.164	0.237	0.295	0.300	0.312
LSE	0.725	0.800	0.742	0.746	0.725	0.716	0.692	0.670	0.618	0.682	0.472	0.422
BdL	0.243	0.251	0.251	0.257	0.249	0.244	0.246	0.253	0.250	0.254	0.232	0.161
MSE	0.185	0.195	0.188	0.189	0.188	0.198	0.182	0.170	0.176	0.174	0.157	0.141
OMXN	0.420	0.428	0.389	0.398	0.399	0.397	0.399	0.389	0.369	0.404	0.414	0.406
EURONEXT	0.587	0.601	0.583	0.579	0.557	0.552	0.547	0.555	0.543	0.580	0.574	0.609
OSE	0.244	0.275	0.257	0.269	0.279	0.286	0.298	0.297	0.281	0.305	0.307	0.291
SIX	0.452	0.414	0.387	0.392	0.371	0.385	0.481	0.461	0.495	0.486	0.508	0.453
WSE	0.207	0.215	0.197	0.202	0.202	0.202	0.206	0.205	0.198	0.228	0.226	0.240
$\overline{SM}_t$	0.303	0.316	0.298	0.303	0.295	0.293	0.296	0.296	0.290	0.309	0.280	0.281
S_{SM_t}	0.152	0.158	0.149	0.152	0.147	0.146	0.148	0.148	0.145	0.155	0.140	0.140

Source: Own elaboration. Note – markets name abbreviations as in Table 2.

On the basis of the SM_{it} values it is possible to construct rankings of stock exchanges, which are presented in Table 6. In the years 2000–2009 the first place was hold by London Stock Exchange, and the second by Euronext, which became a leader in years 2010–2011. Other the most important European stock exchanges are BME and Deutsche Börse. In transitional countries the best positions were hold by Stock Exchanges in Budapest, Prague and Warsaw, which were kept the position from the 11th to the 18th in analyzed years. As one can notice, Euronext together with London, Spanish, German and Swiss Stock Exchanges are the most developed markets since they belong to the 4th class. The capital markets in transitional economies usually belongs to the second class, although stock exchanges in Bratislava, Bucharest, Sofia and Ljubljana, together with Cyprus and Malta Stock Exchanges belong in selected years to the first class, i.e. they are the least developed ones.

Table 6. Clustering of the stock exchanges: class IV – the best, class I – the worst

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Class
LSE	LSE	LSE	LSE	LSE	LSE	LSE	LSE	LSE	LSE	NEXT	NEXT	
NEXT	NEXT	NEXT	NEXT	NEXT	NEXT	NEXT	NEXT	NEXT	NEXT	SIX	DBAG	**IV**
DBAG	DBAG	DBAG	BME	BME	BME	SIX	BME	SIX	BME	BME	BME	
SIX	OMX	BME	DBAG	DBAG	DBAG	BME	DBAG	DBAG	SIX	LSE	SIX	
OMX	BME	OMX	OMX	OMX	OMX	DBAG	SIX	BME	DBAG	DBAG	LSE	**III**
Borsa	SIX	SIX	Borsa	Borsa	SIX	OMX	OMX	OMX	OMX	OMX	OMX	
BME	Borsa	Borsa	SIX	SIX	Borsa	Borsa	Borsa	Borsa	Borsa	OSE	BIST	
ATEX	ISE	ISE	ISE	OSE	OSE	OSE	OSE	OSE	OSE	BIST	OSE	
CSE	OSE	BIST	OSE	ISE	ISE	ISE	BdL	BdL	BIST	Borsa	Borsa	
OSE	ATEX	OSE	BdL	BdL	BdL	BdL	ISE	PSE	BdL	BdL	ISE	
BdL	BdL	BdL	ATEX	ATEX	ATEX	ATEX	ATEX	BIST	PSE	WSE	PSE	
ISE	BIST	ATEX	BIST	PSE	PSE	VSE	VSE	ISE	VSE	PSE	WSE	
BIST	CSE	BSE	PSE	VSE	VSE	PSE	PSE	VSE	ISE	VSE	VSE	**II**
BSE	BSSE	PSE	BSE	BSE	BSE	BSE	BSE	ATEX	ATEX	ISE	BSE	
WSE	BSE	CSE	VSE	WSE	WSE	WSE	WSE	BSE	WSE	BSE	ATEX	
BSSE	WSE	VSE	WSE	BIST	MSE	CSE	CSE	WSE	BSE	ATEX	BdL	
PSE	VSE	WSE	CSE	MSE	BIST	MSE	Sofia	MSE	CSE	MSE	BVB	
VSE	PSE	LJSE	MSE	LJSE	CSE	Sofia	LJSE	CSE	MSE	CSE	Sofia	
MSE	LJSE	MSE	BSSE	Sofia	Sofia	LJSE	MSE	Sofia	Sofia	Sofia	CSE	
Sofia	MSE	BSSE	LJSE	CSE	LJSE	BIST	BIST	LJSE	LJSE	LJSE	BSSE	**I**
LJSE	Sofia	Sofia	Sofia	BSSE	BVB	BVB	BVB	BVB	BVB	BVB	LJSE	
BVB	BVB	BVB	BVB	BVB	BSSE	BSSE	BSSE	BSSE	BSSE	BSSE	MSE	

Source: Own elaboration. Note – markets name abbreviations as in Table 2.

CONCLUSIONS

Development of the financial sector influences the economic development thus capital market plays an important role in the market-oriented economies. In the past, London Stock Exchange was the most important financial institution in Europe, and other domestic capital markets were far away from it. Creating pan-European stock exchanges, which applies the trading platform for some domestic markets changed situation in Europe. Although London Stock Exchange together with Euronext have been still one of the most developed.

At present majority of stock exchanges in Europe lists domestic and foreign enterprises, which are often double-listed, i.e. on domestic capital market and in selected stock exchanges. However, it could be distinguished two types stock exchanges: the ones that operate mostly on domestic market or even on the part of it and the ones that operate on several markets.

Capital markets in post-communist countries have quite short history but they adopted solutions from the developed ones and their position is visible in Europe. Stock exchanges in Baltic States belong to NASDAQ OMX Nordic, creating Baltic market while stock exchanges in Budapest, Ljubljana and Prague created a holding together with Vienna

Stock Exchange. Warsaw Stock Exchange represents the biggest capital market among European transitional economies.

Financial crisis influenced capital markets in Europe with different intensity. Comparison of the stock exchanges' positions in the year 2009 to the year 2006 shows that half of them did not change the position in the ranking, although Oslo Børs (OSE) and Deutsche Börse (DBAG) moved to the higher class, and the development of the latter is stable i.e. it is observed also in the years 2010–2011. Among analyzed security exchanges, six stocks (i.e. Greek – ATEX, Irish – ISE, Swiss – SIX, Hungarian – BSE, Cyprian – CSE and Slovenian – LJSE) obtained lower position in 2009 in comparison to 2006. The highest decreased (by four positions) is observed by Irish Stock Exchange (however in the year 2011 the situation essentially improved) and Athens Stock Exchange (by three positions) and this market seems not to recover until 2011.

There are five markets: Turkish, represented by Istanbul Stock Exchange (BIST), Bulgarian (Sofia), Maltese (MSE), Spanish (BME) and Czech (PSE), that improved their position in the year 2009 in comparison to 2006. Istanbul Stock Exchange represents the capital market, which has been developing the quickest because it shifted in by 11 positions (from the 20th place in 2006 to the 9th place in 2009), and it has been still improving its position (the 7th position in 2011) moving to the third class.

To sum up our consideration, we claim that the most developed and the biggest stock exchanges did not change their positions in the ranking while the small ones were exposed on crisis. Capital market in Turkey seems to be the only one (among all investigated) not affected by the world financial crisis.

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PORÓWNANIE EUROPEJSKICH RYNKÓW KAPITAŁOWYCH

Streszczenie. Rozwój systemów finansowych w krajach post-komunistycznych skutkował powstaniem rynków kapitałowych. Celem artykułu jest porównanie poziomu rozwoju giełd kapitałowych w krajach Europy Środkowo-Wschodniej z rozwiniętymi rynkami kapitałowymi. W badaniach przeprowadzono analizę giełd zrzeszonych w Europejskiej Federacji FESE. Badania obejmują sytuację na giełdach europejskich w latach 2000–2011 ze szczególnym uwzględnieniem giełd funkcjonujących w krajach post-komunistycznych. Dane pochodzące z FESE zostały poddane jedno- i wielowymiarowej analizie. Ta ostania pozwoliła na zbudowanie syntetycznych mierników rozwju oraz klasyfikację giełd do grup o zbliżonym poziomie rozwoju.

Słowa kluczowe: rynek kapitałowy, FESE, miara taksonomiczna, kapitalizacja, obroty, płynność

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DO LOW INTEREST RATES MEAN LOW EARNINGS FOR BANKS?

Sylwester Kozak
Warsaw University of Life Sciences – SGGW

Abstract. The banking sector in developed economies for nearly a decade operates in an environment of low interest rates. This phenomenon is gradually transferring to the Polish banking sector. The article analyzes the mechanism which forces central banks to maintain low interest rates, and the effects of their impact on the banks' earnings in 2008–2014. The study is based on the data published by the central banks in selected countries and Poland. The results show that globalization, outsourcing of significant share of jobs, collecting savings and a lower inflationary pressure are major causes of environmental persistence of low interest rates in developed economies. Low interest rates in these countries have not lowered significantly banks' net interest margin, as well as their overall profitability. Similar behavior of banks can be observed in Poland during the period of cutting interest rates starting from the fourth quarter of 2012.

Key words: banks, interest rates, profitability of banks

INTRODUCTION

Nominal interest rates in the global economy have a downward trend in recent years. In many countries they turned to negative values[1]. Such a situation results, among others, from relatively weak economic growth, rising household savings, increased level of economic risk and low capital expenditures. In Poland, after a series of cuts that started in the fourth quarter of 2012 interest rates became the lowest in the history. This is so far a new experience for the Polish economy and in different ways impacts creditors and debtors. Beside positive effects, mainly related to the decrease in financing costs for enterprises

Corresponding author: Sylwester Kozak, Warsaw University of Life Sciences – SGGW, Department of European Policy, Public Finances and Marketing, Nowoursynowska 161, 02-798 Warsaw, Poland, e-mail: sylwester_kozak@sggw.pl

[1] Negative central bank main or deposit rates are set, among others, in the euro zone countries and in Denmark, Sweden, Switzerland; for more information see websites of central banks of forementioned countries.

and households lending from credit institutions, low interest rates could, however, produce significant adverse effects, among others, in the structure and the value of earnings of the banking industry.

GOAL AND METHODOLOGY

The impact assessment of the effects for the enterprises, households and the banking sector arising coming from the operation in the low interest rate environment is a significant, although relatively rarely analyzed, issue. Due to the short-term occurrence of this phenomenon, the assessment for the Polish economy has to partly rely on the experience recorded in some developed economies, where central banks persisted for many years low interest rates and led relaxed monetary policy. The goal of the paper is to shed some light on the mechanism responsible for creation of the low interest rate environment and its impact on the earnings of banks in some developed countries and in Poland. Analysis covers the period 2008-2014 and is based on data from the central banks of Sweden, the Czech Republic, the European Central Bank, the Federal Reserve System and the National Bank of Poland and the economic literature.

The remainder of the paper is structured as follows. The next chapter presents the conclusions from analysis of the literature on the idea of low interest rate environment and its implications for the financial performance of the real and banking sectors. The following chapter presents the impact of low interest rates on banks' earnings in selected developed countries and in Poland. The whole discussion is summarized in conclusions.

CONDITIONS FOR CONDUCTING THE LOW INTEREST RATE POLICY

In the majority of developed economies interest rates are reduced to values close to zero or even negative. Such trend could be noticed especially since the outbreak of the financial crisis of 2007–2009 when central banks of countries affected by the crisis implemented the strategy of easing of the monetary policy. The purpose of such action was to boost the growth of economy weakened by the financial crisis (Fig. 1). Maintaining low interest rates in these countries is not a new phenomenon. Relaxed monetary policy was conducted in countries forming the euro area since the 1980s and in the most developed countries of the G7 group since the 1990s. In the case of Japan the ultra-low interest rates are effective since the early 1990s.

The economic literature considers interest rates in nominal and real terms. Real interest rates are the price of money and are the balance point between supply of savings and investment demand. Nominal interest rates are the price of money adjusted by the value of inflation expectations [Danthine 2013]. Based on these theories it can be said that the level of interest rates depends on the following factors:

- supply of savings;
- investment demand;
- inflation expectations.

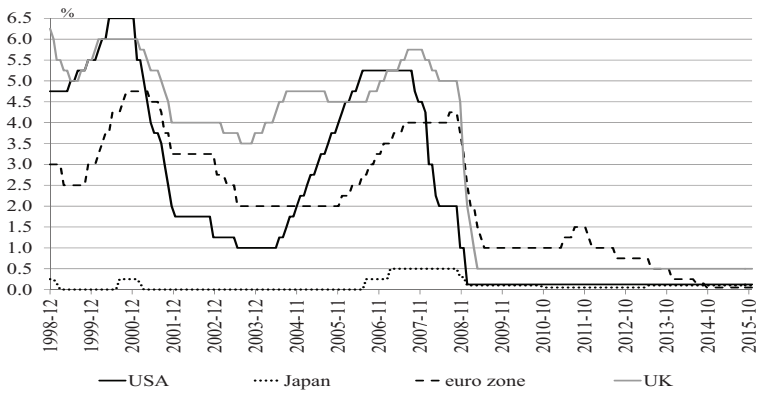

Fig. 1. Central bank interest rates in selected countries

Source: Websites of the central banks.

The growing supply of savings contributes to lower interest rates. In the opposite direction impacts the increasing investment demand, as well as the inflationary pressure. It can be concluded that low interest rates in the most developed countries are the result of, among others, significant increase in savings and low inflation. Globalization, outsourcing and lower wage pressure reduce inflation premium and lead to a decline in nominal interest rates [Orr et al. 1995, Ahrend et al. 2006].

Another model of shaping interest rates assumes that savings do not have to be entirely converted to domestic investment and should not be their only source of funding. Interest rates determined in such a manner in a given country are the sum of the international interest rates, expected rate of depreciation of the domestic currency and the exchange rate risk premium [Fuentes and Gredig 2007]. Such a model indicates that the decline in interest rates on the global markets leads to a decrease in interest rates in the respective country. In countries with economic cycles harmonized with the global economic cycle and stable exchange rate of the domestic currency, domestic interest rates are similar to the average global interest rates [Bosworth in 2014]. In the case of lowering interest rates on international markets one could expect the same direction of interest rate changes in a such group of countries.

According to both models of shaping interest rates, a low economic growth of the highly developed economies is one of the main causes of the low interest rate environment. Such situation results, inter alia from: adverse demographic processes, including aging problem, transfer of significant portion of production to less developed economies, over-indebtedness of enterprises and households and the public sector [Thwaites 2015]. In recent years, high supply of savings has met with limited investment demand resulting from uncertainty about the long-term growth rate of the global economy. As a result, a balance between demand and supply of money is fixed at a low level and sets low market interest rates.

The impact of low interest rates on the whole economy can be multidirectional, and because of the important position of banks, the effects of this interaction are essential to banks financial results. The impact of changes in market interest rates on the value of the net interest margin (NIM) is usually asymmetric, i.e. different in the case of an increase,

and another in the event of a fall in interest rates. There are also differences in these effects in the short- and long-term perspective. One of the regularities noticed by economists is the existence of a positive correlation between NIM and the value of short-term interest rates [Alessandri and Nelson 2012]. Another important rule which appears in the case of very low interest rates is the barrier of zero interest rates of deposits on current accounts. In such case, further lowering of the central bank interest rates may contribute only to fall in interest rates on loans, which leads to reduction of the net interest margin.

The decrease in NIM forces banks to seek new sources of non-interest income. Banks often engage in more risky activities which might provide higher returns. Such behavior indicates that banks switch their strategies to "search for yield" [Maddaloni and Peydro 2010, Borio and Zhu 2012, Paligorova and Jimenez 2012]. Aggressive investment strategies of banks are usually accompanied by the relaxation of the credit requirements. Dell' Ariccia et al. [2013] argue that in the low interest rate environment, interest rates on loans are negatively correlated with the level of tightening of banks' credit policies. Another method of compensation for declines in interest earnings is the reduction of certain operating costs, primarily costs of labor and maintenance of the branch network. This strategy is conducive to the consolidation of banks and improvement of profitability by exploiting positive features of economies of scale.

The low cost of financing promotes the growth of bank lending. However, maintaining such a strategy banks may contribute to an increase in prices of some assets in the long term. It is possible to produce a positive feedback, i.e. an increase in the value of loans due to rising prices of assets, which in turn increases the demand for these assets and further contributes to their price increases [Adrian and Shin 2010]. This mechanism may result in the formation of speculative bubbles in the markets for these assets. The rise in prices on financial markets in an environment of low interest rates may increase competition among banks for deposits. For investors, the purchase of assets with quickly rising prices becomes a more attractive investment vehicle than investment in bank deposits. As a result banks often raise interest rates on deposits what shrinks their net interest margin [Gerdesmeier et al. 2009, Forbes 2015].

An important result of long-term presence of low interest rates is the artificial improvement of the quality of the loan portfolio. This particularly applies to corporate loans and consists in rolling in their existing loan commitments. In a view of the persistence of low interest rates, banks often allow their borrowers to pay off the existing, often irregular or non-performing loans by means of newly granted funding. In this way, companies can avoid bankruptcy, and banks the need to register higher provisions for nonperforming loans. Such transitions improve the financial results and capital ratios. This mechanism, known as the phenomenon of "zombie" occurs for instance in the Japanese economy, where the close to zero-percent interest rates exist from the beginning of the 1990s [Caballero et al. 2005].

The positive effects of the low interest rate environment can include an increase in the creditworthiness of some enterprises and households. Improving the ability of these entities to service existing loans as well as expanding borrowing ability to new entities provides banks the possibility to transfer to the market new funds for consumption and business development. Furthermore, a reduction in interest costs can increase the capacity of borrowers to service their debt and may contribute to a decline in the value of nonperforming loans and their share in the banks' loan portfolio [Boeckx et al. 2013].

IMPACT OF LOW INTEREST RATES ON BANKS' EARNINGS

Swedish central bank pegs the level of interest rates to interest rates of the European Central Bank. The policy of low interest rates was implemented in 2009, after appearance of the severe effects of the financial crisis (Fig. 2). With a break for 2011–2013, interest rates are kept at a rate close to zero. According to data from the Swedish National Bank low interest rates on loans and deposits and downward pressure on the interest margin motivate banks to invest more funds in more risky instruments and to raise funds on the financial markets for financing their activities.

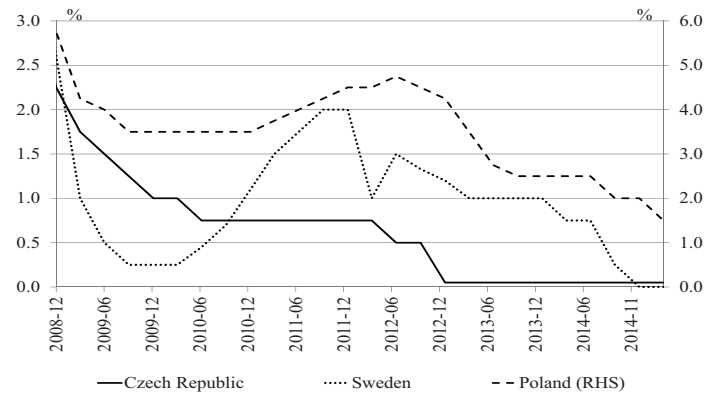

Fig. 2. Central bank interest rates in selected EU countries

Source: Own calculations based on data from the websites of central banks.

Between 2009 and 2014 the average interest rates on the non-financial sector deposits in Sweden fell by 4 p.p. and lending rates by 5.5 p.p. However, despite the long-term persistence of low interest rates, the value of NIM was relatively stable during this period (Fig. 3). The slight reduction in the NIM value after 2013 could result from the fact that deposit rates were already close to 0% in this period and the reduction in the central bank interest rates by 2 p.p. could force banks to lower interest rates on loans only.

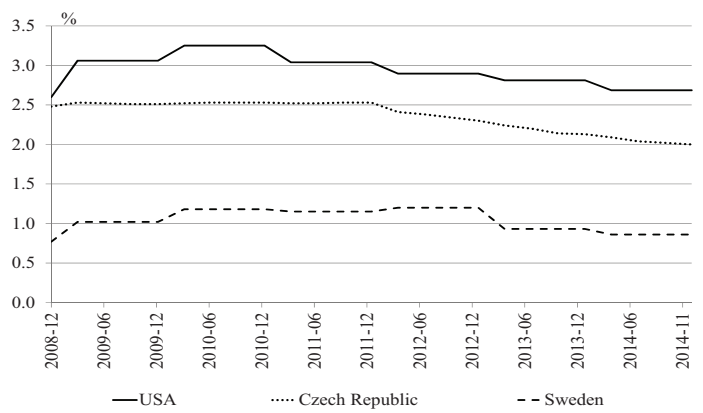

Fig. 3. Net interest margin in the baking sectors of selected countries

Source: Own calculations based on data from the websites of central banks.

Lowering interest rates in Sweden did not bring negative effects to the earnings of the banking sector. Starting from 2009 net profits of the banking sector and the return on assets ROA are in a mild uptrend. Net profits in 2014 was about 50%, and ROA nearly three times higher than in 2014 (Fig. 4).

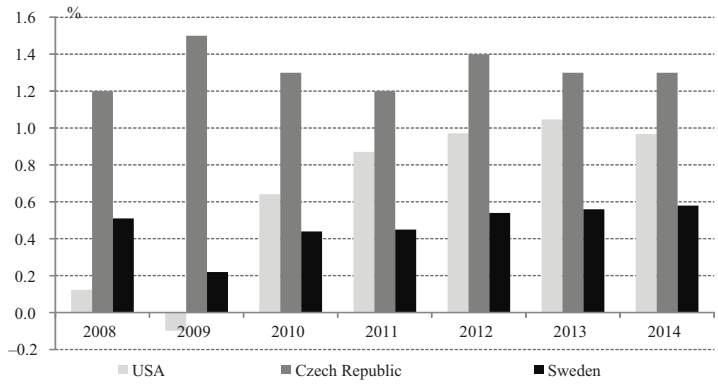

Fig. 4. Return on assets ROA in banking sectors of selected countries

Source: Own calculations based on data from the websites of central banks.

In a similar way banks in the United States reacted to a radical reduction of interest rates. Holding since 2009 the Federal Reserve's main interest rate at the level of 0.13% did not worsen the financial performance of the banking sector in this country. Net interest margin did not fall below 2.5% during the entire period and ROA increased from –0.1% in 2009 to 1% in 2014. Higher profitability of the banking sector was mainly due to better performance of the largest US banks [Genay 2014]. The growth of lending activity and increasing volume of lending contributed to the positive trend in profitability of banks, as well as the improvement in the quality of banks' loan portfolio and lower cost of provisions for non-performing loans [Morris and Regehr 2014]. Such situation was associated with the improvement of the economic situation of the United States [Genay 2014].

In the Czech Republic a significant reduction of central bank interest rates which started in 2010 did not bring significant changes in the banking sector operation. While interest rates in the years 2008–2014 decreased by approximately 2.5 p.p. the net interest margin decreased only by 0.5 p.p. and at the end of 2014 amounted to 2%. The high net income enables banks to increase assets profitability. In 2014 ROA was equal to 1.3% and was higher by 0.1 p.p. than in 2008. The positive results were possible, among others, due to the increasing volume of bank lending.

In Poland, the process of lowering the NBP interest rates was initiated in the fourth quarter of 2012 as the response to the deteriorating economic situation in the country. Stimulation of the economy by loosening monetary policy was one of the factors enabling the growth of lending to enterprises and households. At the beginning of the process of lowering interest rates, the interest margin on loans and deposits decreased to a similar extent (Fig. 5). However, starting from 2014 the average interest rates on deposits decreased much slower than lending interest rates due to the fact that the interest rates on deposits were close to zero. This prevented banks from the even decreasing interest rates on assets and liabilities.

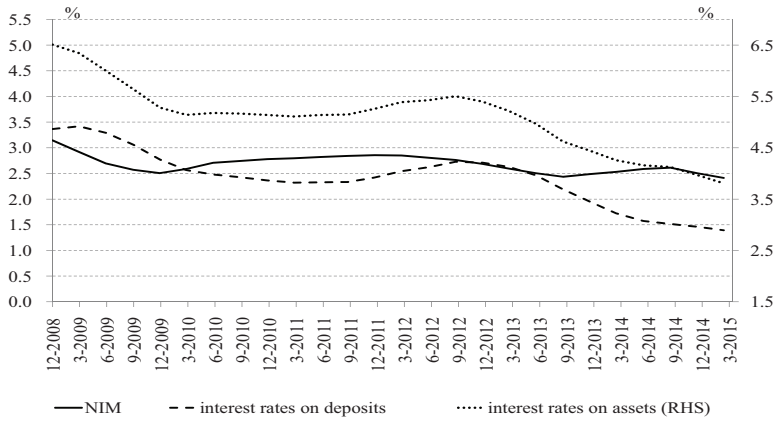

Fig. 5. Net interest margin in the Polish banking sector
Source: Own calculations based on data from the NBP.

Environment of low, and even historically the lowest interest rates did not negatively affect the banks' earnings. For 2013 and 2014, the banking sector achieved the highest ever net profits. Return on assets and return on equity remained in those years at the stable high levels (Fig. 6). The high profitability of banks was indirectly influenced by the improving situation of the Polish economy. The increase in business activity and improving economic and employment prospects increased enterprises and households' demand for loans. It helped banks to generate higher interest and non-interest earnings. During this time the quality of the loan portfolio significantly improved, what reduced cost of provisions for non-performing loans.

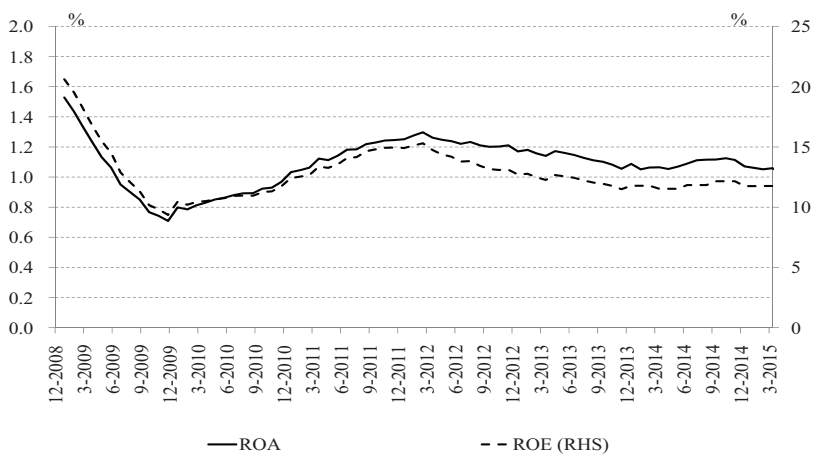

Fig. 6. Return on assets and return on equity in the Polish banking sector
Source: Own calculations based on data from the NBP.

CONCLUSIONS

The environment of low interest rates is present in highly developed economies since the outbreak of the financial crisis. It is a result of the declining economic potential of these countries, an aging population, growth of savings, globalization and outsourcing a significant portion of jobs to developing countries, and decline in the wage growth and inflationary pressure.

Central banks exploit loosened monetary policy and, among others, lower interest rates to stimulate the economic growth. Low interest rates affect banks' performance in direct and indirect way. In the early periods of the interest rate reduction, the central bank action reduces interest margins on loans and deposits in the same way.

When interest rates get closer to the zero level, banks mostly lower lending interest rates. Deposit interest rates are lowered only slightly as they are already close to 0%. This process of adapting banks to the rates' cuts was noticeable in most developed countries, as well as in Poland in 2014.

The improving economic conditions in developed countries indirectly enhanced banks' performance. Banks achieve higher results thanks to increasing the volume of lending, improvements in the quality of the loan portfolio and reduction of losses on irregular loans. Such a relationship between the situation of the real and the banking sectors was observed over the period 2013–2014 in Poland.

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CZY NISKIE POZIOMY STÓP PROCENTOWYCH OZNACZAJĄ MAŁE DOCHODY BANKÓW?

Streszczenie. Sektor bankowy w krajach o wysokorozwiniętych gospodarkach od blisko dekady funkcjonuje w środowisku stóp procentowych na niskich poziomach. Zjawisko to stopniowo przenosi się do polskiego sektora bankowego. Artykuł analizuje mechanizm ustalanie się stóp procentowych na niskich poziomach, a także efekty wpływu tego zjawiska na dochody banków w latach 2008–2014. W badaniach posłużono się danymi z banków centralnych wybranych krajów i Polski. Wyniki badań wskazują, że globalizacja, outsourcing znacznej części prac, wysoka stopa oszczędności i słaba presja inflacyjna stanowią ważniejsze przyczyny utrzymywania się środowiska stóp procentowych na niskich poziomach w wysokorozwiniętych gospodarkach. Niskie poziomy stóp oprocentowanych w tych krajach nie obniżyły jednak znacząco marży odsetkowej, a także ogólnej dochodowości banków. Podobne zachowania banków można zaobserwować w Polsce w okresie obniżania stóp procentowych zapoczątkowanego w IV kwartale 2012 roku.

Słowa kluczowe: banki, stopy procentowe, dochodowość banków

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CYCLICALITY OF MARKUPS IN THE EU FOOD INDUSTRY AND THE MICHAŁ KALECKI THEORY

Justyna Kufel
Institute of Agricultural and Food Economics – National Research Institute

Abstract. The problem of markups cyclicality is nowadays one of the most urgent one, as the assumption of countercyclical markups is a key one in a number of neokeynesian macroeconomic models. The aim of the paper was to use the Kalecki theory to explain the mechanism behind the countercyclical markups in the EU and Polish food sectors taking advantage of literature review and logical reasoning. Moreover, as an answer for the newest studies indicating procyclical markups in the EU and the USA, it was checked, utilizing panel regressions, if the EU food sector markups cyclicality is different from that of other EU manufacturing industries. It was concluded, that although the Kalecki explanation of countercyclical markups is still in force regarding the EU countries food sector, it is no longer adequate in regards to the EU manufacturing sector.

Key words: price-cost margins, business cycles, Kalecki approach

INTRODUCTION

The monopolistic markup of price over marginal cost is inversely proportional to the price elasticity of demand and indicates the level of exerted market power [Pindyck and Rubinfeld 2013]. As pointed Nekarda and Ramey [2013], research on markups cyclicality is currently one of the more challenging measurement issues in macroeconomics. This is mostly because the assumption of countercyclical[1] markups, referring to the changes in the level of market competition, is one of the main in a number of neokeynesian macro--economic models, e.g. Smets and Wouters [2003] and Christiano et al. [2005]. Because

Corresponding author: Justyna Kufel, Institute of Agricultural and Food Economics – National Research Institute, Świętokrzyska 20, 00-002 Warszawa, Poland, e-mail: kufel@ierigz.waw.pl

[1] Markups are referred as procyclical, when its correlation with the business cycle is positive, and countercyclical – when it's negative, where both correlation and regression analysis are used to determine the cyclicality (see Rotemberg and Woodford [1999]).

these models are nowadays most frequently used by central banks, including the Polish Central Bank, estimates of markups cyclicality influence the monetary policy[2]. Moreover, the topic is important in the context of predicting business cycles [Figiel i Kufel 2015].

The first economist, who presented a market-clearing model, in which the elasticity of goods demand behaves procyclically, giving the theoretical justification for countercyclical markups, was the Polish economies Michał Kalecki [Bils 1987, Martins and Scarpetta 1999]. Klein [1951] admitted that the model created by Kalecki presented in 1933 in *The trial of business cycle theory* includes all important elements from the *Theory of employment, interest rate and money* written by Keynes and published in 1935, what makes Kalecki the parallel creator of the so-called Keynesian revolution. According to Perlman and Mc Cann [1998] his theory of effective demand predated the theory as stated by Keynes.

As proved in the previous studies, markups in the Polish food industry [Kufel 2015a], as well as in the EU food industry [Kufel 2014] behave countercyclical. Also markups in the whole Polish manufacturing behave countercyclical [Gradzewicz and Hagemejer 2007, Hagemajer and Popowski 2012, Gradzewicz et al. 2012]. This however stays in contradiction with the latest results obtained for the EU [Gali et al. 2007], as well as for the USA [Nekarda and Ramey 2013], what may undermine the assumptions behind the neokeynesian models and created the urgent need for an explanation for these inconsistent results.

In such a framework, the aim of this paper is to describe the mechanism behind the countercyclical behaviour of the EU and Polish food industry using theories created by Michał Kalecki, as well as to check if the EU food industry cyclicality is different from the cyclicality of other branches of the EU manufacturing industry. Therefore, the two following questions are tried to be answered:

- How the Kalecki theory explains the cyclicality of markups in the food industry?
- Is the markups cyclicality in the food industry different from that of other EU industries?

The author hope is that the answer to these questions will contribute to the ongoing discussion on how and why markups change, especially considering their cyclicality.

MATERIAL AND METHODS

In order to answer the first question, presented in the introduction chapter, the literature review and logical reasoning are utilized. The problem of markups cyclicality is tacked in the framework of three main theories created by Michał Kalecki, that is the theory of effective demand, the theory of prices and the distribution of national income and the business cycle theory [Lopez and Assous 2012]. Although the problem of countercyclical markups was discussed mostly within the second one, it concerns the first and the third one, as the Kalecki macroeconomic model is underlid by the assumption of imperfect competition.

[2] More broadly on the concept of markup, its significance and estimation methods (see Kufel [2015b]).

In order to reveal the character of the relationship between markups and business cycle in different industries the 14 regression models separately for each of 14 manufacturing industries in 27 EU countries (without Croatia) are solved. Industries being analyzed are as follows: (1) Production of food, non-alcoholic beverages and tobacco; (2) Production of textiles and textile products; (3) Production of leather and leather products; (4) Production of wood and wood products; (5) Production of pulp, paper and paper products, publishing and printing; (6) Production of coke, refined petroleum products and nuclear fuel; (7) Production of chemicals, chemical products and man-made fibres; (8) Manufacture of rubber and plastic products; (9) Manufacture of other non-metallic mineral resources; (10) Manufacture of basic metals and fabricated metal products; (11) Manufacture of machinery and other equipment; (12) Production of electrical and optical equipment; (13) Manufacture of transport equipment; (14) Other manufacturing industries.

Because of the data availability, for markups measurement price-cost margin (*PCM*) is applied. In the *k* industry of *i* country it can be expressed as follows [Cheung and Fujii 2005]:

$$PCM_{i.t}^{k} = \frac{V_{i.t}^{k} - M_{i.t}^{k} - W_{i.t}^{k}}{V_{i.t}^{k}} = \frac{VA_{i.t}^{k} - W_{i.t}^{k}}{V_{i.t}^{k}}$$

where: $V_{i.t}^{k}$ – output value;
$M_{i.t}^{k}$ – cost of materials;
$W_{i.t}^{k}$ – compensation of labour;
$VA_{i.t}^{k}$ – value added.

The high *PCM* value is an evidence of higher increase of a price above costs and therefore a bigger market power [Kufel 2014]. A business cycle, after Gradzewicz and Hagemejer [2007], is considered on both sectorial and macroeconomic levels. Consequently, as an indicator of the macroeconomic business cycle the most common indicator [Drozdowicz-Bieć 2012], that is real GDP is utilized, whereas value added testifies for changes in the activity on the sectorial level. Both measures, because of being non-stationary, are detrended using first differences of logarithms[3].

Due to the limited number of explanatory variables, the panel regression is chosen. It is estimated with the generalized least squares method. Group effects is tested with the F-test, the Breusch-Pagan test is used to check if group effects extraction is justified, and the type of effects is chosen with the Hausmann test. Both, the time and the country effects are taken into consideration. Consequently, the analyzed equation is as follows:

$$\mu_{it} = \alpha_i + \alpha_t + \beta Y_{it} + \varepsilon_{it}$$

where: μ_{it} – logarithm of *PCM*;
α_i – country effect;

[3] Markups are not detrended because in their essence they cannot grow indefinitely.

α_t – time effect[4];
Y_{it} – logarithm of a business cycle indicator.

The data are on a yearly basis and come from the Eurostat database covering the period 1995–2010. Because of the missing data, the number of observations, the number of countries analyzed, the length of the time series differs across industries. The panel wasn't balanced.

THE DEGREE OF MONOPOLY AND THE BUSINESS CYCLE ACCORDING TO MICHAŁ KALECKI

Michał Kalecki (1899–1970) was an autodidact in economics. Because of the material situation he stopped his polytechnic studies, became a publicist and an economic analyst. *The trial of business cycle theory* was published while he worked in the Institute for Business Cycles and Prices Research in Warsaw. Although in 1970 his candidacy was considered by the Nobel Prize Committee, only after the 2007 crises his theory was brought back by the most influential economists in the USA, the UK and Germany, who regarded his solutions as more appropriate than those created by Keynes [Woś 2014]. The possible reason may be that Michał Kalecki was always aware of a need for combining rationality with socio-political consequences, e.g. by studying the convertibility of a loss in consumption for the later benefits [Brus 1999].

Both economists share the following: a principle of effective demand, investments as a variable guiding the economic system, and an allowance of persistent involuntary unemployment [Assis Libanio 2002]. Nevertheless, according to Klein [1951] as well as Landreth and Colender [1998] the Kalecki model may be regarded as even superior to Keynes because of including: dynamic setting, national income division, both investment decisions and their realisation, as well as elements of monopoly instead of perfect competition. Assis Libanio [2002] wrote Kalecki wasn't discovered because of the Polish language of publication and a lack of Keynes ability to attract attention. Moreover, his works were quite laconic and difficult to understand, and he made few references to works of other authors. But the main reason why Kalecki hasn't been popular is the dominance of neoclassical economic theory in teaching economics and excluding other options from consideration [Sawyer 1985]. While Kalecki placed himself in the classical or the Ricardian-Marxian approach, Keynes contributed to the neoclassical, particularly the Marshallian one, so he could be more accepted by the mainstream [Assis Libanio 2002]. Although Kalecki used mathematical modelling and econome-trics in empirical studies, his works were in contrast with neoclassical orthodoxy because of an assumption that a capitalist economy may be better described by monopolistic competition, taking advantage of social classes, as well as an absence of: equilibrium analysis, utility function and production function.

[4] This study is a continuation of the analysis of the behavior of the EU food sector markups in the business cycle [Kufel 2014], which was concentrated solely on this industry and 8 different specifications were analyzed taking into consideration different variables indicating the business cycle. For a more detailed characteristic of the panel regression methodology and data see Kufel [2014].

The Kalecki principle of effective demand states the aggregate expenditure determines the aggregate supply. In other words, expenditures in relation to what was spent on consumption and investment, determine profits and wages [Assis Libanio 2002]. Kalecki distinguished two classes – workers who earn wages (W) and spent them (C_w) immediately without savings, and capitalists who earn profit (P) and spend it on consumption (C_c) and investment (I). Considering identity between national income ($P + W$) and aggregate expenditure ($C_w + C_c + I$), it turns out that profits equals investments plus capitalists consumption. Because according to the principle of effective demand causality runs from expenses to income, capitalists are the one who by their spending decisions determine profit, and having the national income distribution between profits and wages given, also the national income and product. In other words workers spend what they earn and capitalists earn what they spend. Because consumption is quite stable, investments become the most important for the business cycle dynamics. Summarising, it can be stated, that production and employment depend on the capitalists investment expenses and on the national income distribution (e), which is calculated as the share of profits in the national income [Lopez and Assous 2012].

The Kalecki theory of national income distribution is based on three assumptions. Firstly, short-term marginal cost of majority of companies isn't considerably different from the average cost including workers wages and cost of materials until the point of practical production capacity[5]. He pointed, that in the imperfect competition firms revenues are limited by the demand, and its changes cause quantity and prices adjustments, opposite to the perfect competition, where costs and prices limit revenues. Secondly, a firms production is usually under this point, as excess capacity is a normal consequence of imperfect competition, in which firms operate most of the time. Thirdly, companies make markup (μ) over their marginal costs (MC), where markup is called a degree of monopoly and it's an inverse of the elasticity of demand. The degree of monopoly is expressed as a ratio of firms outputs (profits plus costs) to costs, but it can be also (see PCM) measured by the markup over price (k') calculated as the ratio of output value minus costs to the value of output[6]. When an industry is vertically integrated, so costs are made of wages only, we get:

$$k' = \frac{P + W - W}{P + W} = \frac{P}{P + W} = e$$

Summarising, if the marginal costs curves are horizontal (1) until the point of practical production capacity (2), the degree of monopoly (3) describes the relation of profits to the national income, and consequently also the relative shares of wages and profits in the national income[7].

[5] The Kalecki assumption, that when the production capacity is underutilized, firms can act on the horizontal part of their marginal cost curve (constant returns to scale) was however broadly criticized [Scitovsky 1964].

[6] It is widely utilized transformation, as $\frac{P - MC}{P} = 1 - \frac{MC}{P} = 1 - \frac{1}{\mu}$.

[7] The same is true, when industry isn't vertically integrated, so a firm buys part of materials from other firms, and costs are made of both wages and materials [Lopez and Assous 2012].

The theory of income distribution shows that the degree of monopoly is the most important factor influencing the profits share in the national income, and stability of distributive shares depends on the stability of markups. Moreover, because according to the theory of effective demand changes in distribution of the national income between profits and wages affect the national income, the degree of monopoly is also the most important factor influencing the national income itself. The theory of income distribution says, that a change in aggregate expenditure doesn't have to cause a change in the share of profit in the national income as long as the degree of monopoly stays unchanged. The degree of monopoly is determined by: a structure of an industry, an intensity of price competition, a product differentiation and a power of labour unions [Lopez and Assous 2012]. Moreover, it should be noticed, that the Kalecki theory of effective demand is related to the entrepreneurs pricing policy, and that it is in fact a short-term theory dealing with daily firms decisions [Scitovsky 1964].

Kalecki proposed an endogenous explanation for the business cycle [Assis Libanio 2002]. Two basic engines are: a positive influence of the national income on investments and a negative of capital stocks on decisions to invest. The increase of investments orders in the prosperity phase leads to the increase of production of investment goods, and then to the increase of capital stocks, which finally exceeds replacement requirements, what decreases gross profitability and investment demand. Afterwards, investment orders start to decrease and downturn begins. Therefore, cycles are caused by investments acting in two roles – they increase aggregate expenditure and create production capacity. The investment paradox is that they stimulate the economy only when they are built, created (as expenditures). After that, they compete with the equipment of an older generation, make the employees unemployed and start producing goods and services which lack increasing demand, what ends the prosperity. Consequently, any investment is better than none[8].

Regarding markups cyclicality (the cyclicality of a degree of monopoly), Kalecki [1938] supported the Joan Robinson opinion [1933], according to which the degree of monopoly depends on the number of companies, which is changing in the cycle. He pointed out the countercyclical behaviour and explained it by the fact that during downturns firms restrain from decreasing prices in a fear of increasing competition[9]. Kalecki argued that during downturns, in order to save profits firms combine in cartels, which

[8] In the later stages of development of the business cycle theory, Kalecki stated the economy dynamics of capitalism cannot be taken as something given and obvious, resulting from the nature of capitalists. In his opinion business cycle fluctuations around the quasi-static state are caused by exogenous factors in the form of incentives for innovation, e.g. great technological innovations or new exogenous markets. Without them the stagnation comes [Kowalik 2015].

[9] Lopez and Assous [2010] noticed that this reasoning was in accordance with the Sweezy [1939] theory of a kinked demand curve in an oligopoly. If a producer increases a price, he notices a loss, as his rivals don't reciprocate in order to take his clients, whereas decreasing his price he can't expect expanding his business at the expanse of his market rivals, as they reciprocate in order not to lose their clients. The increase of demand with increasing prices results in the demand curve losing its elasticity, whereas the decrease of demand with decreasing prices results in the higher elasticity, as rivals are eager to reciprocate, so a producer is determined to keep the price unchanged. Consequently, during booms prices increase easily, whereas during downturns they resist pressure to decrease.

are closed during recovery because of an external competition (new entrants) and better perspectives for self-activity. Consequently, despite the decrease of prices of materials and wages during downturns, prices of final goods remain sticky. Entrepreneurs don't decrease prices as their competitors may do the same. Creating cartels they are not afraid of the external competition. Consequently, markups increase. In his opinion this argument was more important than the one saying that the higher income during the prosperity phase implies the lower expected value of looking for better options among closer substitutes, what would cause decrease of elasticity of demand and therefore increase of markups making them procyclical [Lopez and Assous 2010].

Moreover, when an industry isn't vertically integrated, so a firm buys part of materials from other firms, and costs are made of both wages and materials, the relative share of wages in the value added (w) being a sum of profits and wages, is described by both a degree of monopoly (k) calculated as a ratio of firms outputs ($P + W + M$) to costs ($W + M$) and a relation between variable costs of materials and wages (j) [Lopez and Assous 2010]:

$$W = \frac{1}{1+(k-1)\cdot(j+1)}$$

Consequently, Kalecki [1938] argued, that the observed stability in the relative share of wages (w) during the business cycle is an outcome of opposite changes of the degree of monopoly (k) and the ratio of materials cost to wages (j) in the cycle. While countercyclical changes in markups are caused by different sources of price stickiness at the product market and by cooperative firms activities, which aim is to save their profits by strengthening their market power during crises, the ratio of materials cost to wages change procyclically because of a shape of marginal cost curves in agriculture and mining, which deviate sharply upwards, so costs of materials from agriculture and mining fluctuate stronger during business cycle then wages in manufacturing industries[10]. Interestingly, Kalecki [1954] didn't want to explain more precisely why the degree of monopoly and the ratio of materials cost to wages change so accurately, that the labour share remains constant. In his opinion the knowledge with regard to transformations in manufacturing industry is needed and this is a task for an economic historian.

PCM CYCLICALITY IN 14 MANUFACTURING INDUSTRIES

Table 1 presents the results of panel regressions executed for 14 manufacturing industries across 27 EU countries.[11] The constant seemed to be significant in all specifications. The Hausmann test indicated fixed or random effects, and the Breusch-Pagan as well as

[10] Kalecki spoke about the class war, what eventually determines income distribution. Assuming an increase of costs of materials and stable wages, entrepreneurs would like to keep their profits by increasing prices by the same amount, so the degree of monopoly remains constant. As a result, the share of wages in value added decreases. But workers can defend their share, e.g. by creating labour unions, which increase their bargaining power. Additionally, he pointed, that the share of wages increases, when industries with share of wages above average become relatively more important in creating national income, so also the market structure matters [Lopez and Assous 2010].

[11] A more detailed presentation of data on business cycles may be found in Kufel [2014].

F-tests showed that group effects were significant in RE and FE models, respectively. The only exception was the result of regression for Production of wood and wood products (4), where the constant appeared to be insignificant, as well as group effects. In models with significant variables for both sectorial and macroeconomic business cycle, these variables explained more than 65% of the *PCM* variability. Interestingly, an industry the most vulnerable for changes in the business cycle was Production of food, beverages and tobacco (1). The explanatory variables explained 84% of an overall variation of this variable.

Table 1. Results of panel regressions with fixed (F) or random (R) effects separately for 14 EU manufacturing industries (parameter estimation; standard error; *p*)

Specification	1F	2R	3R	4F	5R	6R	7R	8R	9R	10R	11R	12R	13F	14R
Sectorial cycle (value added)	0.45 0.09 ***	1.11 0.19 ***	0.94 0.19 ***	1.03 0.34 ***	0.54 0.14 ***	–0.17 0.11 0.13	0.53 0.12 ***	0.93 0.21 ***	0.11 0.13 0.42	0.44 0.17 ***	1.05 0.17 ***	0.73 0.20 ***	0.67 0.17 ***	0.46 0.11 ***
Macrocycle (GDP)	–0.40 0.24 *	0.20 0.53 0.71	–0.31 0.85 0.72	–1.26 0.34 ***	1.31 0.33 ***	1.61 1.73 0.35	–0.14 0.36 0.69	0.81 0.64 0.21	1.96 0.45 ***	1.64 0.55 ***	–0.91 0.58 0.11	0.31 0.80 0.69	0.63 0.82 0.44	–0.13 0.39 0.74
Constant	–2.15 0.01 ***	–2.30 0.08 ***	–2.48 0.13 ***	0.00 0.01 0.76	–2.02 0.06 ***	–2.82 0.19 ***	–1.92 0.06 ***	–2.15 0.05 ***	–1.94 0.03 ***	–2.33 0.05 ***	–2.34 0.04 ***	–2.35 0.10 ***	–2.62 0.03 ***	–2.31 0.21 ***
Number of observations	280	280	258	280	280	233	280	277	280	279	280	271	278	269
Number of countries	22	22	21	22	22	20	22	22	22	22	22	22	22	22
Length of time series	8–14	8–14	8–14	8–14	8–14	3–14	8–14	8–14	8–14	8–14	8–14	7–14	8–14	3–13
'Within' and 'Between' variance	–	0.06 0.14	0.18 0.31	–	0.02 0.07	0.54 0.68	0.03 0.07	0.07 0.05	0.02 0.02	0.04 0.06	0.05 0.03	0.13 0.23	–	0.04 0.93
R^2 (when FE)	0.84	0.71	0.65	0.34	0.78	0.52	0.71	0.47	0.58	0.65	0.47	0.61	0.62	0.89
Breusch-Pagan test	1027 <0.01	710 <0.01	536 <0.01	0.05 0.82	874 <0.01	200 <0.01	679 <0.01	186 <0.01	342 <0.01	601 <0.01	153 <0.01	391 <0.01	408 <0.01	133 <0.01
Hausman test	6.80 0.03	1.43 0.49	2.09 0.35	6.74 0.03	1.37 0.50	1.15 0.56	1.34 0.51	1.86 0.40	3.17 0.20	2.91 0.23	4.01 0.13	1.16 0.56	18.62 <0.01	1.73 0.42
F-test	57.55 <0.01	25.89 <0.01	21.11 <0.01	1.18 0.27	37.63 <0.01	11.5 <0.01	27.55 <0.01	8.60 <0.01	12.97 <0.01	19.81 <0.01	7.96 <0.01	18.09 <0.01	15.25 <0.01	92.08 <0.01

* indicates significance at 10-percent level
*** indicates significance at 1-percent level

Source: Own elaboration based on Eurostat data.

In all industries analyzed markups approximated by *PCM* appeared to be procyclical regarding sectorial cycle indicated by the value added. The only exception was Production of coke, refined petroleum products and nuclear fuel (6), where the sectorial cycle influence was negative, but insignificant. Also in Manufacture of basic metals and fabricated metal products (9) the influence of sectorial cycle appeared to be insignificant. The strength of the influence of sectorial cycle was diverse. It was minimal in Manufacture of basic metals and fabricated metal products (10), where a 1-percent increase of sectorial value added was accompanied by 0.44-percent increase of markups, and maximal in Production of textiles and textile products (2), where a 1-percent increase of sectorial value added was accompanied by a 1.11-percent increase of markups. Regarding Production of food, non-alcoholic beverages and tobacco (1), a 1-percent increase of sectorial value

added was accompanied by a 0.45-percent increase of markups, what means the strength of relation above average, which amounted to 0.74.

Regarding the macroeconomic cycle, the results seemed to be much more varied. First of all, only in 4 out of 14 industries this relation was statistically significant. Out of these, it was negative in one industry and positive in three ones[12]. The positive relation was in Manufacture of machinery and other equipment (9), where a 1-percent increase of GDP was accompanied by a 1.96-percent increase of markups, as well as in Manufacture of basic metals and fabricated metal products (10) with a 1.64-percent increase of markups, and in Production of pulp, paper and paper products, publishing and printing (5) with a 1.31-percent increase of markups. Because in the regression regarding markups in Production of wood and wood products (4) the constant was insignificant, the only industry with countercyclical markups appeared to be Production of food, non-alcoholic beverages and tobacco (1), where 1-percent increase in GDP was accompanied by a 0.4-percent decrease in markups.

Summarising, the markups in the EU food industry, similar to the other manufacturing industries, were procyclical regarding industrial cycle, but countercyclical regarding the macroeconomic cycle, what makes it different from other EU manufacturing industries. Because of the insignificance of part of the results, additionally two panel regressions were conducted using our database, but with all industries combined (Table 2). Markups in the EU manufacturing industry in the period analyzed seemed to behave procyclical regarding the industrial business cycle and also procyclical regarding the macroeconomic business cycle, what is in accordance with results received by Gali et al. [2007]. Specifically, GDP (1F) was replaced by the national value added (2F), so the results for sectorial cycle may become significant. Finally, the second research question may be answered – markups cyclicality in the food industry in the period analyzed was indeed different from that of other industries.

Table 2. Results of panel regressions with fixed (F) effects for 14 EU manufacturing industries (parameter estimation; standard error; *p*)

Specification	1F	2F
Sectorial cycle (value added)	0.02; 0.06; 0.70	0.12; 0.06; **
Macrocycle (GDP)	1.92; 0.39; ***	
Macrocycle (value added)		1.05; 0.32; ***
Constant	–2.21; 0.01; ***	–2.19; 0.01; ***
Number of observations	196	196
Number of countries	14	14
Length of time series	14	14
R^2 (when FE)	0.87	0.86
Breusch-Pagan test	916.90; 2.08e-201	898.96; 1.66e-197
Hausman test	10.09; 0.01	9.92; 0.01
F-test	88.66; 6.09e-071	82.27; 1.88e-068

** indicates significance at 5-percent level; *** at 1-percent level

Source: Own elaboration based on Eurostat data.

[12] When not excluding the insignificant cases, markups were countercyclical in 6 industries and procyclical in 8 ones.

DISCUSSION

The Michał Kalecki theory of prices and income division brings an explanation of the countercyclical behaviour of markups in the EU food sector, so of the counteryclical changes in the exerted market power in the EU food sector. The same is true with the countercyclical markups in Poland [see Gradzewicz and Hagemajer 2007, Hagemajer and Popowski 2012, Gradzewicz et al. 2012] and all countries analyzed in other studies of markups cyclicality, e.g. by Bils [1987], Rotemberg and Woodford [1999], Martins et al. [1999], Bils and Kahn [2000], Gali et al. [2007], Jaimovich and Floetotto [2008], Edmond and Veldkamp [2009].

The Kalecki theory seemed however as not the proper one to explain the procyclicality of markups in reference to the business cycle in the part of the EU manufacturing industries in the period 1995–2010. The obtained results regarding the macro cyclicality of manufacturing industry confirm these received by Nekarda and Ramey [2013] for the USA and by Gali et al. [2007] for the EU. Consequently, the Kalecki explanation isn't good for them too. Also the procyclical behaviour of markups regarding the sectorial business cycle cannot be explained by the Kalecki theory. It should be added however, that the theory wasn't created to be applied to the sectorial business cycles. Gradzewicz and Hagemajer [2007] admitted, that the character of cyclicality regarding sectorial business cycle may be opposite because of different kind of adjustments to external shocks on the levels of economy and sectors, as well as different kinds of shocks encountered at both levels.

Moreover, looking at the type of industries, it can be observed, that markups are countercyclical in regard to industries of necessity goods (like food) and procyclical in regard to industries like machinery and other equipment, basic metals and fabricated metal products, pulp, paper and paper products, publishing and printing, which can be described as investment goods, superior goods or maybe goods where innovations nowadays appear more frequently. This may also explain countercyclical markups in Poland, as the Polish economy is the developing one and converging to the more innovative economies, which are primary based on production of superior goods. In other words, taking into account that manufacturing markups are procyclical in the EU and countercyclical in Poland, the result obtained may show that from the macroeconomic point of view the food industry is playing more important role in Poland than in the EU. Therefore, it can be stated, that although the Kalecki theory explains the behaviour of markups in the food sector, it might be not robust to changes in the structure and way of functioning of the developed countries manufacturing sector and theirs stages of development.

CONCLUSIONS

The aim of this study was to explain the mechanism behind the countercyclical behaviour of the Polish food industry markups using the theory of Michał Kalecki, and to check if the food industry cyclicality is different from the cyclicality of other EU manufacturing industries, taking advantage of the panel regression. The scope of the analysis equalled approximately 1–2 business cycles, what enables studying variability of markups in the cycle, though drawing general, long-term conclusions was rather limited. Business cycle

was approximated by the value added on the sectorial and GDP on the macroeconomic level, whereas markups – by the *PCM*. In order to remove the trend from the data first difference of logarithms were calculated.

The Polish economist Kalecki developed a theory of imperfect competition, in which firms set the price of a product adding a markup over average variable costs, what has become a standard assumption in many macroeconomic models. On the other hand, the Kalecki explanation of countercyclical markups was original and fruitful contribution to the field. Taking into account his theory of income division, the reason for countercyclical behaviour of markups in the food industry in reference to the macroeconomic cycle may be that firms restrain from decreasing prices during downturn in a fear of increasing market competition, as their competitors may do the same. Consequently, in order to save profits during downturns firms create cartels, which are closed during recovery because of increasing external competition and better perspectives for self-activity. While prices of final goods remain sticky during downturns, because of a shape of marginal cost curves in agriculture and mining, which deviate sharply upwards, prices of raw materials decrease, so markups may increase, becoming countercyclical.

The examination of the impact of both kinds of cycles on markups revealed however, that although other manufacturing industries behaved similar to the food industry regarding sectorial cycle, their direction of cyclicality on the macrolevel, taking into account the statistically significant results, is opposite to that of the food industry. Also considering the insignificant results, markups in majority of industries seemed to behave procyclical. This stays in contradiction with the Kalecki theory of prices and income division. As a conclusion it was stated that, although the Kalecki theory explains the behaviour of food industry in reference to the macroeconomic business cycle, it seemed to be not suitable to explain the procyclical character of markups in the majority of EU manufacturing industries, both the sectorial and macroeconomic ones. As possible reasons, changes in the structure and way of functioning of the developed countries manufacturing sector and theirs stages of development were indicated.

Based on the research conducted, an analysis of markups may provide an interesting insight, not only in markups cyclicality and therefore in changes of the level of departure from perfect competition during business cycles, but also in the formation of business cycles. Further research should be conducted in order to check if this result is robust to different ways of business cycle approximation (e.g. unemployment rate) and markups estimation (e.g. Roeger method), as well as different ways of removing trends out of time series analyzed (e.g. the Hodrick-Prescott filter) and calculating the relationship between them (e.g. VAR analysis). Also the analysis taking advantage of longer time series would be very welcome. But the most important research direction seems to be the theoretical explanation of a change in the character of markups cyclicality from countercyclical to procyclical. So far convincing theories about markups are lacking and as Blanchard [2008] said in response to what and why markups move stays an area where research is still urgently needed. Nevertheless, it shouldn't be forgotten, that the Polish economist Michał Kalecki invented the theory of prices and income division, in which the countercyclicality of markups was explained, and that the EU food industry still behaves according to his explanation.

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CYKLICZNOŚĆ MARŻ W PRZEMYŚLE SPOŻYWCZYM A TEORIE MICHAŁA KALECKIEGO

Streszczenie. Problem cykliczności marż zaliczany jest obecnie do jednego z głównych problemów makroekonomii, ponieważ założenie o antycykliczności marż jest kluczowe w wielu modelach neokeynesowskich. Celem artykułu było wykorzystanie teorii Kaleckiego w celu wyjaśnienia mechanizmu prowadzącego do antycyklicznego zachowania się marż w przemyśle spożywczym UE oraz Polski, do czego posłużył przegląd literatury i logiczne wnioskowanie. Ponadto, w odpowiedzi na najnowsze badania wskazujące na procykliczne marże w UE i USA, korzystając z metody regresji panelowej, sprawdzono, czy charakter cykliczności marż jest różny w przemyśle spożywczym w porównaniu do innych gałęzi przetwórstwa przemysłowego krajów Wspólnoty. Pokazano, że pomimo iż wytłumaczenie antycykliczności marż autorstwa Kaleckiego może być adekwatne dla przemysłu spożywczego krajów UE, nie jest ono już aktualne w odniesieniu do przemysłu przetwórczego tych krajów.

Słowa kluczowe: marże cenowo-kosztowe, cykle koniunkturalne, podejście Kaleckiego

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REAL-TIME DELPHI SURVEY ON COMPETITION AND COMPETITIVENESS OF GEOGRAPHICAL INDICATIONS AS A NEGOTIATIONS' ISSUE OF THE TRANSATLANTIC TRADE AND INVESTMENT PARTNERSHIP

Mariusz Maciejczak
Warsaw University of Life Sciences – SGGW

Abstract. This paper aimed to present the issues of geographic indications as an element of the intellectual property right negotiations under the Transatlantic Trade and Investment Partnership between the European Union and the United States. It is argued that implementation of different legal regimes related to intellectual property might create significant barriers to the liberalization of international trade of quality food products. Using the results of foresight researches it was shown that the agreement might add small value to the development of markets and their participants in both regions. If is forth seen the possible positive impact with regard to competitive advantages of EU products and negative to EU market competition, and contrariwise, negative influence on competitive advantages of US products and positive on US market competition.

Key words: geographic indications, IPR, TTIP, Real-Time Delphi, competition, competitiveness

INTRODUCTION

Intellectual property rights (IPR) have never been more economically and politically important or controversial than they are over this decade. Trademarks and geographical indications are frequently mentioned in discussions and debates on such emerge topics as trade, industrial policy, industrial organisation, food security, traditional knowledge, biotechnology, marketing. In a knowledge-based economy, there is no doubt that an understanding of IPRs is indispensable.

Corresponding author: Mariusz Maciejczak, Warsaw University of Life Sciences – SGGW, Faculty of Economic Sciences, Nowoursynowska 166, 02-787 Warsaw, Poland,
e-mail: mariusz_maciejczak@sggw.pl

Recent studies demonstrate the important contribution of IPR to the United States (US) and European Union (EU) economies. Royalties and license fees based on IPR figure high among the exports of both, and applications, and grants, for IPR protection made by Europeans in the US and vice-versa represent an important share of the totals. The differences between the respective IPR systems are comparatively small, yet seen as hard to overcome. In this respect one need to notice that negotiations on the Transatlantic Trade and Investment Partnership (TTIP) between the EU and the US reached their eleventh round already in October 2015. Discussions have covered a broad range of topics, and substantial work undertaken, in particular on the chapters of the agreement covering customs and trade facilitation, services, SMEs, sector. However several issues remain highly controversial on both sides. One of the most disputable is the issue of geographical indications (GI), which should be considered in brother perspective of the negotiations of IPR. From this perspective the TTIP negotiations may present the opportunity for a step change in EU-US relations in respect of IPR. The EU has put in place a sui generis system on unitary GI protection. The US also protects GIs under trademark law, as trademarks, collective marks or certification marks, but only to the extent required by WTO's Agreement on Trade-Related Aspects of Intellectual Property Rights, and does not recognise a number of EU's GIs.

This paper first objective is to present the issues of GI as an element of the IPR negotiations under the Transatlantic Trade and Investment Partnership between the European Union and the United States. Using the results of foresight researches, the second objective is to assess, whereas TTIP will have an impact on the competition and competitiveness of GI markets. Thus, the conducted research aimed to answer the questions (i) whether, (ii) and if so, how: positively or negatively; and (iii) thus with what force (measured in the Likert scale), TTIP will influence the competition and competitiveness of GI markets in the EU and the US.

SOURCE MATERIAL AND RESEARCH METHODS

The investigations are based on primary and secondary data sources. The later were acquired from in depth literature review on the examined issues. The primary data comes from the Real-Time Delphi survey.

The rationale for the choice of the foresight heuristic Delphi method [Rowe and Wright 2011] was the hypothetical impact of trade agreement on GI as there are unknown results of final TTIP agreement. The impact of policy changes on the agriculture and food systems has been already researched using Delphi method by Menrad et al. [1999], Grisham [2009], Maciejczak [2010, 2015], or Wentholta et al. [2012].

There was used Real-Time Delphi approach. Whereas conventional Delphi studies are characterised by repeating sequential rounds, the Real-Time Delphi approach is characterised by a continuous round-less procedure leading to a reduced time frame needed to conduct such studies [Monguet 2010, Gnatzy et al. 2011]. The core methodological innovation of Real-Time Delphi studies are the absence of iterated rounds and the real-time calculation and provision of group responses [Zipfinger 2007]. Another core methodological innovation is the fact that experts may not only judge once or twice, depending

on the number of rounds, as it has been usual in a Conventional Delphi study. During a Real-Time Delphi, experts can independently reassess their responses as often as they want [Gordon and Pease 2006].

The typical Real-Time Delphi process can be described in the way that participants get access to an online questionnaire portal for a certain time frame, within which they are allowed to login and logout as often as they want. Whenever they login, they see all their quantitative and qualitative answers of previous sessions and can change all answers as desired within the given period of time. Besides own answers they will see the on-going – hence, real-time – responses of other participants, and with regard to metric assessments the group as a whole will be visualised in terms of median or average. The numerical visualisations as well as the qualitative inputs change in the course of other participants changing their responses. Consequently, a participant can find out to what extent his own responses from an earlier point of time are still within the group opinion. As argued by Gnatzy et al. [2011] the core innovation of Real-Time Delphi studies is the real-time calculation and provision of results.

Using a web-based tool a predominantly qualitative and quantitative Real-Time Delphi survey was held. The questionnaire was open from 1 October 2015 to 31 December 2015. There were identified 26 experts from the EU and 26 experts from the US food sectors, each from six areas of the GI supply chains: farmers, processors, traders, consumers, policy makers, academics. All experts were chosen deliberately because of their knowledge about food systems, IPR, GI or TTIP. There was a basic assumption that the TTIP will influence the GI markets at both countries with regard to competition and product competitiveness.

RESULTS AND DISCUSSION

The importance of IPR has grown considerably in recent years. As summarized by Moschini et al. [2008], Bramley [2009], Lapan [2009], Belletti et al. [2011], Menapace and Moschini [2012] they generate economic value that in some cases surpasses the value of physical property, as well as have influence, in different extend, on many areas of society: i.e. technological advance, firms, institutions, organisations, re-distribution of wealth and income etc. Intellectual property refers to creations of the mind such as inventions; literary and artistic works; symbols, names and images used in commerce etc. As such, as argued by Raustiala et al. [2007] in practice, it covers various rights based on different rationales (e.g. while patents and copyright are linked to innovation, trademarks are centred on providing an answer to asymmetric information on the market and are not associated directly with innovation). Traditionally, two categories of IPR are identified: industrial property (patents, trademarks, designs and geographical indications) and copyright (literary and artistic works and related rights). The World Intellectual Property Organisation (WIPO), a United Nations specialised agency, founded in 1967 by the WIPO Convention, acts as a global forum for IP services, policy and cooperation. WIPO's main role is to administer the current 26 treaties in the field of IP, for its 187 member states. The first IP treaties concluded were the Paris Convention for the Protection of Industrial Property (1883) and the Berne Convention for the Protection of Literary and Artistic Works (1886).

Additionally, the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) was concluded in the framework of the World Trade Organisation.

TRIPS addresses both substantive and procedural issues as regards copyright and related rights, trademarks, patents, geographical indications, industrial designs, topographies of integrated circuits and trade secrets. On trademarks (articles 15–21), TRIPS includes a definition and adds certain rights for the owners of well-known marks. For geographical indications (articles 22–24), TRIPS provides protection against unfair competition and misleading use; clarifies to a certain extent the relation between GIs and trademarks and establishes a higher level of protection for wine and spirits or absolute protection. The holders of GIs can prevent the marketing of wine and spirits even if their labels indicate the true origin of the product or if they contain the GI in translation or if the GI is accompanied by expressions, such as "style", "type", "kind" [Gangjee 2007, Creditt 2009, Mulik and Crespi 2011].

On the above described trade laws both the US and the EU attach great importance to the protection of IPR and each has put in place a high-standard legal system of protection and enforcement [Sylvander et al. 2006, Belletti et al. 2009].

The EU has gone through a sophisticated process of assuming competence from its Member States to regulate in the field of IPR and has managed to Union-wide system for GI. As described by Barjolle et al. [2009] the EU has put in place a sui generis system on unitary GI protection since 1992. The Quality regulation (Regulation (EU) 1151/2012), which entered into force in January 2013, repeals the previous regulations to strengthen the scheme for protected designations of origin (PDOs) and protected GIs. It also provides a legal basis for inserting in the EU register third-country GIs protected through bilateral agreements and another legal basis for measures to defend EU logos. Chever et al. [2012] pointed out that in the EU, GI protection is said to be absolute – it protects registered names against any misuse or misleading practices, including when the true origin of the products or services is indicated or if the protected name is translated or accompanied by an expression such as style, type, method, as produced in, or similar, including when those products are used as an ingredient. Generic names (terms that have become common) cannot be registered as GIs. The EU also provides specific protection to wines and spirit drinks. The EU has an international policy on promoting and extending protection for its GIs, in particular through bilateral trade agreements. However, as mentioned by Babcock and Clemens [2004] as well as Rose [2007] the EU system is contested by certain third countries, including the US, which use different systems of protection and accuse the EU of impeding market access for their products.

Contrary to the EU's GI regime, the US law provides for a type of trademark that can serve a purpose similar to GI protection. The US protects GIs but only to the extent required by TRIPS and does not recognise a number of EU GIs. To operate like a GI, a linkage with origin must be part or all of the stated basis for certification [Akhatar and Jones 2014]. GIs are usually protected in the US under trademark law, as trademarks, collective marks or certification marks, and not under a sui generis system like the EU. Certification marks are used to indicate the regional or other origin; characteristics of the product/service (quality, mode of manufacture etc.); or that the labour on the goods/services has been performed by a member of a union or other association. Usually, the owner of a certification mark is a governmental body which does not use the mark but may

authorise other entities who meet the requirements to use it. Collective marks are marks adopted by a "collective" (association, cooperative etc.) which identify the goods and services as belonging to the collective and distinguish them from those of non-members. The collective itself does not sell the products/services (only its members do), but may advertise them. Finally, GIs can be protected as trademarks, when consumers recognise a certain sign referring to a geographical region as identifying a company or manufacturer [Cirlig 2014, Hajdukiewicz 2014].

The study by Chever et al. [2012] estimated that the EU's exports of GI products in 2010 were 11.5 billion GBP, representing 15% of all extra-EU exports of food and beverages. Again, half of this represents wine and another 40% spirits, and exports of agricultural and food GIs accounted for the remaining 9%. The US was the single largest market for the EU's GI products, and GIs accounted for 30% of all US imports of food and beverages from the EU. However, export values are concentrated in a small number of products: champagne and cognac from France; Scotch whisky from the United Kingdom; and Grana Padano and Parmigiano Reggiano from Italy. As Table 1 shows food related GI counts for rather small share of direct contribution of IPR-intense industries to employment and GDP in the EU and the US. Their contribution to EU's GDP in 2010 was on the level of 0.2%, whereas for the US it accounted for 0.9%. Similarly, the employment engagement was on the level of 0.8 and 0.1% respectively. However, as shown by Trachtenberg [2012] the importance of GI issue in trade negotiations between the EU and the US is that the EU recognises it to be competitive in the production of basic agricultural commodities but that its long culinary heritage has created a number of premium products which are valued by consumers in the marketplace.

Table 1. Share of direct contribution of IPR-intense industries to employment and GDP in the EU and the US in 2010 [%]

Types of products of intelectual property rights intensity	USA		EU	
	share of employment in total economy	share in total GDP	share of employment in total economy	share in total GDP
Trade mark intense	15.7	30.8	20.8	33.9
Including food products, wines and spirits (for US)	0.9	0.8	–	–
Design intense	3.4	4.8	12.2	12.8
Patent intense	2.7	5.3	10.3	13.9
Copyright intense	3.5	4.4	3.2	4.2
GI intense	–	–	0.2	0.1
Including food products, wines and spirits (for EU)	–	–	0.2	0.1

Source: Own calculation based on EU Eurostat and US Economics and Statistics Administration.

In order to reduce barriers to trade, such as tariffs and regulatory inconsistencies, between the two largest economies in the world, the EU and the US entered to the negotiations on the Transatlantic Trade and Investment Partnership. Trade barriers between the US and the EU are already remarkably low, with weighted tariffs for U.S. agricultural

exports to the EU averaging 4.8%, and 2.1% for EU exports to the US [Bureau et al. 2014]. The biggest challenge is however the very different approaches to regulation. The trade agreement could affect a broad range of sectors, and would have a significant impact on the evolution of agricultural markets and food systems in the US and the EU, including GI [Kaliszuk et al. 2013, Puccio 2015].

The major difficulty in the negotiations [Cirlig 2014] is around the use of EU GIs that the US considers generic and used so widely that consumers view them as representing a category of all of the goods and services of the same type. This may have arisen because European immigrants brought the names with them to the US and used them to promote their own products in their new home. As suggested by Trachtenberg [2012] the differences between the US and the EU on this issue are not differences in principle, but rather revolve around a number of specific names which are protected in the EU as GIs but which the US sees as generic. Though, two competing systems add costs, of course, for those attempting to have global protection for their GIs.

In order to foresight the possible impact of TTIP negotiations on both GI food markets, which includes also wines and spirits, the Real-Time Delphi survey was conducted. Table 2 describes the average assessments of the EU and the US experts on four investigated issues.

Table 2. Average results of Real-Time Delphi study (1 – the worst possible impact, 5 – the best possible impact)

GI related issues under assessment	Average score for the EU experts ($n = 26$)	Average score for the US experts ($n = 26$)
Competitiveness of products	4.20	2.90
Domestic market competition	1.95	4.13
Market development	3.38	2.13
TTIP value added	1.48	1.80

Source: Own investigations.

The analysis of the results from Table 2 indicate that overally TTIP is a low assessed by experts. Both the EU and the US experts thinks that it will add small value to the development of markets and their participants in both regions. They scored the value added impact for 1.48 points (EU) and 1.80 (US) out of 5 possible. As it is shown in Figure, the more primary element of the GI food chain, the lower assessment, respectively in both cases.

Taking into account the impact on markets development with regard to its institutional and organizational scopes the EU experts thinks that the TTIP will have higher positive impact (3.38) then their US counterparts (2.13). It can be regarded as interesting that the stakeholders such as policymakers and academics assessed this impact totally differently. The US experts saw it more negatively, as the EU more positively. This can be explained by the different levels of GI market developments and strategies assumed by both firms and regulators.

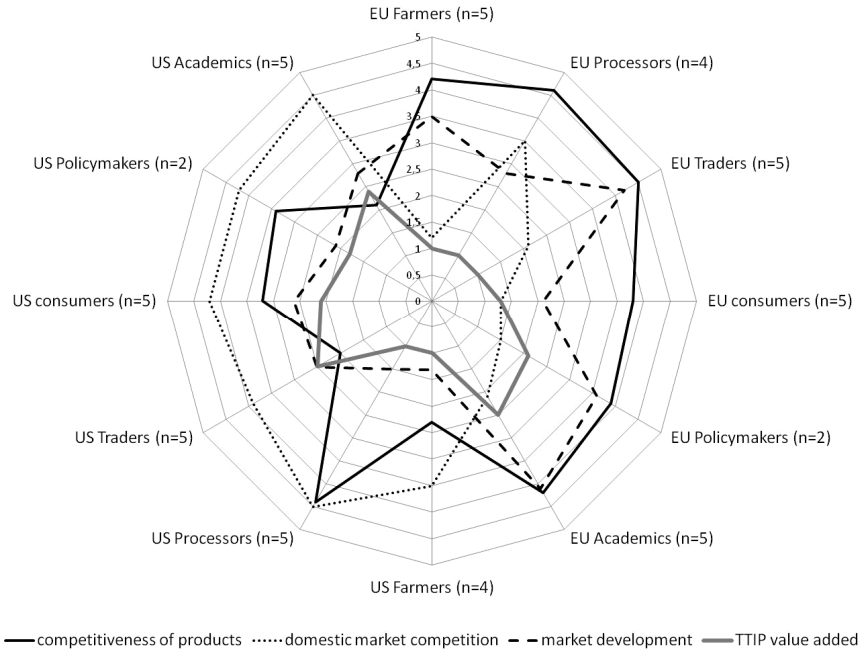

Fig. Results of Real-Time Delphi study (1 – the worst possible impact, 5 – the best possible impact)

Source: Own investigation.

Quite different views can also be seen in relation to competitiveness of the GI products and domestic market competition. The EU experts forth see that TTIP would negatively impact domestic market competition, while positively competitiveness of the EU GI products. Contrary, the US experts assumed that TTIP might impact domestic competition positively and the products competitive advantages negatively. It can be translated by the tradition, heritage and higher values associated to the GI products by Europeans [Guerrero et al. 2006].

CONCLUSIONS

Intellectual property rights are important issues in the development of markets, their industrial and institutional organization as well as trade. Implementation and mature diffusion of different legal regimes related to intellectual property, as it was shown on the example of geographic indications, might create significant barrier to the liberalization of international trade of quality food products. Therefore the on-going negotiations on the Transatlantic Trade and Investment Partnership would require significant adjustments and compromises from both negotiating parties, especially with regard to legal provisions. The possible impact on the GI food markets, especially with regard to competition and products competitive advantages highly depends on the development level of the markets

with regard to specific issues, such as heritage or tradition. The Real-Time Delphi survey shoved, that contrary to decision makers, the parties engaged in the market forth seen TTIP impact on GIS market overally as low. That could mean that TTIP might re-define the rules of the market game by changing the centre of the gravity from legal arrangements and control into to governance arrangements. In such a case the leading role might start to play market institutions such as locally and regionally oriented private quality standards, as well as consumer driven marketing strategies or two-side market platforms. These might be interesting issues for further researches.

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BADANIE METODĄ DELFICKĄ W CZASIE RZECZYWISTYM KONKURENCJI I KONKURENCYJNOŚCI OZNACZEŃ GEOGRAFICZNYCH JAKO PRZEDMIOTU NEGOCJACJI TRANSATLANTYCKIEGO PARTNERSTWA O WZAJEMNYM HANDLU I INWESTYCJACH

Streszczenie. Celem artykułu było przedstawienie kwestii oznaczeń geograficznych jako elementu negocjacji w zakresie praw własności intelektualnej negocjowanego między Unią Europejską a Stanami Zjednoczonymi Transatlantyckiego Partnerstwa o Wzajemnym Handlu i Inwestycjach. Stwierdzono, iż wdrożenie różnych reżimów prawnych związanych z własnością intelektualną może stwarzać znaczące bariery w liberalizacji handlu międzynarodowego produktami żywnościowymi wysokiej jakości. Korzystając z wyników badania foresight, wykazano, że umowa ta może wnieść małą wartość dodaną dla rozwoju rynków i ich uczestników w obu regionach. Może jednak pozytywnie wpłynąć na przewagi konkurencyjne produktów UE, jednocześnie negatywnie wpływając na konkurencję na rynku UE. Przeciwny wpływ przewidywany jest w przypadku USA, TTIP może pozytywnie wpłynąć na konkurencję na rynku, negatywnie zaś na konkurencyjność amerykańskich produktów.

Słowa kluczowe: oznaczenia geograficzne, IPR, TTIP, Real-Time Delphi, konkurencja, konkurencyjność

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FACTORS AFFECTING CHANGES IN THE POPULATION OF SOWS IN POLAND. REGIONAL ANALYSIS

Benedykt Pepliński
Poznan University of Life Sciences

Abstract. Since 2008 there has been a deep crisis in the production of pork in Poland. It has been especially noticeable in the decreasing population of pigs, especially sows. The aim of the article was to analyze the factors affecting changes in the sow population in Poland and in individual voivodeships. The period under investigation ranged from 2001 to 2014. The study was based on the results of a model farm with a semi-closed cycle production system. The farm sold 3836 porkers in 2011. The analysis proved that there was a high correlation between the cost-effectiveness of porker and piglet production and the sow population level at the end of the following year. In individual voivodeships there was low dependence between changes in the sow population and the cost-effectiveness of porker and piglet production. However, there was a high correlation between the average sow population in individual voivodeships and the number of piglets farrowed by one sow per year.

Key words: population of sows, profitability, piglets, regional analysis

INTRODUCTION

Since 2008 there has been a deep recession in the production of pork in Poland. It has been noticeable in a rapid decrease in the pig population [*Pogłowie świń*… 2001–2014]. Although Poland is self-sufficient in meat production, in the case of pork it has been a net importer of pork since 2008 [*Rynek mięsa*... 2009, Kapusta 2015]. The scale of the decrease is so large that this situation will not change soon [Pejsak 2012b, Pepliński 2012, Blicharski and Hammermaister 2013, Szymańska 2014]. In spite of the regressing production, pork production requires special attention due to the culinary traditions in Poland and its importance for the income in Polish agriculture [Gajewczyk et al. 2014].

The general opinion is that the main factor responsible for the decrease in pig population is the worsening relation between the prices of porker and prices of cereals [Pepliński

Corresponding author: Benedykt Pepliński, Department of Management and Law, Poznan University of Life Sciences, Wojska Polskiego 28, 60-637 Poznań, Poland, e-mail: pepliński@up.poznan.pl

2013], i.e. worse cost-effectiveness of production. However, it is necessary to note the fact that the prices of pig carcasses in Poland were usually higher than the average prices in the EU [Blicharski 2011, Knecht and Środoń 2013b]. Poland is one of the countries where the pig population has decreased most in recent years [Stępień 2013]. Apart from that, there has been an unequal decrease in the sow population in individual voivodeships.

Therefore, the aim of the research was to analyze the factors determining changes in the sow population in Poland and in individual voivodeships between 2001 and 2014.

In view of the order of the technological process, we made a research hypothesis that the cost-effectiveness of piglet production has greater influence on the sow population level in Poland than the cost-effectiveness of porker production.

MATERIAL AND METHODS

On average in 2011 the model farm maintained 150 sows, which farrowed 3105 piglets. Additionally, the farm purchased 1190 piglets. In 2011 the farm sold 3836 porkers with an average live weight of 118.7 kg. The choice of a large pig producer, by Polish standards, was caused by the need to show the level of production cost-effectiveness on the farms which are and will be capable of competing on international markets. As results from the study conducted by Ziętara [2012], positive income can only be achieved in a closed cycle on farms breeding 36 sows and selling about 700 porkers. However, there is a rapid increase in the minimum production, which guarantees income for investments. Studies by Pepliński [2005] and Skarżyńska [2011] show that the farms producing several dozen porkers a year generate the costs of production which are about 20% greater than on the farms which produce at least 1000 porkers a year. Therefore, in the long run small entities do not have much prospect for development.

Porker production was a basic commodity product on the farm under analysis. The production technology included feeding the animals with the farm's own forage based on premixes, post-extraction soya and rapeseed meal and, to a lesser extent, on legumes. This is a typical method of feeding pigs in Poland.

In order to obtain comparable results of the cost-effectiveness of porker and piglet production in individual voivodeships we made an economic analysis based on the economic and production results achieved in 2011 by a model farm situated in the south of Wielkopolskie Voivodeship. The analysis was conducted according to the methodology presented by Pepliński et al. [2004]. It had a separate production center for the piglets. The indirect costs of the whole farm was divided in proportion to the value of animal production. The average annual prices of cereals (both owned and purchased by the farm), piglets, porkers and sows in individual voivodeships were adopted for analysis. The costs of cereals were the most important cost, because during the period under analysis they amounted to 31.8–49.0% of the total costs in porker production and to 17.6–27.1% of the total costs in piglet production. In order to calculate the costs of post-extraction meals, premixes, electricity, coal, diesel and human labour we assumed that they had identical prices in all regions of Poland. In order to determine the costs of premixes, forage additives, veterinary care as well as building and machinery depreciation in individual

years, we included selected price variation ratios provided by the Central Statistical Office (GUS) in statistical yearbooks for comparison with 2011.

The Pearson correlation coefficient was applied in order to determine the influence of the cost-effectiveness of porker and piglet production on the population of sows in Poland and in individual voivodeships. There is delayed influence of changes in the cost--effectiveness of production on the population level. Therefore, we compared the profit per unit with changes in the population after one year and after two years. For analysis we assumed the population levels in November of a particular year.

RESULTS

Between 2001 and 2014 there was high spatial diversification in the sales prices of porkers and market prices of piglets in Poland (Fig. 1). As far as porkers are concerned, the difference between the minimum and maximum price in individual voivodeships ranged from 5.9% in 2007 to 17.2% in 2011. During the whole period under analysis the lowest average prices of porkers were noted in Śląskie Voivodeship (4.09 PLN per kg of live weight) and in Lubelskie Voivodeship (4.13 vs 4.19 PLN per kg, which was

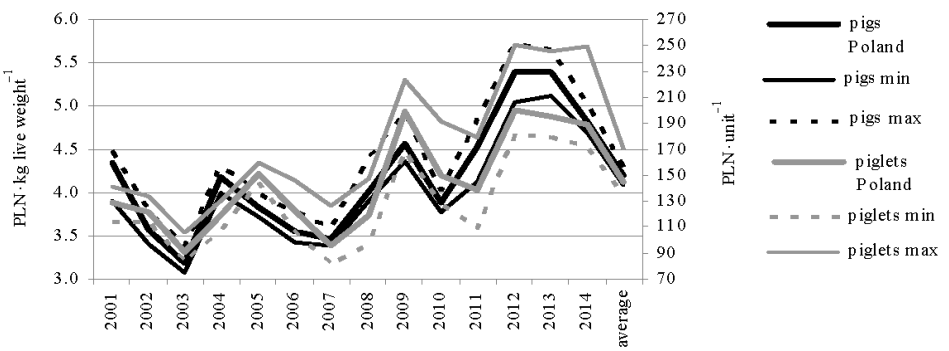

Fig. 1. The prices of porkers and piglets in Poland between 2001 and 2014 (the average values in Poland and the minimum and maximum values in individual voivodeships)

Source: Pepliński [2013] and own study based on *Skup i ceny*... [2014].

the average value in Poland). These voivodeships were also characterised by the most frequent occurrence of the lowest average annual prices in Poland. Farmers in Kujawsko--Pomorskie Voivodeship and in Warmińsko-Mazurskie Voivodeship achieved the highest prices, i.e. 4.28 and 4.26 PLN per kg, respectively. Thus, the difference amounted up to 0.19 PLN per kg, i.e. 4.6%. As far as piglets are concerned, there was much greater spatial diversification in prices. The difference between the maximum and minimum prices in individual voivodeships ranged from 11.8% in 2005 up to 65.0% in 2011. Between 2001 and 2014 farmers in Lubelskie Voivodeship and in Pomorskie Voivodeship achieved the lowest average prices, i.e. 133.9 and 135.4 PLN per piece, respectively. On the other hand, the highest prices were noted in Śląskie Voivodeship (170.5 zlotys per piece) and

Małopolskie Voivodeship (163.6 PLN per piece). The average price in Poland was 144.3 PLN per piece. Thus, the difference amounted up to 29.7 PLN per piece, i.e. up to 27.3%.

The average level of prices in the voivodeships, where the population of pigs exceeded 1 million in 2001, was also diversified. On average the prices in Kujawsko-Pomorskie Voivodeship and Mazowieckie Voivodeship were higher than the average prices in Poland, whereas the prices in Lubelskie Voivodeship, Łódzkie Voivodeship and Wielkopolskie Voivodeship were lower. In all of those voivodeships the prices of piglets were lower than the average prices in Poland. During the whole period under analysis they were 4.0% lower on average. However, between 2008 and 2014 this disproportion increased to 5.2%, which points to the increasing disproportion as compared with the average prices.

The costs of porker production in Poland were characterised by spatial diversification similar to purchase prices. During the whole period under analysis on average they amounted to 4.8%, where the maximum difference reached 11.5% in 2008. As far as piglets are concerned, the differences between individual voivodeships in the level of costs were lower. On average they reached 2.7%, where the maximum difference reached 5.0% in 2008.

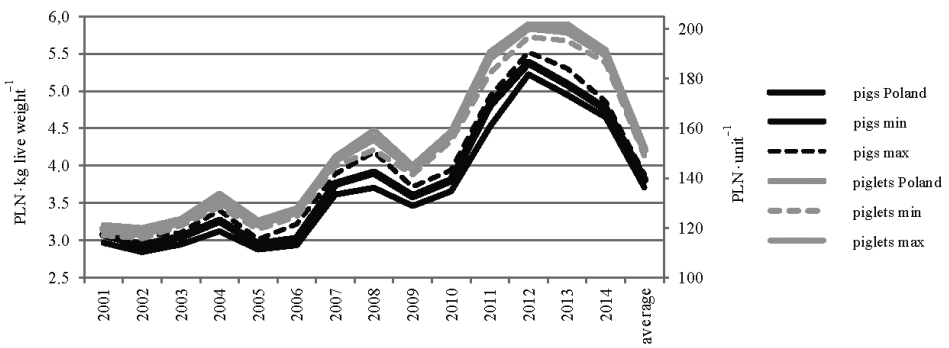

Fig. 2. The costs of porker and piglet production in Poland (on the model farm) between 2001 and 2014 (the average values in Poland and the minimum and maximum values in individual voivodeships)

Source: Pepliński [2013] and own investigations.

Between 2001 and 2014 the lowest average costs of piglet production were noted in Podkarpackie Voivodeship, i.e. 3.71 PLN per kg, whereas the highest costs were noted in neighbouring Małopolskie Voivodeship, i.e. 3.88 PLN per kg. As far as piglets are concerned, the lowest costs were noted in Podkarpackie Voivodeship, i.e. 149 PLN per piece, whereas the highest costs were noted in Mazowieckie Voivodeship, i.e. 153 PLN per piece.

The cost-effectiveness of porker production in Poland is subject to high fluctuations, which is confirmed by the occurrence of pork cycles (Table 1). Between 2001 and 2007 the farm under analysis made an average income of 0.58 PLN per kg, whereas between 2008 and 2014 it was only 0.18 PLN per kg. As the calculations of the trend line revealed, every year the cost-effectiveness level dropped by 0.0686 PLN per kg. The cost-effectiveness of porker production is characterized by great spatial diversification, because

Table 1. The profit from porker production in Poland and voivodeships (on the model farm) between 2001 and 2014 (PLN per kg of live weight)

Specification	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2001–2014
Poland	1.27	0.64	0.14	0.92	0.87	0.54	–0.30	0.10	0.97	0.09	–0.29	0.02	0.30	0.06	0.38
Dolnośląskie	1.31	0.71	0.23	1.10	1.04	0.74	–0.25	0.43	0.94	0.08	–0.57	–0.22	0.36	0.02	0.42
Kujawsko-Pomorskie	1.34	0.72	0.21	0.96	0.87	0.60	–0.37	0.10	0.96	0.18	–0.13	0.41	0.61	0.24	0.48
Lubelskie	1.28	0.62	0.04	0.76	0.84	0.49	–0.37	0.05	0.98	0.11	–0.24	0.07	0.20	0.07	0.35
Lubuskie	0.90	0.69	0.16	0.97	0.93	0.55	–0.32	0.11	1.01	0.15	0.21	0.08	0.46	0.01	0.42
Łódzkie	1.28	0.61	0.06	0.73	0.82	0.50	–0.27	–0.06	0.87	0.13	–0.30	–0.03	0.09	–0.01	0.32
Małopolskie	1.17	0.67	0.26	0.84	0.86	0.28	–0.22	–0.20	0.85	0.11	0.04	–0.11	–0.12	–0.13	0.31
Mazowieckie	1.20	0.53	0.13	0.87	0.86	0.55	–0.30	0.06	0.93	0.11	–0.33	0.03	0.24	0.04	0.35
Opolskie	1.41	0.64	0.13	0.75	0.80	0.56	–0.20	0.12	0.92	–0.05	–0.21	0.00	0.13	–0.01	0.36
Podkarpackie	1.31	0.67	0.12	0.86	0.87	0.54	–0.16	0.17	1.04	0.13	0.10	0.09	0.29	0.09	0.44
Podlaskie	1.42	0.77	0.14	0.81	0.93	0.58	–0.32	0.07	0.90	0.00	–0.33	0.06	0.20	0.05	0.38
Pomorskie	1.47	0.85	0.32	1.06	0.92	0.65	–0.20	0.29	1.43	0.14	–0.60	–0.09	0.36	–0.03	0.47
Śląskie	1.26	0.54	0.12	0.72	0.95	0.47	–0.26	–0.03	0.74	–0.09	–0.35	–0.41	–0.15	–0.17	0.24
Świętokrzyskie	1.25	0.56	0.09	0.84	0.99	0.67	–0.14	0.24	1.11	0.21	–0.14	0.09	0.02	–0.11	0.41
Warmińsko-Mazurskie	1.43	0.60	0.13	0.94	0.94	0.59	–0.34	0.20	0.97	0.07	–0.35	0.03	0.26	0.09	0.40
Wielkopolskie	1.19	0.58	0.10	0.90	0.81	0.45	–0.32	–0.01	0.92	0.06	–0.21	0.04	0.34	0.05	0.35
Zachodniopomorskie	1.39	0.74	0.30	1.04	0.94	0.71	–0.17	0.32	1.18	0.16	–0.32	0.18	0.44	0.29	0.51

Source: Pepliński [2013] and own investigations.

the profit level in individual voivodeships fluctuated from 0.23 PLN per kg in 2007 to 0.82 PLN per kg in 2012. The best economic conditions for porker production were noted in Zachodniopomorskie Voivodeship, where the farm under analysis would have earned 0.51 PLN per kg and in Kujawsko-Pomorskie Voivodeship – 0.48 PLN per kg. The worst economic conditions for porker production were noted in Śląskie Voivodeship and in Małopolskie Voivodeship, where the profit would have been 0.24 and 0.31 PLN per kg, respectively.

The structure of the costs of production was predominated by the costs of feeds, which ranged from 57.5% in 2009 to 70.1% in 2007 of all the costs of porker production (it was significantly related with the prices of cereals and feed additives). In 2011 the farm under analysis used wheat (11%), barley (38%), rye (9%), triticale (23%), high protein feeds – post-extraction meals: soya, rapeseed and legume meals (13%), premixes and other additives (6%). Cereals made from 55 to 70% of the costs of feeds and from 33 to 50% of the total costs of porker production. The maximum disproportions in the prices of cereals in individual voivodeships often exceeded 20%. In 2011 triticale in Małopolskie Voivodeship could be purchased at an average price which was 41% lower than in Mazowieckie Voivodeship. Therefore, the level of prices of cereals in individual voivodeships had significant influence on the costs of porker production.

Piglet purchase costs were also important, as they ranged from 7.6% in 2007 to 16.4% in 2009, where the average cost was 11.4%. On average, the share of labour costs in total costs amounted to 7.8% (from 6.7 to 8.9%), whereas the average share of veterinary costs was 4.0% (from 3.0 to 4.7%).

The cost-effectiveness of piglet production is also subject to cyclical fluctuations (Table 2). The results of the farm under analysis in piglet production ranged from –51.63 PLN in 2007 to 54.76 PLN per piece in 2009, where the average loss amounted to 7.1 PLN per piece during the whole period under investigation. There were also considerable disproportions between the voivodeships. The production was the most cost-effective in Śląskie Voivodeship, where during the whole period under analysis the income reached 20 PLN per piece (as many as eight times this voivodeship was characterised by the best economic relations in Poland), and in Małopolskie Voivodeship – 11.9 PLN per piece. The production was the least cost-effective in Lubelskie Voivodeship (–17.6 PLN per piece), in Kujawsko-Pomorskie Voivodeship and in Pomorskie Voivodeship, where the average loss exceeded 15.0 PLN per piece. In this case the prices of piglets were the most decisive to the cost-effectiveness level.

Similarly to porker production, the structure of costs was predominated by the costs of feeds, but their share was much lower and reached the average value of 54% during the period under analysis. It ranged from 48.9% in 2009 to 57.8% in 2012. Labour costs and veterinary costs were more important than in the costs of porker production. Respectively, they reached the average values of 15% (ranging from 13.5% in 2001 to 17.1% in 2009) and 12.1% (ranging from 10% in 2012 to 14% in 2005).

Polish pig production is in deep crisis. This observation can be proved by the fact that the pig population in Poland decreased from 18.13 million pieces in 2007 to 10.99 million pieces in 2013. In 2014 the population increased slightly to 11.7 million pieces only to

Table 2. The profit from piglet production in Poland and voivodeships (on the model farm) between 2001 and 2014 (PLN per piece)

Specification	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2001–2014
Poland	9.1	4.2	–31.3	–11.5	29.1	–3.2	–51.6	–37.2	54.8	–7.8	–49.1	–0.8	–4.0	–0.5	–7.1
Dolnośląskie	–2.3	–0.3	–30.5	–20.2	26.2	1.9	–35.1	–30.7	77.6	–0.8	–42.8	–4.5	8.5	11.1	–3.0
Kujawsko-Pomorskie	6.5	2.7	–38.5	–16.8	28.2	–4.7	–66.7	–61.9	37.9	–5.0	–57.5	–8.4	–14.9	–13.4	–15.2
Lubelskie	7.1	–2.9	–38.3	–16.5	23.2	–20.2	–66.6	–43.3	45.8	–29.5	–63.3	–8.2	–19.3	–13.7	–17.6
Lubuskie	4.4	7.8	–23.7	–8.9	31.6	18.5	–21.1	–47.9	33.7	–2.5	–79.5	–14.3	–3.0	–2.8	–7.7
Łódzkie	11.1	8.3	–32.1	–13.4	35.5	–1.3	–58.3	–49.8	47.4	–11.5	–57.0	–8.5	–8.3	–8.5	–10.5
Małopolskie	20.3	16.6	–17.7	–1.6	39.4	10.0	–27.6	–19.9	79.2	10.0	–24.5	34.4	20.3	28.0	11.9
Mazowieckie	9.5	1.8	–32.8	–16.1	29.0	–5.9	–60.7	–45.4	55.1	–16.8	–68.5	–18.9	–22.1	–20.0	–15.1
Opolskie	–1.0	–1.7	–31.6	–21.1	26.0	–12.8	–64.1	–51.9	65.1	–0.8	–42.0	–19.0	–9.6	–4.3	–12.1
Podkarpackie	16.3	7.9	–26.3	–2.6	30.1	–6.0	–40.5	–25.3	64.6	–6.0	–28.9	28.8	4.1	17.3	2.4
Podlaskie	15.2	6.6	–31.9	–2.2	31.8	1.4	–47.5	–27.5	65.1	–6.3	–60.5	–2.5	4.1	–4.8	–4.2
Pomorskie	2.9	–3.0	–39.3	–20.7	23.1	–6.8	–49.7	–50.0	29.4	7.0	–60.0	–8.6	–18.5	–12.2	–14.7
Śląskie	15.3	12.7	–19.0	–8.6	35.0	14.8	–18.8	–7.5	67.7	34.7	–7.3	51.6	47.4	61.9	20.0
Świętokrzyskie	10.4	2.8	–32.9	–11.1	28.2	–11.5	–55.3	–37.9	64.2	–8.0	–46.9	0.4	–5.8	4.8	–7.0
Warmińsko-Mazurskie	8.8	8.2	–24.0	–8.9	26.7	12.2	–24.1	–22.4	49.1	23.1	–18.4	42.6	2.4	–2.4	5.2
Wielkopolskie	5.7	2.8	–38.3	–14.2	35.6	3.3	–58.1	–51.6	52.6	–13.8	–57.9	–11.3	–3.4	–4.4	–10.9
Zachodniopomorskie	–4.3	–2.5	–35.0	–21.1	29.1	–7.3	–33.9	–34.8	24.7	–12.3	–22.5	–12.4	–1.6	–5.5	–10.0

Source: own investigations.

drop by nearly 0.5 million pieces in December again. In 2001 the pig population in Poland was 17.1 million pieces and in five voivodeships it was greater than 1 million pieces, i.e. in Łódzkie Voivodeship (1.17 million), Lubelskie Voivodeship (1.24 million), Mazowieckie Voivodeship (1.74 million), Kujawsko-Pomorskie Voivodeship (2.11 million) and Wielkopolskie Voivodeship (4.56 million). In 2014 the pig population exceeded 1 million pieces only in Łódzkie Voivodeship (1.01 million), Kujawsko-Pomorskie Voivodeship (1.27 million) and Wielkopolskie Voivodeship (3.96 million). In comparison with 2001 the population dropped by more than a half in five voivodeships, i.e. in Dolnośląskie Voivodeship, Lubelskie Voivodeship, Małopolskie Voivodeship, Podlaskie Voivodeship and Zachodnio-Pomorskie Voivodeship (Fig. 3). Until 2007 Świętokrzyskie Voivodeship was the leader in increasing the population. In comparison with 2001 the population increased by as much as 30%, whereas during the downturn the voivodeship was characterised by the greatest decrease (except Podlaskie Voivodeship). By 2014 the population decreased by as much as 54%, as compared with 2007. The population level was the most stable in Wielkopolskie Voivodeship and in Łódzkie Voivodeship. In comparison with 2001 the pig population in these voivodeships decreased by 13.1 and 13.5%, respectively, whereas in comparison with 2007 it decreased by 24.8 and 26%, respectively.

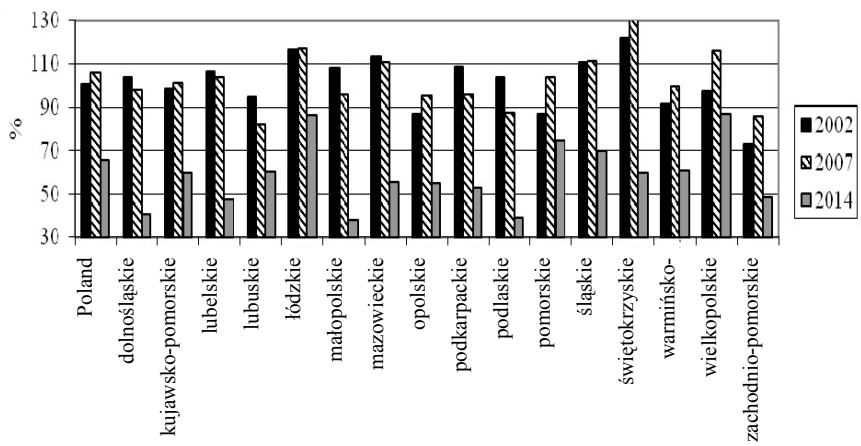

Fig. 3. Variation in the pig population in Poland and voivodeships in November between 2001 and 2014 (2001 = 100%)

Source: Pepliński [2013] and the own study based on *Pogłowie świń wg stanu…* [2014].

The situation in sow population was even more difficult (Fig. 4). In November 2001 there were 1.63 million sows in Poland. In 2006 the population increased by more than 17%, i.e. up to 1.9 million pieces, whereas in 2014 the population decreased to about 0.95 million pieces, which amounted only to 58% of the population in 2001 and 49.6% of the population in 2006. In comparison with 2001 the population dropped by more than 50% in Podlaskie Voivodeship (–63.9%), Zachodniopomorskie Voivodeship (–57.9%), Małopolskie Voivodeship (–55.7%), Mazowieckie Voivodeship (–55.3%), Lubuskie Voivodeship (–53.3%) and Lubelskie Voivodeship (–50.5%). In comparison with 2001

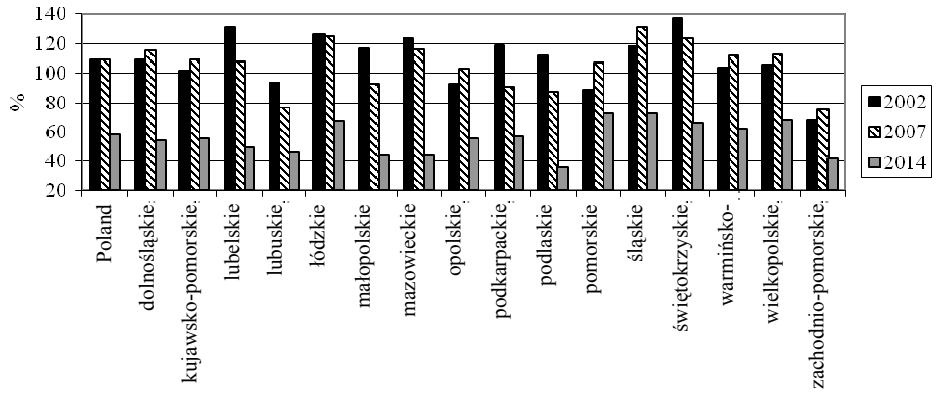

Fig. 4. Variation in the sows population in Poland and voivodeships in November between 2001 and 2014 (2001 = 100%)

Source: Pepliński [2013] and the own study based on *Pogłowie świń wg stanu…* [2014].

the lowest decrease in the sow population was noted in Pomorskie Voivodeship (–27.2%), Silesian Voivodeship (–27.3%), Wielkopolskie Voivodeship (–31.5%) and Łódzkie Voivodeship (–32.4%).

The analysis of correlations between the profit made from porker production in a particular year (n) and the sow population level at the end of the following year (n + 1) for the average national profit and pig population in Poland revealed a high positive correlation of 0.82. However, the correlation with the population level in year n + 2 was lower, as the coefficient amounted to 0.39.

There was a weaker correlation between the profitability of piglet production and the sow population level in the following year (n + 1), i.e. 0.52. However, there was no correlation with the population level in year n + 2 (the correlation coefficient amounted to 0.003). Thus, the research hypothesis was not confirmed. It may have resulted from the fact that most farmers do not divide the technological process into piglet production and fattening of porkers. In consequence, they do not know the costs and cost-effectiveness of piglet production. Therefore, decisions concerning production chiefly depend on the cost-effectiveness of the entire production process.

The analysis of correlation between the cost-effectiveness of porker and piglet production and variation in the sow population level in the following year in individual voivodeships indicated that this dependence was weaker, because the correlation coefficient amounted to 0.49 and 0.23, respectively.

DISCUSSION

The analysis pointed to considerable dependence between the sow population level in Poland and the cost-effectiveness of porker production and to lesser dependence between this level and the cost-effectiveness of piglet production. The lack of cost-effectiveness of porker (profit: 0.06 PLN per kg) and piglet production (profit: –0.5 PLN per piece) in 2014 and worse price relations in the second half of 2014 suggest a further decrease in

the sow population level in 2015. If the cost-effectiveness of porker and piglet production does not improve, their population may drop below 0.9 million in 2016.

The fact that the sow population level greatly depends on the cost-effectiveness of porker production may be caused by the closed production cycle, which is still preferable and predominant on most farms in Poland [Pepliński et al. 2004, Szymańska 2008, 2014, Blicharski and Hammermaister 2013, Knecht and Środoń, 2013a]. The farmers who use the closed production cycle usually do not know the costs of piglet production, so their decisions concerning production are usually based on the cost-effectiveness of porker production.

There was an uneven decrease in the sow population in individual voivodeships. The relatively low values of the coefficients of correlation between the cost-effectiveness of porker and piglet production and the sow population in individual voivodeships in the following year, i.e. 0.49 and 0.23, respectively, point to the fact that other factors are also very important. The low concentration and scale of pig production is one of frequently listed causes of the decrease in the pig population, and in consequence, in the sow population [Pejsak 2012a, Pepliński 2012, Blicharski and Hammermaister 2013]. In 2013 the mean pig population on an average Polish farm was only 41, including 5.7 sows, as compared with 25 pigs, including 4.4 sows in 2002. The increase in the concentration was possible because the number of farms with pigs dropped by more than 60% [*Powszechny spis rolny*… 2003, *Charakterystyka*… 2013]. However, the considerable relative increase in the population is insufficient if we compare the concentration of the population in Poland and in other countries in Europe and on other continents, where the degree of concentration of the population is several times greater and the processes of concentration are much more rapid. For example, between 2003 and 2010 the mean pig population increased by more than 100% in Spain and Denmark, whereas in Italy it increased by more than 400% [Stępień 2014]. Among the five voivodeships, where the sow population dropped by at least 50% between 2006 and 2014, four voivodeships were characterized by the lowest average sow population (in 2002 there were not more than 3.15 sows per farm).

The small scale of production not only made it impossible to achieve the economies of scale but it was also one of the main causes of poor quality of the breeding material, failure to repair the basic herd with sows from breeding herds and in consequence, it resulted in less numerous farrows. It is not cost-effective for small producers to apply modern methods of production and devote their time to handling piglets. Small producers do not have so many possibilities to transfer piglets from bigger to smaller farrows. In consequence, we could see that among the five voivodeships with the largest number of piglets farrowed by one sow (more than 17.8, where the mean number in Poland was 16.7) their sow population was greater than average. These were: Dolnośląskie Voivodeship, Lubuskie Voivodeship, Pomorskie Voivodeship, Wielkopolskie Voivodeship and Zachodnio-Pomorskie Voivodeship. Between 2002 and 2013 sows' fertility decreased in Lubelskie Voivodeship, Małopolskie Voivodeship, Podkarpackie Voivodeship and Świętokrzyskie Voivodeship. These voivodeships were characterised by the lowest concentration of sows on farms (less than 3.5 sows per farm) [*Zwierzęta gospodarskie*… 2003, 2013]. There was a high coefficient of the correlation between the average sow population and the number of piglets farrowed. It amounted to 0.7.

Similarly to the process of herd concentration, improvement in sows' fertility is too slow in Poland, because between 2003 and 2013 the number of piglets from one sow increased only by 1.6 pieces. In view of the fact that the average number of piglets fostered in the EU is 24.3 pieces, whereas in Denmark and the Netherlands it is more than 27 pieces [Blicharski 2011], if fertility continues to improve at this rate, it will take more than 40 years to achieve the current average in the EU. Due to high fixed costs of sows' maintenance (feeds, handling, stands and insemination) and relatively fixed costs of handling farrows in herds of 100 sows the loss resulting from too small numbers of piglets fostered may reach even about 0.1 milion PLN a year. The rapid growth of the number of farms which specialize only in fattening creates the demand for large numbers of piglets. It is estimated that the minimum number of sows in a herd should be 200 to guarantee large, homogenous batches of about 200–300 piglets. There are only about 200 such herds in Poland [Blicharski 2011, Blicharski and Hammermaister 2013]. In consequence, the import of piglets is increasing. According to initial estimates, by December 2014 it exceeded 5 million pieces [*Pogłowie świń*... 2014].

There are also other causes of the decrease in the population of sows and pigs: farmers' poor vocational and specialist education, poor counselling (farmers are usually reserved about consultants from trade companies), little support from the state, which usually supports extensive farming, capital deficit on farms, absence of long-term cooperation between farmers and meat processing companies, high consumption of feeds, low daily growth [Pejsak 2012a, Pepliński et al. 2012, Blicharski, Hammermaister 2013]. Due to the low meat content in porker's meat processing companies try to limit the weight of porkers they purchase. As a result, farmers abandon the most cost-effective fattening of pigs between 110 and 120 kg although in recent years there has been a noticeable increase in the mean weight of porkers sold.

Farmers have rather poor knowledge of economy and organization, which is also a serious barrier to the development of production. It causes difficulties in necessary calculations or makes them impossible. In consequence, most farmers do not know the costs of production, whereas making approximate ad hoc calculations does not usually correspond to reality.

The process of improvement in the situation on the market of pork production in Poland will take a long time and it will require considerable acceleration in the concentration of production, specialization and considerable funds for investments. There are also numerous discussions about producers' horizontal integration, which undoubtedly improves integrated producers' economic results and production [Pepliński et al. 2004, Dziewulski 2012, Szymańska 2012]. However, as far as small producers are concerned, the integration will not meet their expectations, because many small producers will together reach the scale of production equivalent to the scale achieved by larger producers, but the quality and uniformity of piglet batches, for example, will be considerably lower. Extensive farming production, which is predominant on small farms, gives farmers a high potential to switch to organic food production, especially in view of the fact that it is not very difficult to achieve the status of an organic food producer [Bryła 2013]. It may be an alternative trend in the development of some farms, especially due to the fact that there is increasing demand for organic products.

CONCLUSIONS

The analysis proved that:

1. There was a high deference's of cereals, pigs and piglets prices between individual voivodeships.
2. There was a high correlation between the cost-effectiveness of porker and piglet production and the sow population level at the end of the following year and poor correlation in year n + 2.
3. In individual voivodeships there was low dependence between changes in the sow population and the cost-effectiveness of porker and piglet production, so in this case there are another factors differentiating the level of sow population.
4. There was a high correlation between the average sow population in individual voivodeships and the number of piglets farrowed by one sow per year.

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CZYNNIKI WPŁYWAJĄCE NA ZMIANY POGŁOWIA LOCH W POLSCE. ANALIZA REGIONALNA

Streszczenie. Produkcja żywca wieprzowego w Polsce od 2008 roku znajduje się w głębokim kryzysie, czego wyrazem jest spadające pogłowie świń, a szczególnie loch. Celem artykułu jest analiza czynników wpływających na zmiany pogłowia loch w Polsce i w poszczególnych województwach. Badania przeprowadzono za lata 2001–2014 na podstawie wyników produkcyjnych wzorcowego gospodarstwa rolnego produkującego w cyklu półzamkniętym, które w 2011 roku sprzedało 3836 tuczników. Przeprowadzana analiza wykazała dużą korelację opłacalności produkcji tuczników i prosiąt na poziom pogłowia loch na koniec roku następnego. Zmiany pogłowia loch w poszczególnych województwach były w nieznacznym zakresie uzależnione od opłacalności produkcji tuczników i prosiąt. Dużą korelację odnotowano natomiast z przeciętnym pogłowiem macior w poszczególnych województwach i z ilością uzyskiwanych w ciągu roku prosiąt od jednaj maciory.

Słowa kluczowe: pogłowie loch, rentowność, prosięta, analiza regionalna

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PROSUMER OF THE XXI CENTURY – NEW CHALLENGES TO COMMERCE AND MARKETING

Paweł de Pourbaix
Kozminski University

Abstract. The world of consumption changes constantly, with new trends emerging one by one. One of such trends is the phenomenon of prosumerism, which is an expression of consumers' drive to influence the products they buy. The market trend observable in that scope requires a thorough transformation of the way of communicating of manufacturers and sellers with both existing and potential clients. From the point of view of offer makers, prosumers are important because they are both the reflection and the shaping force of the market. Prosumers representing Generation C, which is subject to analysis in this article, deserve particular attention since their line of thinking and acting on the market indicates the direction in which the group they belong to may potentially evolve.

Key words: prosumer, prosumerism, marketing, Generation C

INTRODUCTION

Modern-day consumers see purchasing and owning goods as the way to create one's identity. They believe that what they possess acts as evidence to their social recognition and prestige. They also become susceptible to stimuli coming from their environment. Their more and more frequent desire is not only to participate in the process of consumption, but also to create and improve products and services. Moreover, they do not want to be a passive target audience of ready goods, but to take an active part in the process of creation and commercialization of products. As a result, consumers become "co-producers" of products and services.

The aim of this article is to present the essence and the manifestations of prosumerism. It includes an attempt to create a profile and to analyze the patterns of behavior of persons belonging to Generation C, playing the role of prosumers on contemporary market.

Corresponding author: Paweł de Pourbaix, Kozminski University, Department of Marketing, Jagiellońska 57/59, 03-301 Warszawa, Poland, e-mail: paweldep@kozmisnki.edu.pl

SOURCE MATERIAL AND RESEARCH METHODS

The content of the article is based on a review of literature devoted to the phenomenon of prosumption. Following an assumption that the group of respondents participating actively in prosumption is Generation C, a direct study among the representatives of this group was conducted. The author's reflections include not only the traits of the said group, but concentrate also on the characteristics of this group of consumers acting as prosumers. The first step was to identify the potential and current prosumers taking part in the study. The selection of participants was based on their age, i.e. 19–33 years, and on the moment when the Internet and social media became an inseparable part of their lives.

A qualitative study was carried out – one of exploratory research type, based on FGI method (four groups in total, each consisting of seven people; location: Warsaw; time frame: 15–30 September 2015).

The objective of the conducted study was to determine the qualities of people representing Generation C on the market as prosumers. The study aimed in particular to investigate their understanding of the concept of prosumption and their attitude towards this phenomenon. An attempt was made to compile a set of "symptoms" of prosumption among them, e.g. in the scope of their communication, purchases they make, and brands they choose.

RESULTS AND DISCUSSION

Essence and determinants of prosumption

The term "prosumption" was coined as a result of combination of the words "production" and "consumption", and introduced in the late 1970s by Alvin Toffler [1980]. Toffler analyzed the history of mankind in the context of "waves" coming in succession: First Wave, also known as the agricultural wave, related to the beginnings of agriculture, Second Wave, referred to as the industrial wave, stemming from the industrial revolution of the turn of the 18th and 19th century, and Third Wave, known as the post-industrial wave, connected directly to the arrival of new technologies, making communication virtually unlimited thanks to the development of services and departure from mass production, emergence of information society and post-industrial society [Toffler 2006, Krawiec 2009, Dziedzic and Szymańska 2011, Szymańska 2012a].

Toffler wrote of a prosumer involved in production as part of the First Wave, i.e. a self-sufficient individual being both the producer and the consumer of what they produce. He also mentioned a prosumer engaged in production as part of the Third Wave, establishing cooperative relationships with producers and participating actively in the process of creation of the market offer. This is a situation where the roles of producer and consumer meet, but on different terms than in the case of agricultural society. Here, prosumption means mutual interpenetration of production and consumption until the borders between the two disappear, and consumers become producers in effect [Jung 1997].

At present, a new model of consumption seems to be coming into being, according to which clients take an active part in the process of creation of products. The sole meaning of prosumption appears to be changing as well, as it no longer involves only focusing

on clients by providing them with opportunities to select and modify the products they want, but also engaging them in the process of creation of products and services [Tapscott 2008]. In this case, prosumerism is a joint effort of both producers and consumers in creating goods and services. This results in emergence of communities of common interests and working together on new solutions [Tapscott 2010].

Source literature points to several categories of prosumers. If we base our division on the criterion of cooperation with other market participants, we can enumerate the following types of prosumers [Toffler 1980, Łaskawiec 2014]:

- prosumer participating in individual prosumption, characterized by a complete lack of cooperation with and a full independence of other market participants (prosumer – as an individual – takes part in the process of prosumption on their own);
- prosumer participating in intra prosumption, being a collective prosumption which takes place only within a group of prosumers (prosumer engaged in the process of co-design or co-production);
- prosumer involved in inter-prosumption occurring between a group of prosumers and a producer (cooperation of a prosumer – Internet user – with producers via social network services to develop new – or to improve the already-existing – foodstuffs or their flavors).

The consequences of the presence of prosumption on the market from producers' perspective are e.g. loss of full control over products (consumers modify the products according to their own ideas), providing clients with appropriate tools and materials, partnership (clients become partners business partners, so to speak), and sharing the effects of work – users want to see their involvement bear fruit in the form of benefits [Tapscott 2008].

Prosumption is about aspiring to individualization of a product or services. Consumers are provided by producers with a set of instruments which they can use to create an own – custom-made – product. It is important to notice that the broader the spectrum of such instruments made available by producers, the higher the level of consumers' involvement in the process of production, product individualization, creativity, and innovation [Mitręga and Witczak 2012]. This kind of regularity governs, among other, those areas that involve application of contemporary technology, e.g. IT services/products (social network services), computer software, telecommunications, or mobile devices. The end-product is a result of consumer's efforts made using the set of tools made available by a given company. Consumers do not receive a ready-made product, but are somewhat forced to get actively involved in the process of product creation instead.

To summarize, it can be concluded that prosumer is a consumer who does not want to be a mere passive recipient, but a co-creator of certain products or services. Prosumers are aware of their rights, which makes producers forced to cooperate with them and treat them as equals. According to P. Halicki, prosumers are active consumers, who "gather information about companies, brands, and expect personalized products and a possibility to influence the final shape of products, as well as an interactive type of consumption, which lets them share their insights into product perception with producers – and take part in the process of development of a given product" [Szul 2013, after Halicki 2007]. Prosumers become therefore external employees of companies, involved in the design and production of new goods, as well as in building competitive advantage through enhancing companies' innovation potential [Mróz 2010].

GENERATION C ON THE MARKET AS CONTEMPORARY PROSUMERS

With the arrival of the digital age, consumer groups defined behaviorally – not demographically – emerged. This differentiation is significant in that nowadays it is increasingly more difficult to divide generations linearly on the timeline, according to dates of birth. Establishing borders between linearly-and behaviorally-separated generations is crucial form the point of view of producers and sellers. In consequence, if we look at generations from a linear perspective, it often results in a stereotypical approach to marketing communication and in a mismatch between marketing messages and their target audience.

A group definable in behavioral terms is Generation C since it is easier to compile a profile for this group based on traits, attitudes, values, and lifestyle rather than to look for a common age frame. Although behavioral definition is actually more significant, it is generally agreed that Generation C are people born after 1990, who reach maturity after 2000, commence their studies, and then enter the labor market. These are people who function predominantly in virtual reality, and the world of digital media is their standard. A quality typical of this generation is openness to new technologies. Representatives of Generation C have no experience of the world without the Internet, and cannot imagine living without access to on-line reality.

Unlike earlier generations, generation C does not fit within specific time frames, but is rather characterized by the qualities surrounding and related to the letter "C". The name alone is quite telling in terms of the way this group functions and of its potential expectations. In the literature on the subject, a model representative of Generation C is described by three attributes: computerized, connected, and always clicking [Morbitzer 2012]. In a broader perspective, "C" stands for: content creation, creativity, casual collapse, and control [Hardey 2011]. Many researchers of the phenomenon search for other connotations associated with "C", pointing to: connected, communicating, content-centric, computerized, community oriented, and always clicking [Friedrich et al. 2010]. The list of attributes characterizing Generation C is still growing, which is proven by the increasing number of metaphors ascribed to the qualities typical of this generation: content, co-creation, celebrity, connected, conversation, change, collaborate, creativity, cyber collective [Pankraz 2013].

Members of this generation are always connected to the Internet, becoming a part of prosumers generating content which acts as the building block of the on-line environment. It is believed that it is exactly Generation C who is responsible for the success of social network services such as e.g. YouTube or Facebook. Technologically-advanced devices and services have become an inseparable and fundamental part of our life, just like food or clothes [Hatalska and Polak 2012]. Generation C is interested not so much in searching for information as in creating own content and changing the existing reality.

THE ATTITUDE OF GENERATION C TO PROSUMPTION – STUDY RESULTS

The respondents taking part in the study were asked to define the idea of prosumer, and to name the qualities that differentiate prosumers from other consumers. They were also asked to specify their role in marketing communication, and especially in transmit-

ting information about brands and popularization of trends. Furthermore, the study involved a research into their attitudes towards shopping and brands.

According to the respondents, a prosumer is an active consumer, who takes advantage of technology and information, and is highly involved in what goes on in the area of commerce and services, e.g. among manufacturers, sellers, but also in other spheres of social-economic life they are interested in.

The respondents tended to stress that prosumers constitute a much diversified group, but they were also able to point to certain common qualities. Based on their answers, prosumers are open to innovation, act as points of reference for themselves, are proud to think independently, and are not afraid of experiments; they are communicators (they tell others of their experience with new products, brands, or services, and are keen on getting to know others' opinions as well). The respondents portrayed them as opinion leaders (convinced that other people, companies, and organizations want to know their thoughts and seek their suggestions), skeptical – but not cynical, because they do not take what the media and adverts say for granted, but consider them as valuable sources of information and entertainment; they tend to "get involved" and interested in "the present" and popular culture.

According to the persons questioned, in the era of media fragmentation, excess of information, and increased supply of goods and services, consumers may feel overwhelmed, which might lead to disorientation. Prosumers, in turn, are able to make the most of their abilities to search for, process, and sort information. What is more, they do not gather and filter such information for themselves only, but they share it with others. This is why they become vital points of reference for other consumers. The respondents say, however, that this is not the only quality that makes prosumers so important for the market. Prosumers are a source of knowledge about the changes and current trends on the market. Their attitudes and behaviors are usually a step ahead of other consumers, but they are willing to share their insights, views, and practice with others.

The respondents have also said that prosumers are people who have a rich and good knowledge about the latest product categories, events, or trends. They speak enthusiastically about things they find interesting. They are familiar with whole lists of new products, services, or events, and like to experience something new – and to share their stories with others.

The respondents also believe that prosumers react actively to what happens at a given time, are able to anticipate their expectations, and are quick to communicate their comments to companies, and to other consumers. This combination of quick adoption of new trends, proactivity, and sociability makes prosumers spot certain facts and phenomena, as well as influence enterprises and other consumers.

Prosumerism, according to the respondents, concerns potentially all industries, but particularly those which by definition appear as most competitive, unstable, and prone to rapid transformations. Prosumerism is to some extent a response to these considerations. The most important trait which makes prosumer so significant form the point of view of marketing is sociability in the broad sense of the word. Prosumers are able to form strong bonds with their environment, which lets them be in the know of what happens in the spheres of life they find most interesting. This makes them excellent recipients, able to spot innovation and act as opinion-makers. Prosumers tend to have broad networks

of contacts because they usually happen to be outgoing people, keen on sharing their thoughts and naturally curious about others' opinions. In this context, technology equips prosumers with a wide range of tools of on-going communication – phones, text messages, e-mail, chat, blogs, discussion forums and groups, as well as more conventional means of communication.

Prosumers find informal exchange of information (social networking) and conversations about many topics quite essential. It is no accident that the emergence of prosumerism coincided with the development of IT technology. In the world constantly flooded with data, the ability to reach the right information, to understand this information, to assess its value and to act accordingly results in substantial advantage, and prosumers appear to possess exactly this ability. This is also what gives them the opportunity to exert more control.

The rapid advancement in communication technology has made people detached from sedentary workstyle or landlines. The common access to broadband and wireless devices, as well as the relatively low costs thereof, provides individuals and smaller groups with convenience in terms of communication – something available only to large organizations some time ago. Prosumers benefit from familiarity with modern technology as well, also because it gives them greater control of where, when, and how to work.

According to the respondents, prosumers may play a huge role from the perspective of marketing communication. They are usually hungry for information, and display great potential of processing thereof. They tend to search for and devour information, while non-prosumers generally avoid information and treat it selectively. Therefore, it is very reasonable to address advertising messages to people who might be interested in them, meaning prosumers, and to formulate these messages in a way to meet their needs. Prosumers like to be a step ahead, enjoy innovation, while non-prosumers are rather inclined to stick to what they already know and are familiar with, and avoid changes.

Our respondents have said that prosumerism is significant from the point of view of all areas of marketing communication. A better understanding of prosumers' needs on a given market translates into an opportunity of effective reaching the opinion-leaders of a given group, a better sense of the language they communicate in, and early knowledge of the changes taking place within a given market or category.

The persons participating in the study have also argued that prosumers are effective in transmitting information about brands and in popularizing market trends. As a group, they constitute a powerful source of information for different types of messages, mostly because of the fact that their opinions are usually honest and genuine. Prosumers' involvement with a given brand or trend is much more authentic and has a personal dimension to it.

Prosumers explore and move through the market with great self-confidence. Most ordinary consumers feel overwhelmed with the fluctuation of the commercial reality given the thousands of brands and hundreds of thousands of products and new offers appearing on the market each year. Those more conservative of them "execute" their shopping clinging tightly to reliable and trusted brands, which they will remain faithful to until the end of their lives. Others let themselves sometimes go with the flow without any plan, taking advantage of some "discount" from time to time, or occasionally putting a "new, improved" product into their baskets. Prosumers, on the other hand, try to get the latest information about the things which are important to them – including consumer goods.

When it comes to shopping, they are rather task-oriented, and there are many reasons behind why they actually enjoy shopping; one of them is certainly the fact that shopping lets them use their innate perceptiveness.

Prosumers are active in collecting information from different sources, but they also take the experience and opinions of people similar to them into consideration. Most of all, they trust in their own judgments, and do not need any number-based evidence, which means that they are better in spotting innovation than others, usually reluctant to get off the beaten track.

Prosumers view brands as objects of their interest, as useful sources of information, that need to be checked, verified, and adapted to the image of contemporary lifestyle. Their relationships with brands are characterized by a higher level of engagement and awareness; they are based on refined views, which reach the daylight relatively soon. It means that prosumers normally select certain brands regardless of how they are viewed by others; prosumers are content with the fact that they alone consider such brands valuable. A brand may be of particular value to them also when it carries a specific message they would like to share with their environment, e.g. "I have a sharp eye", "I stand out", "I hold… valuable". In such case, prosumers choose brands deliberately on the basis of how those brands are seen by the environment, but they still do it largely on their own terms.

CONCLUSIONS

Prosumerism is a market trend that requires a thorough change of the way manufacturers and sellers communicate with potential clients. According to the definition, prosumerism is considered as an active participation of clients – including potential ones – in the process of creation of a given company's offer using a set of tools made available to them by such company. Prosumer is a proactive consumer – a person who takes advantage of the access to technology and information to become more engaged in what happens in their environment. Prosumers are a group of trendsetters and opinion leaders across various spheres of life.

Prosumers belonging to Generation C deserve particular attention because their line of thinking and acting on the market indicates the direction in which the group they belong to may potentially evolve. This stems from the fact that prosumers are actively involved in the "now and next", they are more orientated on future trends, while consumers are rather focused on the "here and now", as well as on the past experience. Prosumers are not only a reflection of the trends dominant in their social group, but they also help shape the future.

From the point of view of offer-makers, prosumers are important because they are both a reflection of the market, as well as the force that shapes the market. As highly--communicative individuals, they tend to grasp and read other people's thoughts quickly, and analyze them from the angle of their own experience. They are interested in innovation, collect information from various sources, try new things, and share their experience keenly. Prosumers are more engaged, sensitive, and proactive than non-prosumers, and may be regarded as an "early-warning system". What prosumers do and think now is an indicator of the future trends that reach and catch on among ordinary consumers.

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PROSUMENT XXI WIEKU – NOWE WYZWANIA DLA HANDLU I MARKETINGU

Streszczenie. Świat konsumpcji nieustannie się zmienia. Pojawiają się w nim coraz to nowe trendy. Jednym z nich jest zjawisko prosumpcji, która jest wyrazem dążeń konsumentów do wpływania na to, jakie kupują produkty. Zauważalny w tym zakresie trend rynkowy wymaga gruntownej zmiany sposobów komunikowania się producentów i sprzedawców z aktualnymi i potencjalnymi klientami. Z punktu widzenia oferentów prosumenci są

ważni, ponieważ są zarówno odzwierciedleniem rynku, jak i siłą kształtującą rynek. Prosumentom należącym do generacji C, która podlegała analizie w niniejszym artykule, należy poświęcić wiele uwagi, ponieważ ich myślenie i działanie na rynku sygnalizuje kierunek, w którym dana grupa może potencjalnie ewoluować.

Słowa kluczowe: prosument, prosumeryzm, marketing, generacja C

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FUNDAMENTAL ANOMALIES CONNECTED WITH THE VALUE OF MARKET MULTIPLES AND FIRM SIZE

Anna Rutkowska-Ziarko, Filip Gęstwicki
University of Warmia and Mazury in Olsztyn

Trevor Williamson
Manchester Metropolitan University

Abstract. The subject of the study were market multiples' anomalies. Analyses were focused upon food companies listed on the Warsaw Stock Exchange. The differences in rates of return between portfolios formed from companies with low market multiples and with high ones, were discussed. Not only classic market multiples, like price to earnings and price to book ratio, were considered, but also market multiples based on sales and cash flow were used. In addition, the risk and the size effect was analysed. All companies were divided into two groups: "small" and "big" firms, based on the market value of their share capital. The aim of the article was to explore possible connections between market multiples, firm size and expectations of future rates of return. Our results suggest that investments in stocks of bigger companies are safer and more profitable.

Key words: capital market, semi-variance, equally weighted portfolio, food companies, Warsaw Stock Exchange

INTRODUCTION

The occurrence of market anomalies is still the subject of numerous analyses. This phenomenon is interesting with respect to both theoretical and application aspects. From the perspective of theories describing the behaviour of capital markets, occurrence of long-term and repetitive anomalies suggests fundamental weaknesses in the efficient mar-

Corresponding author: Anna Rutkowska-Ziarko, University of Warmia and Mazury in Olsztyn, Department of Quantitative Methods, M. Oczapowskiego 4, 10-710 Olsztyn, Poland, e-mail: aniarek@uwm.edu.pl

ket hypothesis. The subject of the present research is not, however, to prove or refute this hypothesis. The research concentrates only on anomalies connected with the rate of market multiples and firm size in relation to the market capitalization value of the firm.

Research suggests that the market multiples effect is connected with the firm size effect. Small firms are characterised by higher risk, higher rates of return on capital market and lower market multiples in comparison to bigger entities [Banz 1981, Reinganum 1981].

The main objective of the present research is to identify the relation between the value of selected market multiples, firm size and the achieved future rate of return for portfolios formed with food companies listed on the Warsaw Stock Exchange (WSE). An additional aim is to examine whether the size of the company and value of market multiples affects the risk of investment in stocks.

Analyses concerning the profitability of investment strategies based on values of market multiples were conducted from the Warsaw Stock Exchange.

The present study combines the firm size effect with the market multiples effects and rates of return on capital. Additionally, the risk measured with semi-variance was included.

MARKET MULTIPLES

Market multiples provide information on how the market evaluates a given firm. Market data and financial firm results are used to estimate values of these multiples. In literature on the subject, apart from standard market multiples, such as *P/BV* or *P/E*, multiples such as those relating firm market value to cash flows or sales are used [Barbee et al. 2008]. The most popular indicator of firm evaluation by the market is *P/E* ratio, which relates earnings per one ordinary share to its market price:

$$P/E = \frac{market\ price\ per\ share}{net\ profit\ per\ share}$$

A high value of this multiple means that investors evaluate this firm positively [Tarczyński and Łuniewska 2005].

As for *P/BV* ratio, the price of one ordinary share is related to the firm's book value, estimated per one ordinary share; therefore, this multiple outlines the firm's market value in relation to its book value:

$$P/BV = \frac{market\ value\ per\ share}{book\ value\ per\ share}$$

where:

$$book\ value\ per\ share = \frac{assets - liabilities}{number\ of\ shares}$$

A low value of this multiple may indicate that the firm is not functioning well [Tarczyński and Łuniewska 2005].

Cash flows in a firm show what cash is generated in the course of its operating, investment and financial activities. The *P/CF* is the ratio of market price per share and the net cash flow per one ordinary share:

$$P/CF = \frac{market\ price\ per\ share}{cash\ flows\ per\ share}$$

$$cash\ flows\ per\ share = \frac{flows\ from\ operating\ activities - preferred\ dividents}{number\ of\ shares}$$

Reaching break-even point and generating profit is connected with the ability to sell produced goods and services. Accordingly, a potentially significant ratio for investors is the turnover value per share, i.e. *P/S* ratio*:*

$$P/S = \frac{market\ value\ per\ share}{sales\ per\ share}$$

$$sales\ per\ share = \frac{net\ sales}{number\ of\ shares}$$

REVIEW OF THE LITERATURE

The article of Basu [1977] is frequently claimed to be the first publication analyzing the impact of market multiples on future firm profitability, yet such research was conducted earlier by, for instance, William Breen [1968]. He investigated firms from index S&P500 in 1953–1966, using the COMPUSTAT database. This database was established in 1962 and comprised data since 1950. For particular years, equally weighted portfolios were formed (with 10 and 50 firms) from firms with the lowest and the highest *P/E* ratio values. The results indicate that portfolios formed from firms with lower *P/E* ratios had a higher annual rate of return in the following year than portfolios formed from firms with higher *P/E* ratios.

Similar results to those obtained by Basu [1977] were generated from research undertaken at the University of Chicago where the impact of firm size on profitability of stock investments was evaluated. Reinganum [1981] observed that investments in stocks of "small" firms are characterized by higher profitability in relation to investments in stocks of "big" firms with similar levels of beta coefficients, which indicates that this higher profitability cannot be explained in terms of risk premium in accordance with the Capital Asset Pricing Model (CAPM) [Reinganum 1981]. Reinganum claimed that this premium is connected with firm size. This effect was observed for both annual and two-year rates of return. The firm size effect was also investigated by Banz [1981].

Reinganum [1981] analyzed the results published by Basu [1977] and observed that there is a relation between firm size and the *P/E* ratio value. For single firms, this

relationship was insignificant (correlation coefficient 0.16), but taking into consideration portfolios formed (by Basu) for various *P/E* levels, this relationship was much stronger (correlation coefficient 0.82). In further research [1983], Basu confirmed the existence of a relationship between firm size and the P/E ratio. In general, investments in stocks of firms with low *P/E* ratio values were more profitable when taking into account return rates adjusted by risk. The apparent *P/E* ratio effect remained significant after dividing firms into subgroups due to their market capitalization value. Firm size effect was not observed when risk and the *P/E* ratio were taken into consideration concurrently. The *P/E* ratio effect was less significant for bigger firms than for smaller ones.

The market multiple effect, including basic multiples such as *P/E*, *P/BV* and those relating share price to other financial measures, is still the subject of research [Barbee et al. 2008, Hashemzadeh et al. 2011, Fama and French 2012].

Barbee et al. [2008] investigated the impact of market multiples values on future prices of stocks. Their research concerned profitability of equally weighted portfolios, formed from firms with various values of particular market multiples. Four market multiples were analyzed: *P/E*, *P/BV*, *P/S*, *P/CF*. The results have shown that the most significant relation to future rates of return is the *P/S* ratio. Furthermore, research conducted by Hashemzadeh has shown that firms with the lowest *P/E* ratios (first quintile) and the highest (fifth quintile) had higher systematic risk measured by their beta coefficients in comparison to firms from middle quintiles.

Fama and French [2012], in research conducted in four regions (North America, Europe, Japan, and Asia Pacific), covering the period 1989–2011, did not observe the occurrence of premiums for firm size. Subsequently they noticed that firm size has impact on return rates if it is considered jointly with *P/BV* ratio. In their research they used quintile equally weighted portfolios (with the same value of particular stocks in portfolio).

Research regarding anomalies connected with values of market multiples was also carried out for firms listed on the WSE and a significant *P/E* ratio effect was found. Firms from bottom deciles were characterized by higher return rates whereas strategies based on *P/BV* ratio effect were the most effective for firms from middle deciles [Czekaj et al. 2001].

In Poland, there was also research on the use of these multiples in portfolio analysis [Tarczyński and Łuniewska 2005, Garsztka and Rutkowska-Ziarko 2012, Rutkowska-Ziarko and Ksepka 2012].

In research conducted for the construction industry, the analysis focused on the impact of *P/E* and *P/BV* ratios, as well as market multiples, by relating share price to revenues from sales and the value of working capital on the future profitability of investment portfolios. Among these multiples, the most profitable were portfolios formed from firms with low values of market multiples, whereas only for *P/S* ratio the most profitable were portfolios for middle values of this multiple [Rutkowska-Ziarko and Sochoń 2014].

Firm size effect was analyzed on the WSE on the basis of data concerning all firms listed on the WSE in 2002–2010 [Sekuła 2013]. It was observed that small firms were the most risky and the least profitable. Risk was measured with classic beta coefficients.

RESEARCH RESULTS

The research was carried out for 19 firms from the food industry, listed on the Warsaw Stock Exchange. The analysis included share prices from 2011–2013. The firms which were selected had their annual financial statements for 2010–2012 available. They were ranked in order of the market value of share capital and then divided into two groups.

Firm size was measured on the basis of market value of share capital [Handa et al. 1989] from 3 March 2014. Ten firms were put in the first group (small firms), and nine in the second group (big firms). For each firm, values of the aforementioned market multiples were estimated. These estimations were based on data from annual financial statements and closing stock prices from 21st March of the year following the year of the latest financial statement. Also, the firms were divided based on the estimated values of market multiples.

The analysis of investments commenced on 21st March each year. It was assumed that shares were bought on this day. The rate of return was calculated using the closing price at the end of each day. For example, the rate of return for one week was calculated based on the share prices on 28th of March and 21th March in the given year.

For firms divided in this way, the rates of return of equally weighted portfolios in particular years were calculated. The results of these calculations are shown in Tables 1 and 2. Moreover, firms were divided into small and big. For each division, the highest return rate of the weekly, 2-weekly, monthly, 2- and 3-month investment period in particular years was highlighted in bold font. Return rates of these portfolios are also shown in Figures 1, 2 and 3.

Table 1. Return rates of equally weighted portfolios

Length of investment period	Year	Values of *P/S* index				Values of *P/E* index			
		low		high		low		high	
		small firms	big firms	small firms	big firms	small firms	big firms	small firms	big firms
1	2	3	4	5	6	7	8	9	10
Week	2011	–0.005	–0.016	–0.015	–0.002	–0.004	–0.030	–0.013	0.021
	2012	0.003	0.025	–0.011	–0.016	–0.027	0.034	0.033	–0.015
	2013	0.003	0.015	–0.057	0.036	0.029	0.038	–0.021	0.013
Two weeks	2011	–0.004	–0.028	0.032	–0.016	0.006	–0.055	0.047	0.025
	2012	–0.026	0.046	–0.016	–0.021	–0.038	0.074	0.011	–0.031
	2013	–0.025	0.021	–0.064	0.034	–0.009	0.044	–0.061	0.011
Three weeks	2011	–0.025	–0.031	0.012	–0.012	–0.008	–0.076	0.031	0.042
	2012	–0.038	0.009	–0.037	0.002	–0.067	0.073	–0.001	–0.048
	2013	0.001	0.028	–0.032	0.043	0.002	0.056	–0.086	0.016
Month	2011	–0.061	–0.036	0.120	–0.005	–0.020	–0.077	0.169	0.051
	2012	–0.122	–0.050	–0.049	–0.016	–0.064	0.057	–0.085	–0.108
	2013	–0.082	–0.059	–0.101	–0.059	–0.035	–0.082	–0.169	–0.036

Table 1, cont.

1	2	3	4	5	6	7	8	9	10
Two months	2011	–0.103	–0.037	–0.043	–0.103	–0.076	–0.135	–0.037	–0.012
	2012	–0.165	–0.119	–0.098	–0.157	–0.155	–0.107	–0.102	–0.159
	2013	0.055	0.024	–0.051	–0.002	0.173	–0.010	–0.177	0.032
Three months	2011	–0.127	–0.046	–0.114	–0.065	–0.114	–0.071	–0.077	–0.042
	2012	–0.224	–0.185	–0.110	–0.105	–0.168	–0.106	–0.111	–0.184
	2013	0.138	–0.026	–0.096	0.020	0.193	–0.054	–0.205	0.047

Source: Own elaboration.

Table 2. Return rates of equally weighted portfolios

Length of investment period	Year	Values of *P/BV* index				Values of *P/CF* index			
		low		high		low		high	
		small firms	big firms	small firms	big firms	small firms	big firms	small firms	big firms
Week	2011	–0.023	–0.032	0.004	0.017	–0.009	–0.020	–0.006	0.002
	2012	0.012	0.039	–0.020	–0.034	–0.034	0.028	0.038	–0.020
	2013	–0.020	0.016	–0.035	0.036	0.019	0.041	–0.064	0.011
Two weeks	2011	0.023	–0.060	0.004	0.024	0.073	–0.045	–0.022	0.006
	2012	–0.016	0.062	–0.026	–0.041	–0.044	0.052	0.015	–0.029
	2013	–0.015	0.034	–0.074	0.021	–0.022	0.053	–0.034	0.003
Three weeks	2011	0.000	–0.062	–0.013	0.027	0.065	–0.057	–0.035	0.020
	2012	–0.022	0.033	–0.053	–0.029	–0.047	0.036	–0.016	–0.032
	2013	0.042	0.044	–0.072	0.028	–0.026	0.048	–0.024	0.024
Month	2011	0.094	–0.077	–0.035	0.047	0.211	–0.065	–0.057	0.031
	2012	–0.117	0.005	–0.055	–0.085	–0.074	0.016	–0.077	–0.098
	2013	0.005	–0.087	–0.188	–0.031	–0.079	–0.089	–0.091	–0.029
Two months	2011	–0.057	–0.121	–0.089	0.002	0.039	–0.138	–0.138	0.023
	2012	–0.162	–0.111	–0.102	–0.167	–0.130	–0.114	–0.120	–0.164
	2013	0.177	0.023	–0.173	–0.001	0.090	0.002	–0.096	0.019
Three months	2011	–0.110	–0.128	–0.130	0.038	–0.004	–0.099	–0.186	0.002
	2012	–0.211	–0.146	–0.122	–0.153	–0.146	–0.116	–0.127	–0.192
	2013	0.176	–0.045	–0.134	0.039	0.095	–0.001	–0.089	–0.005

Source: Own elaboration.

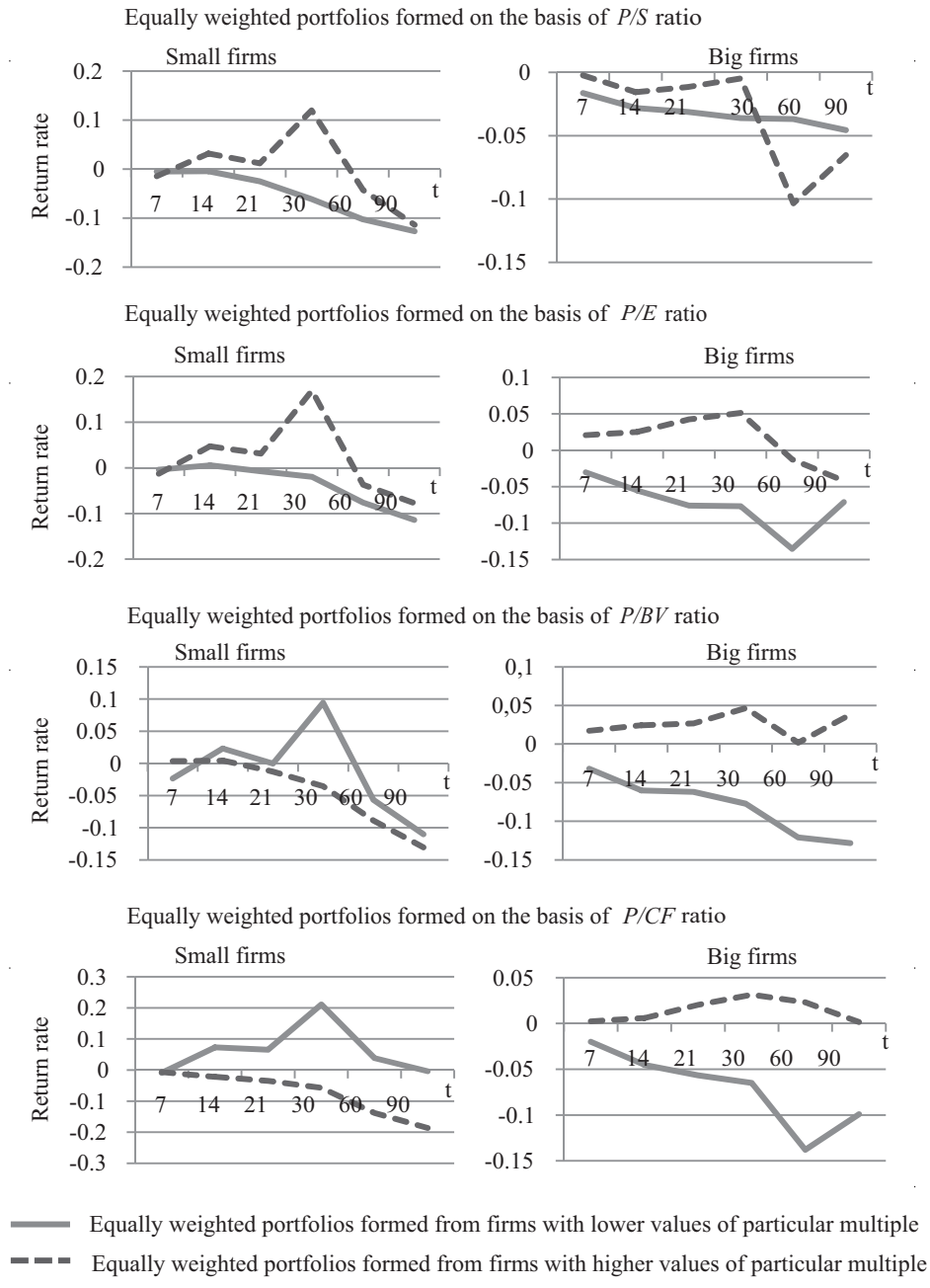

Fig. 1. Return rates of equally weighted portfolios for various lengths of investment periods (1–90 days) in 2011 with division based on firm size and values of particular market multiples

Source: Own elaboration.

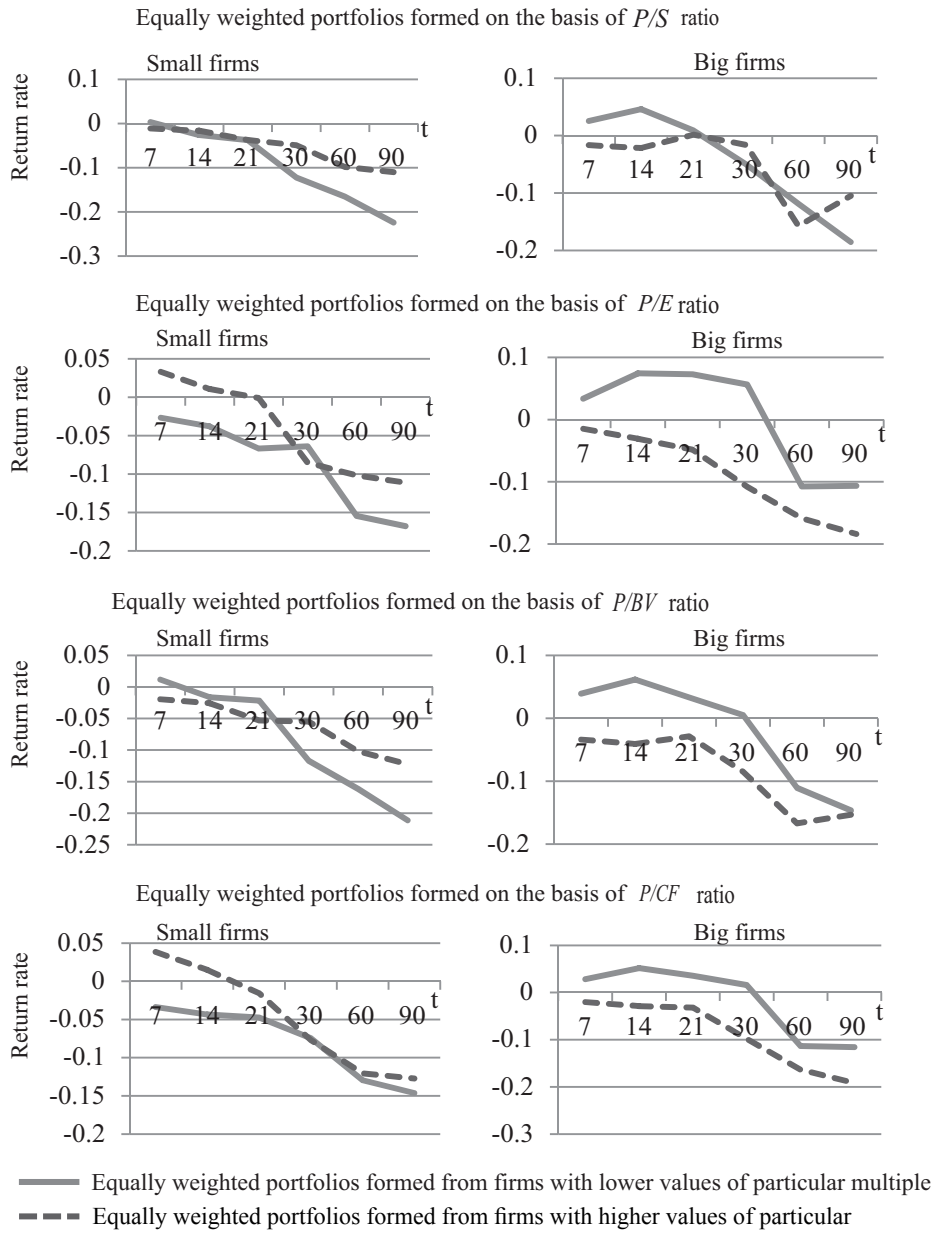

Fig. 2. Return rates of equally weighted portfolios for various lengths of investment periods (1–90 days) in 2012 with division based on firm size and values of particular market multiples

Source: Own elaboration.

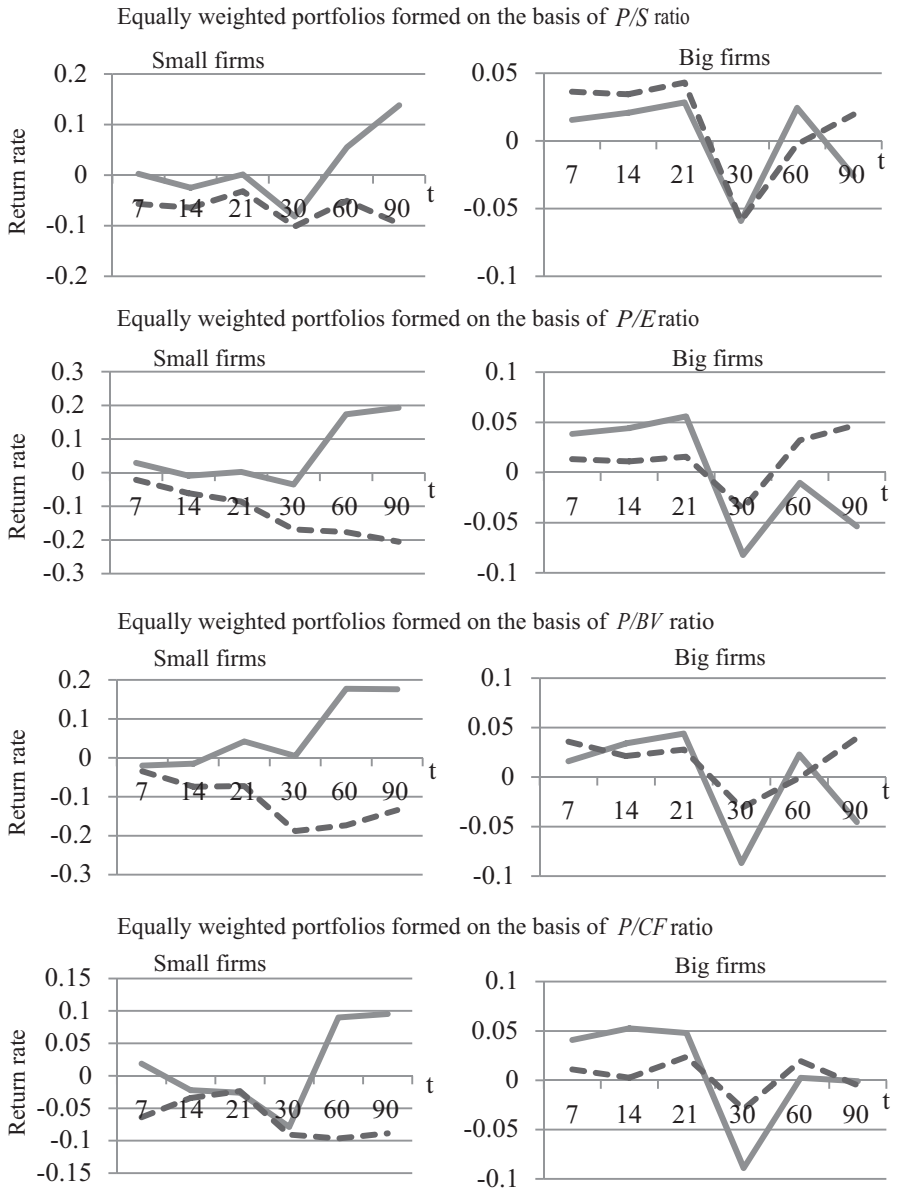

Fig. 3. Return rates of equally weighted portfolios for various lengths of investment periods (1–90 days) in 2013 with division based on firm size and values of particular market multiples

Source: Own elaboration.

On the basis of the results presented in Tables 1 and 2 it can be observed that for *P/S* ratio, the highest profitability had portfolios formed from big firms with high values of this multiple. It is highly significant for investments up to 1-month period. For *P/E* ratio, the advantage of small firms with low values of this multiple was observed (investments up to 1-month period).

On the other hand, for the *P/BV* ratio, insignificantly higher profits brought portfolios formed from firms with low values of this multiple, mainly big firms, particularly for investments up to 1-month period. In the case of the *P/BV* ratio, big firms, irrespective of the multiple value, were more profitable than small firms, which is clearly noticeable for investments up to 1-month period. Portfolios of big firms were more profitable than portfolios of small firms in 10 cases out of 12 (1-month period of investments).

However, as for the *P/CF* ratio, the most profitable were big firms with low values, which indicates that the growth potential, in terms of the market value of stocks, was underestimated in relation to cash flow values (Table 2).

For all considered multiples, the dominance of firms with higher market capitalization over firms with lower market capitalization is observable (Tables 1 and 2).

In 2011, in the case of the *P/BV* and *P/E* ratios, return rate, obtained for portfolios of small firms in comparison to portfolios of big firms were completely different. It can be also observed that portfolios for high multiple values tended to be more profitable.

In 2012, the majority of cases that were more profitable were portfolios formed from firms with low values of market multiples; nonetheless, increased profitability is more noticeable for big firms and shortly after portfolio purchase.

In 2013, the most profitable portfolios were those that were formed from small firms with low values and those that were formed from big firms with low values of the *P/BV* ratio.

Stock investment risk was calculated for particular firms. Risk was measured as semi-variance to risk-free rate, which was assumed as POLONIA index. The semi-variance was calculated using the daily rate of return from 1st January to 20th March.

In each year, correlation coefficients between values of market multiples, market value of firms and semi-variance were estimated. The results of these estimations are shown in Table 3.

In all years there is a negative correlation between firm size and semi-variance. A similar relation can be found for market multiples. Concurrently, the correlation coefficients between market value and particular market multiples were positive. It suggests that big firms were characterized by lower risk and were evaluated more highly by the market in comparison to small firms.

Table 3. Correlation matrix of market multiples, market value and semi-variance in particular years

2011	*P/S*	*P/E*	*P/BV*	*P/CF*	Size	Semi-variance
P/S	1					
P/E	–0.066	1				
P/BV	0.318	0.040	1			
P/CF	–0.228	0.044	0.140	1		
Size	0.335	–0.013	0.895	0.031	1	
Semi-variance	0.314	–0.256	–0.383	–0.155	–0.477	1
2012	*P/S*	*P/E*	*P/BV*	*P/CF*	Size	Semi-variance
P/S	1					
P/E	–0.117	1				
P/BV	0.589	–0.037	1			
P/CF	0.174	0.327	0.120	1		
Size	0.718	–0.073	0.858	0.221	1	
Semi-variance	–0.561	0.041	–0.383	–0.032	–0.341	1
2013	*P/S*	*P/E*	*P/BV*	*P/CF*	Size	Semi-variance
P/S	1					
P/E	0.139	1				
P/BV	0.559	0.091	1			
P/CF	0.250	0.096	0.111	1		
Size	0.603	0.197	0.851	0.102	1	
Semi-variance	–0.447	–0.257	–0.281	–0.306	–0.308	1

Source: Own elaboration.

CONCLUSIONS

The market multiple effects were different in each year of the analyzed period. It can also be shown that those effects were different for big and small firms. Considering the whole of the analyzed period, it can be seen that portfolios formed from big firms were characterized by higher profitability in relation to those formed from small firms. For the *P/CF* and *P/E* ratios, the most profitable were firms with low values of these multiples, but for the *P/CF* ratio alone profitability was associated with big firms.

A negative correlation between market multiples and semi-variance was observed, which indicates a lower market evaluation of firms with higher risk. Also, there is a negative correlation between market value of share capital and semi-variance, which suggests that generally small firms are more risky. Concurrently, correlation of firm size with particular market multiples was usually positive. As a result, it can be concluded that big firms were characterized by lower risk and were evaluated better by the market in comparison to small firms.

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ANOMALIE FUNDAMENTALNE ZWIĄZANE Z WARTOŚCIĄ WSKAŹNIKÓW RYNKOWYCH ORAZ WIELKOŚCIĄ SPÓŁKI

Streszczenie. Przedmiotem opracowania są anomalie związane ze wskaźnikami rynkowymi. Analizy dotyczyły spółek branży spożywczej notowanych na GPW w Warszawie. Zbadano różnice między stopami zwrotu portfeli równomiernych zbudowanych z akcji spółek o małych wartościach wskaźników rynkowych a portfelami zbudowanymi ze spółek o dużych wartościach tych wskaźników. Poza klasycznymi wskaźnikami rynkowymi, takimi jak cena/zysk i cena/wartość księgowa, wykorzystano także wskaźniki zbudowane na

podstawie przychodów ze sprzedaży oraz przepływów pieniężnych. Ponadto przeanalizowano ryzyko oraz efekt wielkości spółki. Spółki zostały podzielone na „duże" i „małe" ze względu na wartość rynkową kapitału akcyjnego. Celem było zbadanie związku między wartością wybranych wskaźników rynkowych oraz wielkością spółki a przyszłą stopą zwrotu. Uzyskane wyniki pokazują, że inwestowanie w akcje większych spółek jest bezpieczniejsze i bardziej opłacalne.

Słowa kluczowe: rynek kapitałowy, semiwariancja, portfel równomierny, firmy spożywcze, Giełda Papierów Wartościowych w Warszawie

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FOOD MARKETS IN POLAND AND LATVIA – THIERS CAPACITY AND COMPETITIVENESS

Anna Rytko
Warsaw University of Life Sciences – SGGW

Abstract. The objective was to identify the capacity of the food markets in Poland and Latvia, and their level of competitiveness. Market capacity decrease was observed in both countries, measured the decline in the shares of expenditure on food and the decrease of final food and non-alcoholic beverages consumption expenditure (in Poland, the level of consumption in 2013 was around 43 billion EUR and Latvia 2.7 billion EUR).The effects of declining demand for food were more than offset by the fast-growing export, which in 2014 in Poland and Latvia respectively amounted more than 20 billion EUR and more than 2 billion EUR. The value of export, in the years 2005–2014, in Latvia has increased more than four times, and in Poland and has tripled. Polish and Latvian foods, during the period, was competitive in foreign markets, although the observed high levels of competitiveness are lowered. In 2011, in Poland 11 product groups was characterised by a high or very high competitiveness, in Latvia much more – 23. Monitor levels of competitiveness is necessary, in particular, the rapidly growing competitiveness of import of some product groups, for example pig meat. Then the next step can be taken – looking for the reasons for these phenomena, as well as to take the appropriate action on the administrative and legal sphere.

Key words: market capacity, competitiveness, final consumption expenditure, market shares

INTRODUCTION

The food sector is an important component of community and country (region) economic development and an indicator of social well-being within region.

To undertake studies on the development of this sector and the various agricultural markets, identifying opportunities and directions of its development is an important element of the strategy for the development of the country.

Corresponding author: Anna Rytko, Warsaw University of Life Sciences – SGGW, Department of European Policy, Public Finances and Marketing, Nowoursynowska 161, 02-798 Warszawa, Poland, e-mail: anna_rytko@sggw.pl

After many discussion on the development of agricultural markets two work areas were identified: capacity and competitiveness. The improvement in this fields has created a myriad of economic and social opportunities for agricultural producers, communities and regional development.

The capacity of the market is the size of the volume of the goods, which can be sold at a given price and income in the specified time and space [Mynarski 2001]. Otherwise: the amount of goods and services, which can be absorbed by the market. A concept similar to the capacity of the market is the market potential as the maximum possible to achieve sales of goods within a certain time when specified input are made on marketing [Balicki 2002].

The economic literature cites several definitions for competitiveness in three different levels – company, sector and country [Porter 1990, Krugman 1994, Pitts and Lagnevik 1998]. These are not necessarily interlinked each other as the competitiveness of a whole economy cannot be connected to the rise or fall of a particular sector. To characterise the competitiveness of a particular industry such as the food sector it is meaningful to consider economic-theory references and, consequently, the sources of competitiveness concept. The main theory references for competitiveness are based on comparative advantage and competitive advantage [Banterle 2005].

To assess the competitive performance of food products in Poland and Latvia, the present analysis refers to the approach of comparative advantage, evaluating indices calculated on trade data and based on OECD definition of international competitiveness. According to them competitiveness means the ability of companies, industries, regions, countries or supranational groupings to meet international competition, or getting competitive advantage from other operators in the same industry in the market.

Food production and trade flows are on continued upward trend, however, the detailed analysis will indicate on the which markets changes are needed and those in which the producers tend to do very well.

The purpose of this paper is indicate the foreign products that compete quite easily on local markets in both countries and products whose production is competitive in foreign markets.

MATERIAL AND RESEARCH METHOD

In the paper a few research methods were used: studies of reference books, the analysis of the competitiveness, capacity and foreign trade. The data was from mass statistics: Eurostat and Faostat in the years 2004–2014. Due to the lack of data the detailed analysis is for the year 2011. The research were made according to the different degrees of aggregation CN nomenclature, although in a manner comparable to individual agri-food markets. In the study used descriptive and an indicative methods. In order to separate the competing products on the domestic and foreign markets, it has been calculated the market shares of imports in the domestic market and export shares in national production. Such an approach is first phase, beginning with an analysis of the level of ex post competitiveness. It allows you to extract the products or groups of products for which it does not possess or have the potential competitive.

The indicators used for the calculations:

$$S_I = \frac{I}{P - E} \qquad S_E = \frac{E}{P}$$

where: S_I – import shares in domestic market;
S_E – export share in national production;
I – import;
E – export;
P – national production.

Based on the statistical analysis of the importance of export in the development of food industry in Poland[1], there have been a separation specified class compartments and their division of the very high, high, medium and low competitiveness.
Import competitiveness to domestic market, export competitiveness on third market is:

- small, when $S_{I,E} < 10\%$;
- medium, when $10.1\% < S_{I,E} < 30\%$;
- high, when $30.1\% < S_{I,E} < 50\%$;
- very high, when $S_I > 50\%$.

It should add that the results obtained were corrected by the author which took into account the production capacity and the final statement of products with a high and very high competitiveness suggests a group of items or goods whose production occurs within the country. It is worth noting that in both countries there was a list of about thirty products which was eliminated, often where we had a competitive advantage calculated using other indicators such as export-import coverage ratio (CR), indicators of the revealed comparative advantages, including relative index of comparative advantage export (XRCA), the relative index of comparative import advantage (MRCA). For example, in the case of Polish competitiveness, they were some citrus fruits or spices, and for Latvia, soya beans. In this cases big import allows for large export to another country and having competitive advantage in export.

RESULTS AND DISCUSSION

The development of the agro-food sector is mainly dictated by two factors: the capacity of the internal market and competitiveness in foreign trade. Therefore, about the pace of its development, decide the internal demand and export food [Mroczek 2014].

Within the development of the countries of Central and Eastern Europe and is going to revenue growth its inhabitants, had to expect a decline in the shares of expenditure on food. Decreases was observed in both countries since 2004, according to Engel's law. Final food consumption expenditure of households dropped from 21.4% and amounted 18% of total expenditure in Poland and fell from 22.7 to 19.1% in Latvia in 2013 (Fig. 1).

[1] It has been observed a large increase the share of export in the food industry. The rate of 20% in 2005 increased to nearly 34% in 2013.

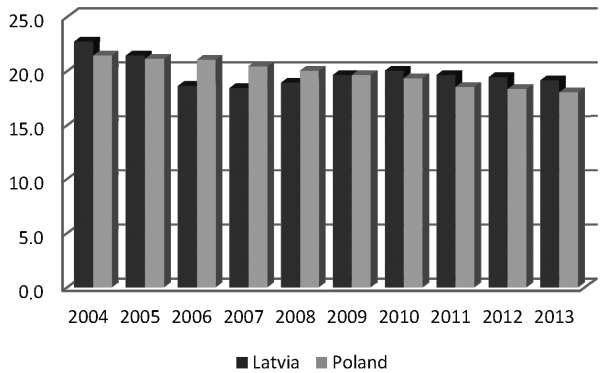

Fig. 1. Final food and non-alcoholic beverages consumption expenditure of households in Poland and Latvia (percentage of total)

Source: Own elaboration based on Eurostat data (access: 22.09.2015).

In recent years, after the global crisis, has been seen not only the decline in the shares of expenditure on food, but also decrease of final food and non-alcoholic beverages consumption expenditure in both surveyed countries (Fig. 2).

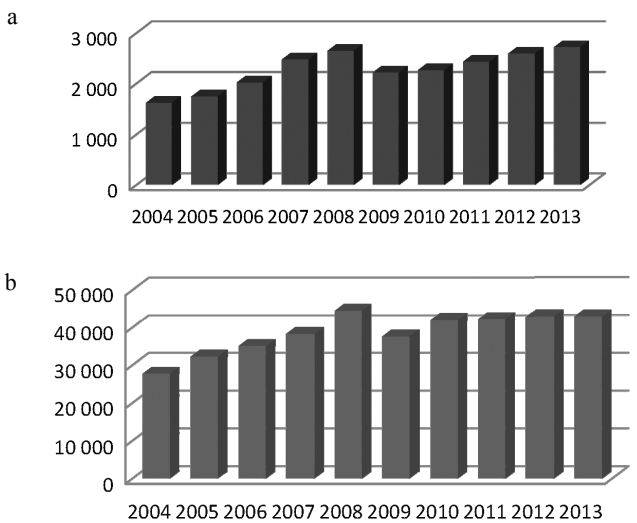

Fig. 2. Final food and non-alcoholic beverages consumption expenditure of households in Latvia (a) and Poland (b) prices in 2004–2013 (million EUR)

Source: Own elaboration based on Eurostat data (access 22.09.2015).

As a result of these phenomena, reported a decrease in market capacity. Decline in demand, which started in 2009, was a characteristic feature of the Polish and Latvian market. It was a big change, one of the basic factors for the development of food economy. As for example, in Poland for the last 15 years the consumption of these goods grew at a rate of 2.8% a year [Mroczek 2014]. According to IERiGŻ, the value of consumption

of food and stimulants in constant prices in Poland in 2013 was almost 5% below the record levels of 2008. According to the data presented in Figure 2, there was a big fall in consumption in 2009 in both countries and a slightly different situation in the years 2010–2013. In Poland there has been a slight reflection and stable situation in the last four surveyed years, reaching a level of consumption of 42.8 billion in 2013 (in current prices). While the upward trend was visible in Latvia, which has led to consumption of 2.7 billion EUR in 2013. It is worth noting that these countries represent a totally extreme markets incomparable capacity.

The effects of declining demand for food were more than compensated for the fast--growing export (Table 1), which in 2014 in Poland and Latvia respectively amounted to more than 20 and over 2 billion EUR. The value of export in the years 2005–2014 in Latvia has increased more than four times, and in Poland and has tripled. In the light of the above, it can be concluded that this foreign trade gives great opportunities for the development of the food sector in both these countries.

Table 1. Latvia and Poland food, drinks and tobacco export (million EUR) in 2005–2014

Country	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Latvia	465	591	792	1 048	933	1 167	1 361	2 022	2 114	2 003
Poland	6 747	8 082	9 451	10 899	10 788	12 708	14 280	17 049	18 977	20 076

Source: Own elaboration based on Eurostat data (access: 22.09.2015).

It is worth noting, that in Poland since 2005 more than half of the food industry's production growth is put up in foreign markets, so without the development of export, which is the effect of accession to the EU and the competitiveness of Polish products, increase in production would not have been so spectacular.

To a large number of factors determining competitiveness there are various ways to empirical analysis of this phenomenon. In assessing the market shares of imports in the domestic market and export shares in national production it was extracted the four groups of import and export competitiveness: the very high, high, medium and low.

In Poland a very high and high import competitiveness had the following products: tomatoes and products, mutton and goat meat, honey, nuts and products, sunflower seed oil, sunflower seed, sugar and sweeteners, pig meat. While in Latvia it was: bovine meat, rye and products, barley and products, rape and mustard oil, peas, rape and mustard seed, offal-edible, butter and ghee, poultry meat, pig meat, beer, eggs, pulses, milk (excluding butter), fats – animals raw, onions, wheat and products. You will find that far more goods and product groups imported to Latvia is characterized by high competitiveness in relation to national production (Table 2).

After analyzing the export competitiveness you will notice that the Polish 14 product groups had high and very high level of competitiveness, Latvia however – 23, as presented in Table 3. It should be noted that part of the goods had to high competitiveness of both exports and imports. In the case of Latvia it was nine following product groups: wheat and products, butter and ghee, rape and mustard seed, pig meat, peas, poultry meat, rye and products, milk (excluding butter), eggs. In Poland it was five product groups: sunflower seed oil, sunflower seed, honey, nuts and products, fruits – other.

Table 2. The competitiveness of import in relation to national production in Poland and Latvia in 2011

Import competitiveness in relation to national production	Poland	Latvia
Very high	tomatoes and products, fruits – other, mutton and goat meat, oil crops – other, honey, nuts and products, sunflower seed oil, sunflower seed	bovine meat, vegetables – other, rye and products, barley and products, rape and mustard oil, peas, rape and mustard seed, offal-edible, oil crops – other, butter and ghee, poultry meat, pig meat
High	sugar and sweeteners, pig meat	beer, eggs, pulses, milk (excluding butter), fats – animals raw, onions, wheat and products
Medium	cream, wheat and products, rape and mustard oil, milk (excluding butter), onions animal fats, barley and products, meat – other, vegetables – other, groundnut oil, bovine meat, apples and products, fats – animals raw, peas, rape and mustard seed, maize and products, beans	oats, potatoes and products, cereals – other
Small	sugar beet, fermented-beverages, beer, oats, rye and products, poultry meat, potatoes and products, pulses, starchy roots, millet and products, alcoholic beverages, eggs, butter and ghee	honey, beans, mutton and goat meat – other, cream

Source: Own study.

Table 3. The export competitiveness in relation to national production in Poland and Latvia in 2011

Export competitiveness in relation to national production	Poland	Latvia
1	2	3
Very high	apples and products, sunflower seed oil, offal, bovine meat, meat – other, sunflower seed, alcohol-non-food, oil crops oil-other, fish and seafood, soy bean oil	wheat and products, barley and products, bovine meat, butter and ghee, rape and mustard seed, soy bean oil, fish and seafood, tomatoes and products, alcoholic-beverages, fruits – other, apples and products, oil crops oil – other, alcohol-non-food, sunflower seed oil, fermented-beverages, sugar and sweeteners, wine

Table 3, cont.

1	2	3
High	honey, eggs, poultry meat, nuts and products, fruits – other	pig meat, peas, poultry meat, rye and products, milk (excluding butter) eggs
Medium	beans, tomatoes and products, wheat and products, maize and products, oil crops – other, onions, butter and ghee, rape and mustard oil, sugar and sweeteners, vegetables – other, sesame seed oil, milk (excluding butter), pig meat, cream, alcoholic--beverages, fats – animals raw, groundnut oil	pulses, potatoes and products, oats, rape and mustard oil, vegetables – other, onions, fats – animals raw, cereals – other, beer, oil crops – other, offal
Small	mutton and goat meat, sugar beet pulses – other and products, cereals – other, oats, peas, rye and products, beer, barley and products, millet and products, potatoes and products, starchy roots, fermented-beverages, rape and mustard seed	honey, beans, mutton and goat meat, meat – other, cream

Source: Own study.

CONCLUSIONS

Following the analysis, the detailed conclusions can be made:

- Final food consumption expenditure of households amounted to 18% of total expenditure in Poland and 19.1% in Latvia. Decreases was observed in both countries since 2004, according to Engel's law.
- Final food consumption expenditure of households in Poland amounted to 42.7 and 2.7 billion EUR in Latvia. In Poland is nearly 16 times higher than in Latvia.
- Disturbing phenomenon in Poland is high and very high import competitiveness in the market of tomatoes, sugar and sweeteners, pig meat.
- In Latvia, action should be taken on the market of the following products: barley and products, rape and mustard oil, peas, rape and mustard seed, butter and ghee, poultry meat, pig meat, wheat and products.

To sum up you will notice, that in Poland and Latvia foreign trade and its competitiveness plays increasingly important role in the agri-food sector. Many of the goods characterised high competitiveness, but also in many cases is observed the decrease of the level of export competitiveness and increase the import competitiveness. It is interesting to note that the role of factors of production in agriculture and the food industry, such as low labour costs, labour resources, slowly decrease. Increasing globalisation and removing

barriers in international trade exacerbating market struggle. That is why it is important to monitor the level of competitiveness, and then look for the answer, why selected groups like pig meat lose their high level of competitiveness. It is crucial to continue to take steps on a regulatory level, in particular as regards food quality and safety.

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RYNKI ŻYWNOŚCI W POLSCE I NA ŁOTWIE – ICH POJEMNOŚĆ I KONKURENCYJNOŚĆ

Streszczenie. Celem opracowania była identyfikacja pojemności rynków żywnościowych w Polsce i na Łotwie oraz poziomu konkurencyjności tych rynków. W obu krajach zaobserwowano spadek pojemności rynkowej mierzonej spadkiem udziałów wydatków na żywność oraz spadkiem spożycia żywności (w Polsce poziom spożycia w 2013 roku wynosił około 43 mld EUR, a na Łotwie 2,7 mld EUR). Skutki słabnącego popytu na żywność były z nadwyżką zrekompensowane szybko rosnącym eksportem, który w 2014 roku w Polsce

i na Łotwie wynosił odpowiednio ponad 20 i ponad 2 mld EUR. Wartość eksportu w latach 2005–2014 wzrosła na Łotwie ponad cztery razy, a w Polsce zaś potroiła się. Polskie i łotewskie towary w badanym okresie były konkurencyjne na rynkach zagranicznych, aczkolwiek obserwowane wysokie poziomy konkurencyjności obniżają się. W 2011 roku w Polsce, wysokim lub bardzo wysokim poziomem konkurencyjności, charakteryzowało się, 11 grup towarowych, a na Łotwie aż 23. Należy monitorować poziomy konkurencyjności, w szczególności szybko rosnącej konkurencyjności importu niektórych grup towarowych, np. mięsa wieprzowego, i szukać przyczyn takiego stanu rzeczy, a także podejmować stosowne działania na płaszczyźnie administracyjnej i prawnej.

Słowa kluczowe: pojemność rynku, konkurencyjność, spożycie, udziały rynkowe

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PREMISES AND POTENTIAL FOR THE APPLICATION OF SEMIOTICS IN MARKETING RESEARCH

Magdalena Sobocińska
Wrocław University of Economics

Abstract. Potential uses of semiotics in market research should be examined in the context of the multi-paradigmatic nature of marketing and the continuous development of qualitative research methods. The essence of semiotic approach is expressed in its focus on the contextual dimension of consumption. Semiotic studies represent a departure from the analytical examination of declarations, placing more emphasis on identification of behavioural changes and emerging trends in consumer attitudes. The semiotic approach places great significance on the analysis of cultural messages, also those propagated through mass media. Semiotic studies may be employed in brand management for portfolio-building, cultural branding and in the design of brand positioning strategies. It is also an effective instrument for the formulation of marketing messages and collation of cultural insights. To reduce the uncertainty of interpretation, results of semiotic analyses should be triangulated against those obtained using standard qualitative and quantitative methods.

Key words: marketing, culture, semiotics, semiotic square, binary opposition pairs, cinema market

INTRODUCTION

Modern trends in market research development seem to follow a multi-directional and multi-paradigmatic approach, as attested by the emergence of new concepts of marketing and the pursuit of research instruments and methods to expand the knowledge base available to the various decision-making bodies. The purpose of this paper is to present premises for and potential benefits offered by the adoption of a semiotic approach to market research. Conclusions were drawn from literature studies, and presented in the context

Corresponding author: Magdalena Sobocińska, Wrocław University of Economics, Institute of Marketing, Department of Marketing Studies, Komandorska 118/120, 53-345 Wrocław, Poland, e-mail: magdalena.sobocinska@ue.wroc.pl

of the main assumptions of semiotics and the potential areas of application. The discussion on the utility of semiotic analyses was exemplified using case studies of local cinema market, to demonstrate methods for inducing change in the popular categorisation of cinemas. The examples suggest that, by breaking the binary oppositions and by concerted marketing effort, it is possible to create a new model (or formula) of a movie theatre.

THE METHOD: THE ESSENCE OF SEMIOTICS AND PREMISES FOR ITS USE IN MARKETING

The essence of the semiotic approach is expressed in its focus on the contextual dimension of consumption. Semiotic analyses, belonging in the category of qualitative market research, are involved with identification of meanings attached to certain notions, with study of forms of product categorisation, or the examination of culturally-determined consumer attitudes and behaviours [Mazurek-Łopacińska and Sobocińska 2014, Mazurek-Łopacińska 2015]. Semiotic analyses place strong emphasis on the study of cultural messages, also those used in mass media (movies, TV productions, popular literature, the press, advertising). Semiotic studies represent a departure from the analytical examination of declarations collected from respondents, placing more emphasis on the study of cultural elements that influence consumer behaviour. It must be noted that semiotic analyses offer potential for the examination of adjustment between values projected by the brand and the current cultural patterns. Analyses of products as signs or symbols involve the study of their denotative meanings, in relation to functional needs and customer expectations, and their connotative meaning, related to the set of properties or features that define the buyer rather than the product itself [Nöth et al. 2001].

The use of semiotics in market research should be examined in the context of the multi-paradigmatic nature of marketing and the resulting development of methods based on paradigms alternative to the present positivist-functional-systemic paradigm, particularly the symbolic-interpretive approach. The latter is characterised by departure from the cause-effect model of neo-positivism, and by the adopted assumption (in accordance with the social constructivism theory) that human beings perceive reality through their culture and experiences. The symbolic-interpretive paradigm places key significance upon rooting the analytical research in practical observation of real-life scenarios and on the cognitive role of language in the formulation of social reality [Sułkowski 2012].

The cultural impact on consumers and their behaviour may be analysed from the viewpoint of:

- forming consumer identity through marketing activities of companies – sources of symbolic capital for the consumer;
- organisation of autonomous consumer groups, to improve the realisation of shared objectives related to consumption;

- consumer relations with various social or institutional structures;
- consumer attitudes and ideologies related to the established social norms and standards [Arnould and Thompson 2005].

Proper recognition of the symbolic roles attributed to products and brands is of paramount importance, since various consumer segments and individuals attribute different meanings to those roles. It may be useful to observe that the formulation of symbolic meanings attributed by consumers to brands and products is a process affected not only by the marketing activities, but also by peer influence, opinion exchange, and by the adopted set of values associated with customers' cultural or subcultural identification [Ahuvia et al. 2006].

The increased interest in culture as a determinant in management processes, modern development of symbolic consumption, heterogenization of lifestyles forcing brands to build their image on more than a single myth – all these can be viewed as premises for the use of semiotic approach in marketing. In addition, the semiotic approach is a good example of a modern qualitative research instrument offering results independent of respondent declarations. At the same time, it must be noted that the use of semiotics in marketing is a response to an ongoing pursuit for more effective forms of market influence.

Application of semiotic analyses in the design of marketing messages and collation of cultural insights may attest to the high potential of this approach. Semiotic analyses are also an effective instrument for the formulation of brand positioning strategies and product portfolios, identification of approaches to brand narration, and cultural branding (Fig. 1).

With regard to cultural branding based on the semiotic approach, it may be useful to emphasise the role of proper identification of identity conflicts which can be targeted and solved by suitably designed cultural myths. Furthermore, it is important to establish methods of building credibility of the brand as the vehicle for the propagation of the myth. Realisation of these postulates improves the chance of success in generating a unique communication code around the brand [Holt 2004].

The use of semiotic approach in marketing requires departure from the narrow perspective of branding based on perceptions and emotions. The brand should be perceived in terms of a cultural icon, a specific emanation of consumer's identity [Pogorzelski 2015].

At the same time, it must be noted that the complexity of modern decision-making processes forces market researchers to go beyond the framework of classical research based on isolated semiotic concepts. Research work in semiotic approach should involve triangulation of semiotic findings with those obtained using classical methods of qualitative and quantitative research.

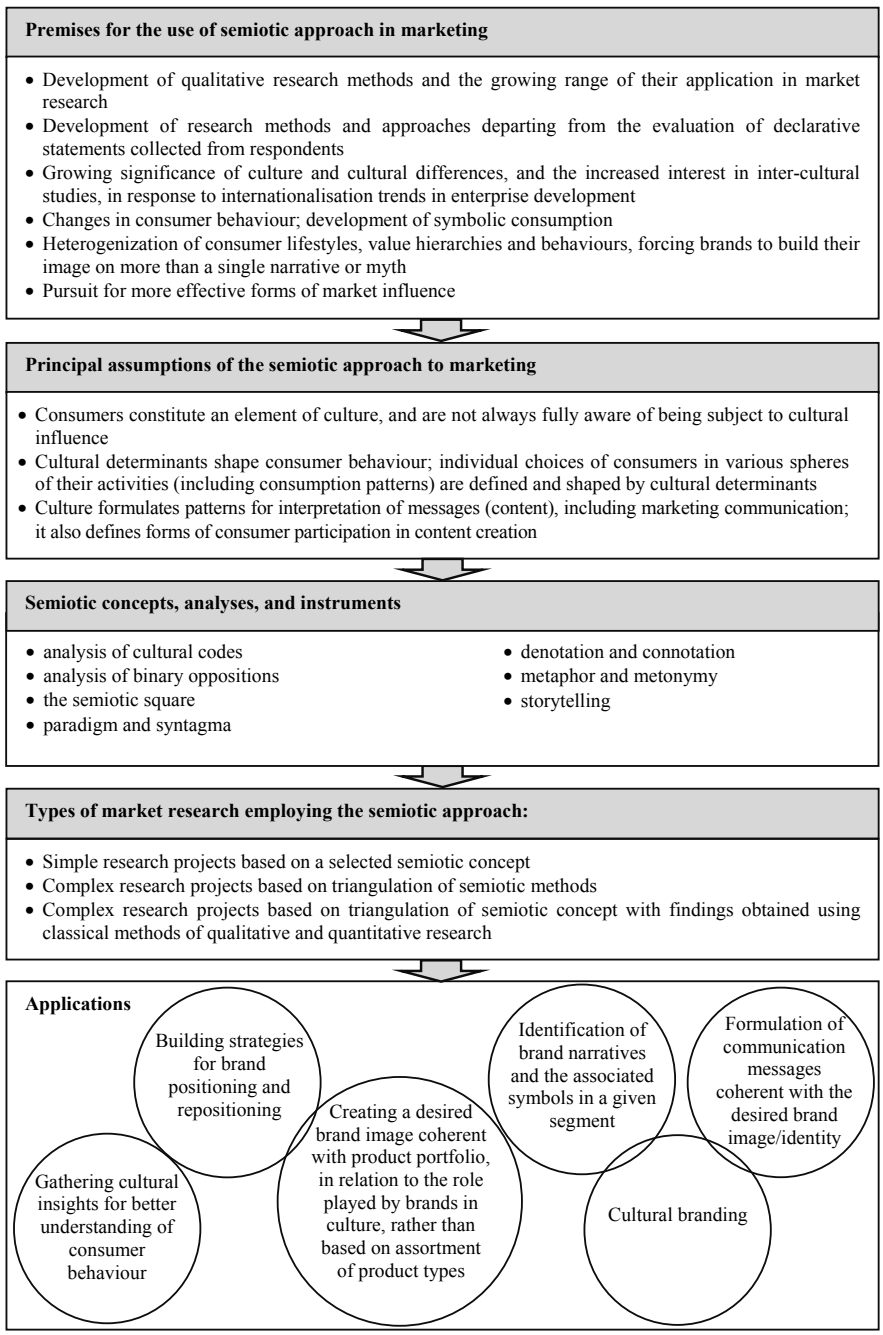

Fig. 1. Premises and main assumptions for the use of semiotic approach in marketing
Source: Own research.

FORMS AND MAIN ASSUPTIONS OF SEMIOTIC ANALYSES

The concept of "sign" lies at the core of all semiotic analyses employed in market research. Professional literature presents two dominant models of the sign concept: de Saussure's and Peirce's. The former represents a dyadic approach. De Saussure's model postulates the following constituents of a sign [Chandler 2011]:

- the signifier – referencing forms adopted by the sign;
- the signified, i.e. a notion, concept or value represented by the signifier.

De Saussure's concept is relational in its assumption that signs as such are devoid of inherent meaning, and that their meaning is generated in relation to other signs. Peirce's model, on the other hand, identifies three fundamental elements of a sign [Chandler 2011]:

- representamen (sign-vehicle), describing the form adopted by the sign;
- interpretant, representing the meaning carried by the sign;
- object – referring to the object signified by the sign and external to the sign itself.

Comparing the two models, it can be seen that there is a rough correspondence between the concept pairs: "representamen" with "signifier", and "interpretant" with "the signified". However, unlike the signified, the interpretant is also a sign by and of itself, although expressed solely in the mind of the interpreter.

It may be useful to note here the difference between the classic and the social approach to semiotics. In classical semiotics, meanings are derived from texts, and the task of the researcher is to identify and decode them based on references to the coding system. Social semiotics, on the other hand, is based on the assumption that meanings are formulated in the course of social communication [Kaczmarek 2014].

Semiotic analyses of visual and textual sources offer potential for identification of meanings attached to the notion or concept under study. Table 1 presents basic types and instruments of semiotic analysis, with examples of application in market research.

From the viewpoint of their utility and potential for market studies, one of the most promising approaches is the analysis of cultural codes: residual, dominant, and emergent. By drawing the trend trajectory, researchers can not only gain insight into past and present behaviour of consumers, but also forecast the emerging trends and future behaviours.

Another widely used method is the semiotic square – a graphical representation of correlations between distinguishing traits of a semiotic category under study. This instrument is an elaboration of the binary opposition analysis. The semiotic square, as a construct, is an elaboration of the assumptions of the structural linguistics, and involves mapping of the correlations based on validation of positive and negative assertions [Floch 2001a]. The semiotic square can be used for the identification of marketing categories, to help organise the structure of notions and to uncover categories which have not yet been targeted.

Table 1. Basic types and instruments of semiotic analysis and their potential applications in market research

Type of semiotic analysis	Authors	Main assumptions and premises	Applications in market research
Analysis of cultural codes: residual, dominant and emergent	R. Williams, M. Alexander, M. Evans, M. Harvey, M. Anderson	culture of a given period may be described through internal correlations between residual values (originating in the past, but still cultivated in culture), dominant values, and emergent values (signalling new meanings and practices of an emerging cultural change)	• building code maps to be used in brand management and marketing communication processes; • setting directions of product and brand development; • identification and interpretation of meaning structures used by consumers; • identification of communication codes employed by market competitors
Analysis of binary oppositions	R. Jacobson, V. Valentine	• cognition and attribution of meanings or senses to various categories can also be derived from definition of the opposite (what the object is vs. is not); • binary opposition pairs are frequent in cultural and subcultural context, and play a significant role in social processes	• identification of binary oppositions and correlations between the notions under study and the understanding of their origin offers insight into the way consumers think and the way they organise the world they live in; • knowledge gained from semiotic analyses can be used in brand management to help identify barriers to development and formulate directions of changes in market communication and brand positioning
The semiotic square	A. Greimas, J.M. Floch	an elaboration of the binary opposition analysis, extending the number of correlations between the notions under study beyond the narrow scope of binary pairing	

Source: Own research based on Polak and Żurawicka [2015].

THE FINDINGS: THE USE OF SEMIOTIC ANALYSES IN THE STUDY OF CHANGES IN MARKET CATEGORISATION OF CINEMAS

To illustrate the utility of semiotic analyses in market research, let us analyse changes in popular categorisation of cinemas, as evident in the formation of new segmentation models in this particular market. For many years, the typical segmentation of cinema market was based on a binary opposition of multiplex cinemas vs arthouse cinemas. The discerning feature of multiplex cinemas is their focus on global (mostly American) and popular productions, presented in large, multi-cinema centres. The context of reception for these films is set in a mercantile environment, to accompany other shopping and entertainment activities, with moving pictures perceived as a source of pleasure and relaxation.

Arthouse cinemas, on the other hand, operate in a sort of opposition to the multiplex centres, both in physical market space, and in the minds of consumers. This model of cinema is characterised by its focus on art cinema and ambitious projects for discerning viewers, often of local or European origin. Arthouse cinemas are cosy and low-key, providing intimacy away from the crowds. They also put strong emphasis on educating their viewers, with introductory presentations and guest panels, to enhance the perception of cinema as an art with unique history and achievements. This image is reinforced by the setting and the décor, as well as the use of suitable forms of market communication, with strong associations to history. In addition, arthouse cinemas build their organisational culture around material artefacts: posters, artistic photos, stills of famous movie scenes, etc. (Table 2).

Table 2. Binary opposition pairs defining the perception of two basic types of cinemas

Multiplex	Arthouse cinema
egalitarian productions, easy reception	ambitious productions for elite audiences
mostly American production	European and local productions
blockbusters	arthouse movies and artistic cinema
movie as a market product	cinema as an art
large facilities	small viewing rooms
multi-stage complexes	mostly one-stage
noisy	low-key and sheltered
modern	retro
unified design	variety in design
hedonism	intellectual reflexion
entertainment	education

Source: Own research.

By pursuing this approach and elaborating it in the form of a semiotic square of the cinema market, we can identify some other types (models) of cinema operation on the market. For our purpose, the correlations between multiplex and arthouse cinemas are still defined in terms of opposing categories, while small cinemas offering commercial production and large cinemas with ambitious productions can be defined by negation (Fig. 2).

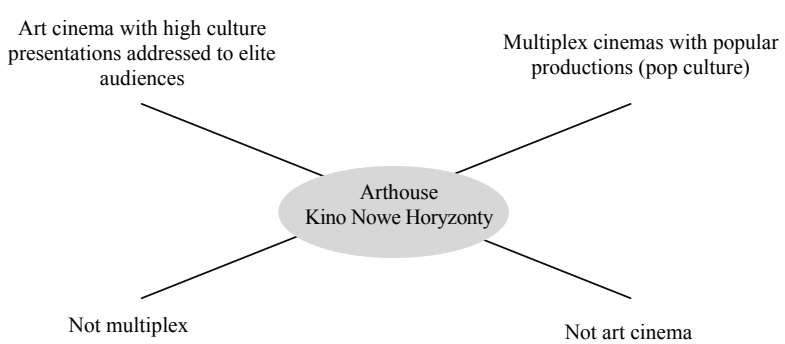

Fig. 2. The semiotic square, as used in the categorisation of cinema types

Source: Own research.

By using the semiotic square, we can identify a space for a new model of cinema operation, integrating features of both multiplex and arthouse models. Kino Nowe Horyzonty is a good example of a practical use of this space, based on transformation of a multiplex into an arthouse complex. The innovation of this approach lies in the potential to present ambitious repertoire in a large facility with nine projection rooms. The cinema offer is built on arthouse and middle-of-the-road movies, with great emphasis on education programs, movie festivals, reviews, guest presentations and other cultural events, not necessarily limited to cinema art. This identity is communicated through modern arrangement and design, contrasting both with the multiplex and the arthouse standards.

This example seems to confirm the notion that, by breaking the narrow space of binary opposition and reaching for suitable forms of communication, it is possible to fashion a completely new and attractive model of cinema house, integrating best features of the types already present and active on the market.

CONCLUSIONS

The use of semiotics in market studies offers a range of benefits, such as [Floch 2006b]:

- better insight into sets of meanings related to the instrumental and operating spheres of marketing, and better organisation of those meanings, with proper identification of hierarchies and logical orders represented in those notions;
- improved effectiveness of marketing through the use of forms and message elements well-adjusted to the task of communicating brand identity;
- better projection of brand and product image on the market.

Semiotic analyses may involve both deconstruction of codes already used by the competitors, and the construction of original content designed to communicate specific values associated with the brand.

There are many premises for the use of semiotic approach in market research. Rapid development of qualitative methods and the growing significance of culture as a determinant of management processes and consumer behaviour patterns seem to confirm the validity of the semiotic approach. The semiotic approach offers good potential for solving decision-making problems in marketing areas, but it should be approached with competence, to avoid the risk of textual over-interpretation. For this reason, is advisable that the findings of semiotic analyses be triangulated against those obtained by other means.

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PRZESŁANKI I MOŻLIWOŚCI ZASTOSOWANIA SEMIOTYKI W MARKETINGU

Streszczenie. Na zastosowania semiotyki w marketingu należy patrzeć przez pryzmat jego wieloparadygmatyczności i rozwoju badań jakościowych. Istota semiotyki polega na tym, że badany jest kontekst, w którym odbywa się konsumpcja. W badaniach semiotycznych odchodzi się od deklaracji respondentów i rozpoznaje się kierunki zmian zachowań nabywców oraz kształtujące się nowe postawy konsumentów. Szczególną rolę w badaniach semiotycznych pełnią teksty kultury, w tym także kultury masowej. Badania semiotyczne znajdują zastosowania w procesach kształtowania portfolio marek, w budowie strategii

pozycjonowania marek, w „branding" kulturowym oraz w tworzeniu przekazów marketingowych, a także służą pozyskiwaniu „insight" kulturowych. W celu zmniejszania niepewności interpretacyjnej istnieje potrzeba stosowania triangulacji analiz semiotycznych z klasycznymi badaniami jakościowymi i ilościowymi.

Słowa kluczowe: marketing, kultura, semiotyka, kwadrat semiotyczny, pary opozycji binarnych, rynek kin

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DIVERSIFICATION IN THE INCOME LEVELS OF EU FARM HOLDINGS SPECIALIZING IN THE PRODUCTION OF MILK

Katarzyna Szmidt, Armand Kasztelan, Andrzej Samborski
University of Life Sciences in Lublin

Maria Kierepka
State Higher School of Vocational Education in Zamość

Abstract. EU farms specializing in milk production are characterized by a considerable diversity in terms of income levels. This variation is due to the impact of a number of natural and economic factors. In EU-15, the level of income increased by 160% in 2011 as compared to 2004. This upward trend was even more strongly manifested – 330% – in the case of dairy farms in EU-10. Such a significant increase in revenue was due to, among others, integration and expansion of the EU, and opportunities for farmers to benefit from support schemes under the CAP.

Key words: milk production, prices, dairy market, productivity, European Union

INTRODUCTION

The agricultural sectors of the European Union have been continually changing in recent years, the changes resulting from internal reforms, integration processes and the impact of global factors. One of the areas characterised by the most dynamic changes is the dairy sector.

European integration – with the introduction of the Common Agricultural Policy (CAP) tools – was the main factor stimulating the restructuring of the dairy sector. The crucial elements in this process included: improvements in the quality of products, pre-accession support investment, growth in exports, increase in milk prices, the introduction of direct payments and the system of milk quotas [Malak-Rawlikowska et al. 2008]. In 1984 saw the introduction of dairy policies of the European Union (EU) quota system

Corresponding author: Katarzyna Szmidt, University of Life Sciences in Lublin, Departament of Agricultural Sciences in Zamość, Szczebrzeska 102, 22-400 Zamość, Poland,
e-mail: katarzyna.szmidt@up.lublin.pl

for milk supply, which was already characterized by import tariffs, export subsidies and purchase intervention [Huettel and Jongeneel 2011].

This common European system, with quotas set for individual countries, guarantees farmers a stable income, and dairy product manufacturers, viable economic conditions for the processing of milk produced in the EU, by limiting price volatility within the limits of milk quotas allocated to individual countries. Also, consumers are provided with a balanced market, well stocked with dairy products of high quality, and of prices they may find acceptable [Seremak-Bulge 2005]. The aims of the breeder/producer is to obtain milk in the most economical manner, with the greatest possible profit [Szymańska 2007].

In many European Union countries, complex projects aiming at improving economic efficiency in dairy herds have been undertaken in recent years. Attention is drawn to the quality of the milk produced, while guaranteeing a widely understood physiological balance in animals, which is one of the essential elements of the so-called animal welfare [Teter 2008].

Quality milk production in accordance with EU standards, in addition to meeting the sanitary – veterinary conditions, and ensuring animal welfare needs, requires modern production technologies and related technical equipment. The main course of action is to implement technologies that help to achieve a high level of hygiene. An alternative to milk producers on an industrial scale are milking robots [Gaworski and Kupczyk 2004].

Changes in production techniques used in dairy farms have been a direct result of investments in new technologies. In addition, a noticeable change has taken place also in feeding practices [Malak-Rawlikowska et al. 2008].

The aim of this paper is to analyse differences in the level of income of farm holdings specializing in milk production.

MATERIAL AND METHODS

The study was based on data collected within the European system of Farm Accountancy Data Network (FADN), as well as information from The Dairy Farming Information Centre, Eurostat. The study embraced farms, whose dominant area of production was milk production, and included the data for the years 2000–2011.

To assess the economic situation of EU-15 we used income data from the family run agriculture farms (SE420) and income per fully employed person in a family (SE420 / / SE015). In addition, an assessment of the economic situation of households was used: economic performance – output per AWU (total work units), the intensity of dairy production expressed as a ratio of milk production per ha of fodder production, capital intensity [fixed assets (SE441) / agricultural income (SE420)].

RESULTS AND DISCUSSION

The number of dairy cows in the European Union comprising 27 countries amounted to 22.8 million items in 2011. It should be noted that in EU-15 there was a reduction in the number of dairy cows (–12%) in the period of 2000 to 2011, on an average level of about 1% per year. A downward trend was also reported in the 10 countries acceded to

the Community in 2004 (EU-10), and those countries showed during the analysed period a decrease in herds of dairy cows by 13% – an average of about 2% per year. An even greater decline characterized dairy farms in Bulgaria and Romania (EU-2). In just four years the number of cows was reduced in these countries by 22%, which accounted for nearly a 6% decline per year.

The decrease in dairy herds in the European Union was compensated by an increase in their milk yield. In 2011, the average productivity of dairy cattle in the EU-27 amounted to 6,501 kg·pc^{-1}, which resulted from several factors, such as increased awareness of the relationship between animal feeding and milk production, breeding productive types of dairy cows, as well as the availability of improved tools and equipment [Boschma et al. 1999] – Figure 1.

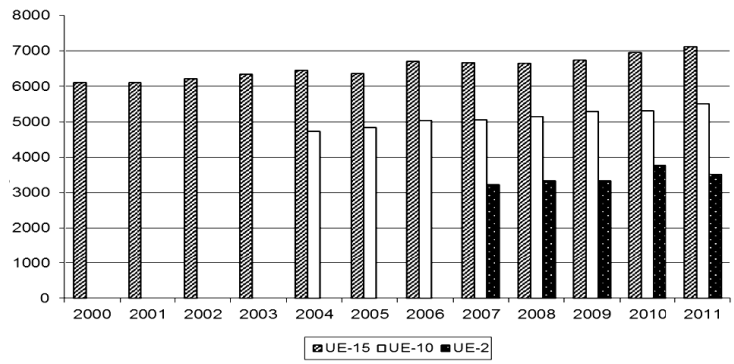


Fig. 1. Milk cow yields in the EU countries in the years 2000–2011 (kg·pc^{-1})

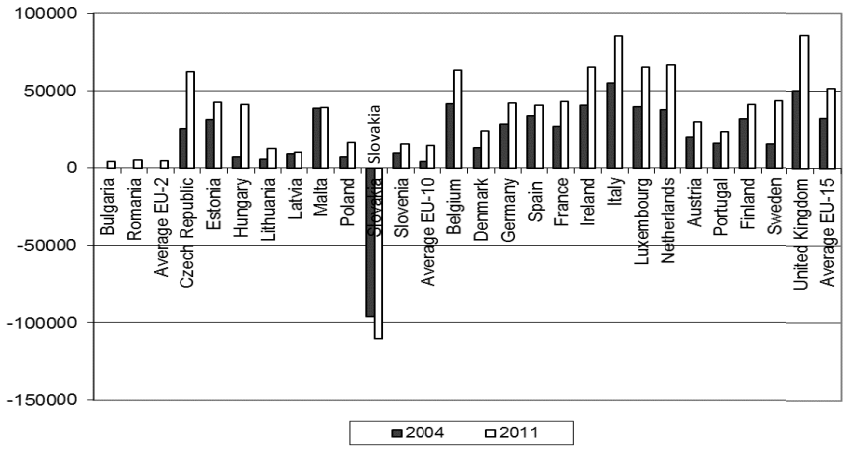
Source: http://www.dairyco.net/datum/milk-supply/milk-production/eu-milk-deliveries.aspx.

The highest yield was achieved by farmers in the EU-15 (7,152 kg·pc^{-1}, data for 2011). Similar results were achieved in 2004, when the figure stood at 6,503 kg·pc^{-1}. It should be noted that in this group of countries, the performance of dairy cows increased steadily – an annual average of about 92 kg·pc^{-1} (Fig. 1). An upward trend was also reported in 10 countries recently acceded to the European Union, but at a much lower efficiency. Milk production in these countries in 2004 was on average at 5,222 kg·pc^{-1}, in 2011 at 6,075 kg·pc^{-1}. The average annual growth in the EU-10 in the period under study amounted to 138 kg·pc^{-1}.

The financial result of farms participating in the FADN was assessed using the revenue from family farms, which is a form of remuneration for work [Ziętara 2011]. Differentiation of income per farm is shown in Figure 2.

In 2011, the lowest value of income characterized farms situated in Bulgaria and Romania. Milk producers in these countries achieved an average yield of 4,918.50 EUR. In nine countries, which joined the Community in 2004, the rate in 2011 amounted to 14,512.89 EUR, its value increased by 70% as compared to 2004. The situation was adverse in terms of income for milk producers in Slovakia. A constant problem in the production of milk in Slovakia are unsustainable increases in prices of means of production as well as fluctuating milk prices. This fact affects the efficiency and the level of income not only for dairy farmers, but also for the dairy processing industry [Masár et al. 2009].

The levels of income for dairy farms located in the countries of the former EU-15 in 2011 were on average 3.5 times higher than the rate characterizing dairy farms in the countries which joined the Community in 2004 (Fig. 2).



No data for Cyprus

Fig. 2. Milk farm incomes in the EU countries in 2004 and 2011 (EUR)

Source: Own study on the basis of FADN data (http://ec.europa.eu/agriculture/rica).

An economic category describing a potential remuneration for the work of the farmer and his family members (FWU) is the income from the farm per fully employed family member (Fig. 3).

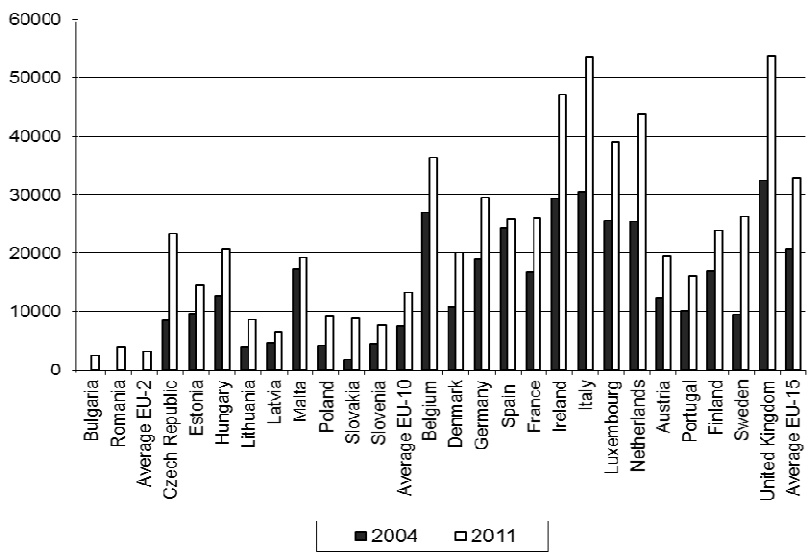


Fig. 3. Income per farm in 2004 and 2011 (EUR·FWU^{-1})

Source: Own study on the basis of FADN data (http://ec.europa.eu/agriculture/rica).

The highest income per family member was reached by farms in the United Kingdom and Italy, then in Ireland, the Netherlands, Luxembourg and Belgium. In the rest of the EU-15 countries, income per family member was lower than the EU-15 average, which in 2011 amounted to 32,900 EUR and as compared to 2004 showed an increase of 18%. In the EU-10 countries in 2011 the highest level of income and remuneration for the work was received by producers from the Czech Republic, Hungary and Malta – above average, which stood at 13,213 EUR.

Differences in farm incomes can also be partly explained by differences in income earned for milk. Milk price depends on the products that are produced from it, and the way in which the production process is organized [Reijs et al. 2013]. In the years 2001–2007, prices paid to EU milk producers remained at a relatively stable level (Fig. 3). With a relatively high level in 2001, the price of milk was gradually decreasing until 2007. During this period, a reform of the EU dairy sector policies reduced intervention prices for butter and skimmed milk [LTO – International Milk Price Comparison 2010]. Positive changes for dairy farmers occurred in the years 2007 and 2008, when there was an increase in the prices of milk, caused in turn by the increase in demand for high value milk and dairy products, both in Europe and in the world [*Dairy market*... 2008]. Year 2009 saw a downward trend, prices paid to milk producers reached a historically low level. The source of the crisis was the weakness in global demand and a strong growth in the production of the largest non-European producers. This situation then changed in 2010 (Fig. 4).

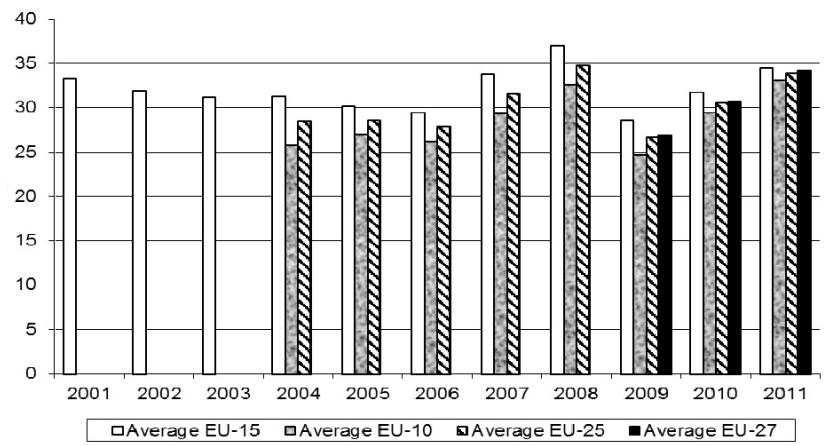


Fig. 4. Prices paid to EU milk producers in the years 2001–2011 (EUR·100 kg^{-1})
Source: http://www.dairyco.net.

The global economic crisis contributed significantly to fluctuations in the price of milk between 2008 and 2011. In 2011, the average price of milk in the EU-15 amounted to 34.51 EUR for 100 kg. In nine (no data for Malta) countries which joined the Community in 2004, milk producers earned prices lower by 4%, while dairy farmers in Bulgaria and Romania obtained prices lower by 12% compared to the prices paid to farmers in the EU-15 (Fig. 5).

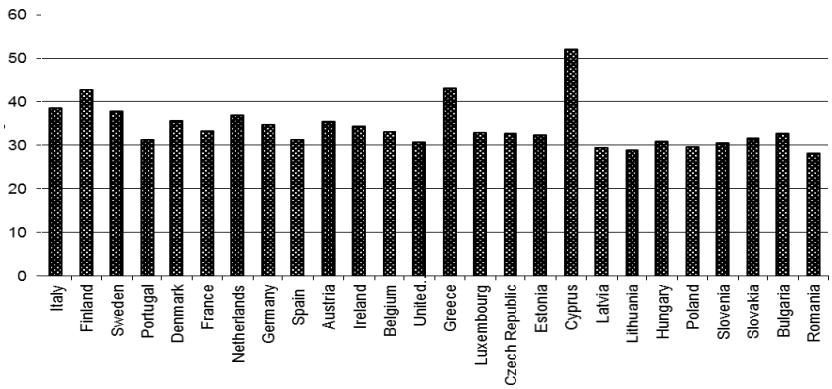


Fig. 5. Prices paid to EU producers of milk in 2011 (EUR·100 kg^{-1})

Source: http://www.dairyco.net.

In 2011, the highest prices for milk were received by producers in Cyprus. One of the reasons for such a high price was the lack of competition and high production costs because, unlike most EU countries, Cyprus has no pastures of its own, and farmers are forced to buy feed from outside. The main supplier of grain is the state itself and it has a monopoly on supplies [*Competition – Cyprus* 2010].

In 2011, the lowest rates among the EU-15 were obtained by milk producers in the UK, mainly due to high feed prices and low prices for dairy products (cream) on world markets [Rucinski and Polet 2010].

The income levels are also determined by the relationship between the prices of agricultural products sold by farmers and the costs of production, whose main component are costs of non-agricultural origin [Ziętara 2011]. Such values showed a great diversity within the European Community (Fig. 6).

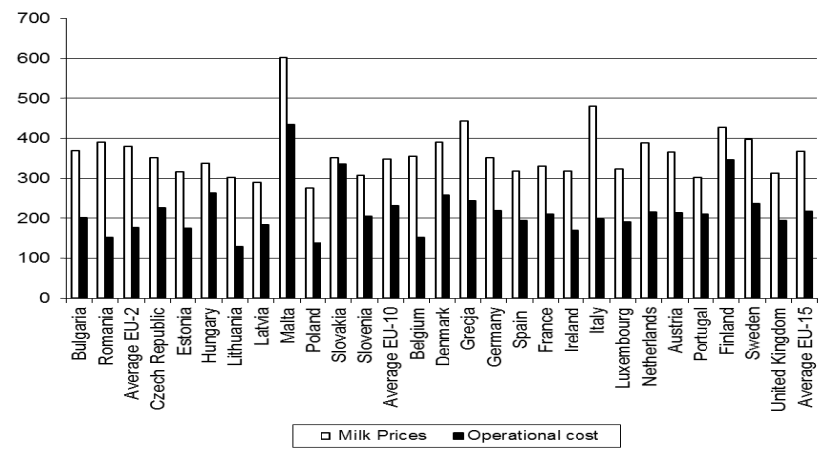


Fig. 6. Price to operational cost ratio in milk production in 2011 (EUR·t of milk^{-1})

Source: EU Dairy farms report 2012. European Commission Directorate – General for Agriculture and Rural Development. Brussels (http://ec.europa.eu/agriculture/rica/publications_en.cfm#DAIRY, access April 2013).

In 2011, milk producers in Central and Eastern European countries incurred operating costs at the level of 232 EUR for 1 t. This figure, as compared to the average in the EU-15 countries was about 7% higher. The high level of this indicator was due to high operating costs incurred by the milk producers of Malta, where the high cost of production in this country resulted from the need to import feed [*Dairy report ferm report 2011*, *2012*]. A competitive cost position in relation to EU-15 was observed among the following producers: Lithuania, Poland, Estonia, Latvia and Slovenia. Costs lower by 18% as compared to the average of EU-15 were shown by the production of milk in Bulgaria and Romania (Fig. 6).

One of the factors leading to an improvement of income situation of farmholds is to increase their areas, which, however, is related to a necessity of abandoning production by a number of farmers [Ziętara 2009]. In 2011, the agricultural area of dairy farms averaged 184.69 ha in EU-10, that figure marked a 17.5% increase as compared to 2004 area of land used for agriculture. Growth of the agricultural area was also noticeable in farms of the former EU-15. In 2011, the smallest area of land used for agriculture was seen in farms in Bulgaria, Romania and Malta. The greatest potential of land used for agricultural production was demonstrated by Slovakian dairy farms. In the years 2004–2011 there was an increase of agricultural land use in the farms under our study (http://ec.europa.eu/agriculture/rica).

The intensity of dairy production ratio was expressed by milk production volumes per one hectare of fodder crops. This indicator measures the productivity of the land, but cannot be used separately to evaluate the performance, as there are differences in the use of purchased feed between countries [Reijs et al. 2013] – Figure 7.

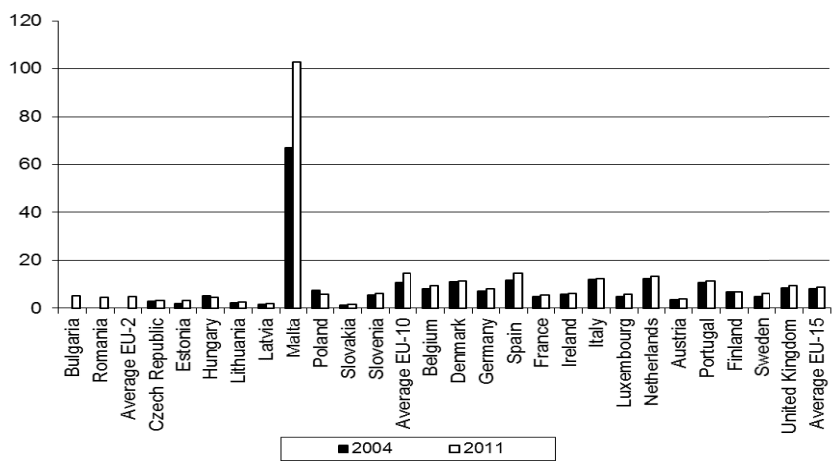


Fig. 7. Intensity of production in dairy farms in EU countries in 2004 and 2011 ($t \cdot ha^{-1}$)

Source: Own study on the basis of FADN data (http://ec.europa.eu/agriculture/rica).

In 2011, among all the countries of the Community, the largest milk production per ha of fodder crops was demonstrated by dairy farmers in Malta (103 t·ha^{-1}), compared to 2004 there was an increase of 53% in the ratio. The average for the ten countries, which together with Malta joined the EU in 2011 amounted to 15 t·ha^{-1}. In Denmark, in 2011, the intensity of production increased by 3% as compared to 2004 and amounted to 11 t of milk per ha, and was higher than the EU-15 average, which stood at 9 t·ha^{-1}. In Sweden and Finland, milk production per ha of fodder crops remained at the constant level – about 6 t in these countries, where a short vegetation period is likely to play a significant role.

The highest economic productivity in 2011 was observed in Danish farms, where they reached an improvement rate of 102%, as compared to 2004 (Fig. 8); though the greatest improvement in economic productivity was achieved in dairy farms in Estonia, Slovakia and Slovenia (on average at around 163%). The lowest value of the index was observed in dairy farms in countries admitted to the Community in 2007 – an average of 7,000 EUR per AWU.

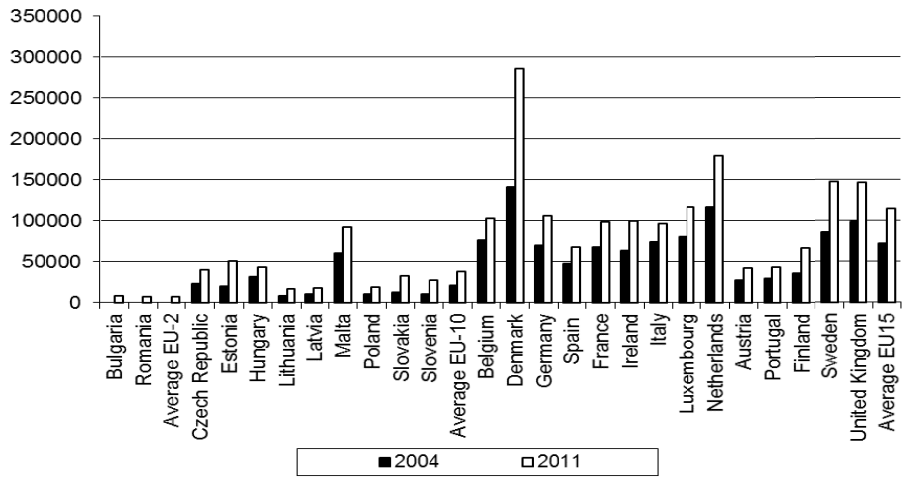


Fig. 8. Economic productivity of human labour in selected EU countries in 2004 and 2011 (EUR·AWU^{-1})

Source: Own study on the basis of FADN data (http://ec.europa.eu/agriculture/rica).

In the years 2011 and 2004, milk production in EU-15 was characterized by higher capital intensity, the rate in both analysed years remained at a similar level and an average of 23 EUR. Milk production in EU-10 in 2011 was characterized by capital intensity of 9 EUR; in comparison to 2004, this value was higher by 19% (Fig. 9).

The index value was varied between countries of the Community. In 2011, the highest level of capital intensity was recorded in Denmark, the Netherlands, Sweden, Malta, Slovenia and the Czech Republic (Fig. 9). Farms specializing in milk production in these countries were characterized by high economic productivity of labour and high yields of dairy cows. High capital intensity may contribute to the increase in production costs, but it can also be a factor in the improvement of the results in the long run.

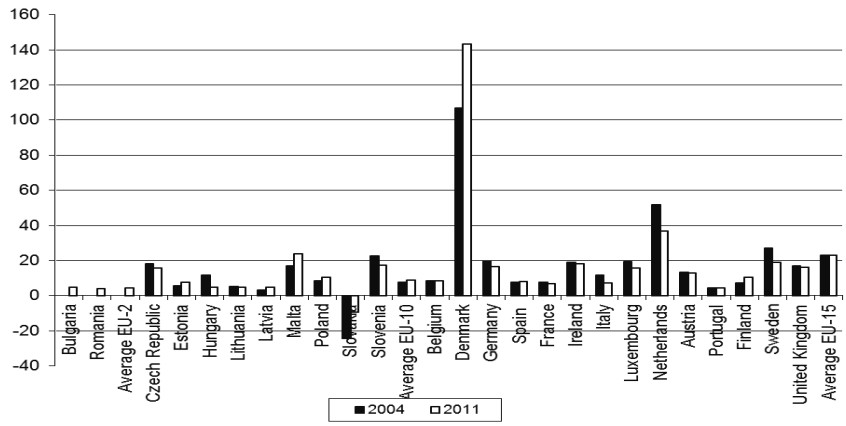


Fig. 9. Capital intensity in milk production in EU countries in 2004 and 2011 (EUR)
Source: Own study on the basis of FADN data (http://ec.europa.eu/agriculture/rica).

CONCLUSIONS

The analysis demonstrated a significant degree of variation in income earned by EU milk producers. This variation resulted from the situation on the commodity markets, which greatly affected not only the revenue from the sale of milk, but also feed costs, which constitute a large portion of the operating costs. In EU-15, the level of income increased in 2011 compared to 2004 by 160% and amounted to 51,483 EUR. An upward trend was even more strongly manifested in the case of dairy farms in EU-10, where there was 339% increase in revenue, which in 2011 averaged 14,513 EUR. Such a significant increase in revenue was due to the integration with the EU and the new opportunities to benefit from support schemes under the CAP – direct payments.

At the national level, the highest income in 2011 was reached by milk producers from the UK and Italy at an average of 86,000 EUR. Income level was also high in the Netherlands, Ireland, Luxembourg, Belgium and the Czech Republic on the average of 65,000 EUR. Good results in terms of revenues could, among others, be due to such various factors as the price of milk and low operating costs (as in Italy).

The lowest level of this indicator was reached by the producers from Slovakia, Latvia, Lithuania, Slovenia, and Poland. The disadvantage of the countries located in this part of Europe are lower milk prices, as compared to the EU-15, and farmers may try to increase their earnings by improving quality of the production. Milk production in these countries was characterized by lower operating costs in comparison to those of the EU-15. These benefits may however disappear if the prices of local resources increase. To remain competitive, it is necessary to use them more effectively. Producers who obtain an higher level of income had more efficient cattle in terms of milk production. In 2011, the productivity of dairy cattle in EU-15 amounted to an average of 6,975 kg·pc^{-1}, which was higher by 28% than the performance obtained by the milk producers of the EU-10.

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ZRÓŻNICOWANIE POZIOMU DOCHODÓW UNIJNYCH GOSPODARSTW SPECJALIZUJĄCYCH SIĘ W PRODUKCJI MLEKA

Streszczenie. Celem opracowania było zbadanie poziomu dochodów wybranych unijnich gospodarstw specjalizujących się w produkcji mleka. Wykonano analizy porównawcze, zestawiając ze sobą wskaźniki ekonomiczno-organizacyjne dotyczące gospodarstw, takie jak: liczebność pogłowia, wydajność, cena. Przeprowadzona analiza wykazała, że unijne gospodarstwa specjalizujące się w produkcji mleka charakteryzowały się znacznym zróżnicowaniem pod względem wysokości uzyskiwanych dochodów. Zróżnicowanie to było wynikiem oddziaływania wielu czynników naturalnych oraz ekonomicznych. W krajach UE-15 poziom dochodów wzrósł o 160% w 2011 roku w porównaniu do 2004 roku. Jeszcze silniej przejawiającą się tendencję wzrostową (330%) zaobserwowano w przypadku gospodarstw mleczarskich UE-10. Tak znaczny wzrost dochodów był spowodowany m.in. integracją z UE i możliwością skorzystania z systemu wsparcia w ramach WPR.

Słowa kluczowe: produkcja mleka, ceny, rynek mleka, wydajność, Unia Europejska

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FROM E-CONSUMER TO E-PROSUMER – CHANGES IN BEHAVIOUR OF E-SERVICES' PURCHASERS

Robert Wolny
University of Economics in Katowice

Abstract. E-service market development is accompanied by development of a presumption phenomenon. Technical possibilities currently provided by the Internet favour prosumer behaviours. E-service consumers are not only passive beneficiaries of e-providers' offer, but they take the initiative, co-participate in creating and designing individualized e-services. The article presents the issues related to behaviour of e-services' purchasers and demonstrates the results of qualitative research in this regard. The empirical material was conducted via the technique of non-participant observation, in 2015, investigating the discussion participants on specialized Internet message boards devoted to e-services.

Key words: e-services, prosumtion, qualitative research

INTRODUCTION

Changes in consumers` approaches and behaviours have been observed for decades. However, it is hard to escape the impression that these changes accelerated profoundly within the last few years. Polish consumers within the last 25 years could observe at least several significant changes, which influenced their ways of shopping. Taking into account the scale of changes, we could venture a name – revolution. That is why we could distinguish at least economic revolution – a transfer to a free-market revolution and hence a change of purchasing behaviours (a change of what we buy, how we buy, and how much we buy) and IT revolution – the occurrence of the opportunity of online shopping (a change of where we buy). Seemingly, the possibility of online shopping had an impact only on a purchasing place. However, as the research results of e-consumers' behaviours indicate, the possibility of such way of shopping is an occasion for the occurrence of a prosumer category. The development of e-service market favours the prosumption

Corresponding author: Robert Wolny, University of Economics in Katowice, Department of Markets and Consumption, 40-287 Katowice, 1 Maja 50, Poland, e-mail: robert.wolny@ue.katowice. pl

phenomenon. Currently, e-service consumers are not only passive beneficiaries of e-providers' offer, but they take the initiative and co-participate in creating e-services.

The objective of the article is an attempt at the exemplification of behaviour of e-service purchasers and their prosumer behaviours.

SOURCE MATERIAL AND RESEARCH METHODS

Field and desk research results were used in the article. Data reported by Central Statistical Office (GUS) concerning the functioning of the entities on e-service market were collected from desk sources. Data related to supply entities originate from the years 2007–2013, and demand entities from the years 2006–2014. Field sources constitute qualitative data collected via the technique of non-participant observation. The research was conducted within the months January – May 2015 analysing the activity of discussion participants on specialized internet message boards. The observation was conducted on Internet message boards fulfilling the following criteria:

- adequacy of topics discussed on a message board with the thematic category;
- high frequency of occurrence of responses on a given message board;
- large number of message board participants;
- high degree of details and contents related to responses of message board participants.

The research was done on 92 message boards of e-services, including e-tourism (25 message boards), e-health (24 message boards), e-banking (22 message boards), and e-insurance (21 message boards). The temporal scope of observations comprised posts on message boards displayed within the period of time from January 2011 to December 2014. Number of 19,728 people expressed their opinions on message boards within the analysed period of time, out of which 32% was constituted by men, and almost 28% by women. About 40% of participants could not be identified because of sex (it did not result from the name of the participant or from a specificity of the post). The most participants were expressing their views on message boards related to services within e-tourism (9,625), and the least within e-banking (2,265). In general, 25,795 posts were displayed on the selected message boards, out of which the most were displayed on message boards related to e-tourism (11,856), and the least within e-insurance (2,889) – Table 1.

Table 1. Characteristics of the studied Internet message boards

Specification	Number of message boards participants				Number of posts
	total	including			
		women	men	sex not stated	
E-tourism	9 625	2 265	1 908	5 452	11 856
E-health	4 882	1 426	1 225	2 231	7 625
E-insurance	2 956	1 152	1 660	144	2 889
E-banking	2 265	680	1 520	65	3 425
Total	19 728	5 523	6 313	7 892	25 795

Source: Own research.

RESULTS AND DISCUSSION

Development of e-service market

The basic criterion of identification of e-service market is an environment in which services are provided – electronic environment. E-service market may be defined as a set of relations among the entities offering the Internet services to sell (service providers) at a given price and the entities purchasing the Internet services (customers) for possessed funds, provided that some services may be offered (provided) free of charge [Wolny 2013]. E-service market is a part of electronic market, which is considered (on a narrow basis) a system or a complex of IT system serving for the realization of purchase-sale transactions of products and services in a given branch [Ordyński 2007].

A big growth of e-service market has been observable in Poland in the recent years. A number of supply entities and customer increases, as well as the offer of provided e-services. Service companies providing e-services are included in the companies running e-sale. In the years 2007–2013 a percentage of companies running e-sale doubled. At average 6.5% of companies were running e-sale in Poland in 2007. The percentage increased to about 12% in 2013. The highest percentage of companies running e-sale is noted among large companies (about 35% in 2013) and these companies noted the highest increase in the years 2007–2013 (of about 26 percentage point). The medium companies were ranked before the small ones – the increase in the analogous period amounted to 9 percentage point, and for the small ones – 4 percentage point (Table 2).

Table 2. Companies running e-sale in the years 2007–2013 (%)

Specification	2007	2008	2009	2010	2011	2012	2013
Total	6.5	4.9	8.7	10.0	10.9	10.7	11.7
In accordance with size of company							
Small (10–49)	6.2	3.9	7.3	8.3	9.2	8.9	10.1
Medium (50–249)	7.0	6.9	11.8	14.3	15.0	15.7	16.1
Large (250 and more)	8.5	18.0	24.5	29.0	31.7	33.3	34.4

Source: *The use of IT technologies*... [*2014*].

A number of individual consumers using e-services increase. Central Statistical Office research indicates that a percentage of consumers purchasing goods and services online in the years 2006–2014 tripled. About 15% of consumers were doing such shopping in 2006, and 45% in 2014. The activity of consumers within e-services sensitive to a phenomenon of prosumption increases in the analysed years. About 33% of consumers (almost four times more than in 2006) were using electronic banking services in 2014. Over 36% of consumers use social networking sites, and at least every eighth participates in message boards or publishes his/her piece of work online (Table 3).

Table 3. Selected objectives of the use of the Internet by consumers in the years 2006–2014 (%)

Specification	2006	2007	2008	2009	2010	2011	2012	2013	2014
Shopping for goods and services online	14.9	19.3	23.3	29.6	35.7	39.1	40.0	42.0	45.1
Using banking services	9.1	12.8	17.1	21.2	27.5	25.3	32.0	32.0	32.6
Using social networking sites	.	.	.	.	35.7	28.0	35.7	35.3	36.8
Participation in chats, groups or message boards online	.	.	15.8	14.6	17.9	10.1	16.6	16.0	13.8
Publishing own texts, photo, videos etc. online	.	.	7.1	10.8	12.8	11.3	14.7	12.9	12.5

Source: *The use of IT technologies...* [*2014*].

Development of prosumer behaviours

Prosumption is a mixture of consumption and production processes until the distinctions between them become less clear [Bywalec and Rudnicki 2002]. A. Toffler [Guido and Peluso 2008] is regarded as a founder of a category of prosumption. Prosumption may be the effect of tendency: consumption is incorporated in the production process – a producer becomes a consumer and production is included in consumption – a consumer becomes a producer. Prosumption may be also considered as a desire (or a wish) to own products which are compatible with a consumer's concept, a thanks to individual choices and activities consumer become co-creators of a given product [Gach 2008]. When consumers create goods and services for personal use, they become prosumers.

Changes occurring in a contemporary world are very significant for the functioning of both service companies and for consumers. Service providers are forced to be open to environment, to make contact with it. Supply entities on market involve their customers more and more frequently and encourage them to cooperate, providing them with their resources and materials, treating them as if they were friends. It is reflected in the creation of relations, the result of which is [Tapscott and Williams 2008]:

- personalisation – consumers have the impact on a final version of a product, they decide themselves about product prices, which reflect their desires, expectations;
- product hacking or product modification to improve them, to adjust them to own needs;
- crowdsourcing – obtaining information from consumers, enable them to express their opinions on the company's offer;
- collective intelligence – group intelligence – summed up knowledge, which is gained as a result of choices, opinions of independent participants.

E-prosumers' behaviour

The 21st century e-service purchaser is not only a passive recipient of a market offer, but he/she more and more frequently participates in its creation. Prosumer behaviours of e-service purchasers may have diverse forms. In a natural environment of e-consumers, which is the Internet network, it is associated with:

- the use of opinion of other Internet users (including: passive use of information displayed by other on the Internet message boards, on social networking sites, blogs etc.);
- expressing opinions on e-services (own description of e-services on the Internet message boards, on social networking sites, blogs etc.);
- displaying suggestions online related to the improvement of service (on social networking sites of service providers);
- own decision how e-service should look like (e-service personalisation);
- displaying suggestions online related to the introduction of new e-services (also transferred directly to service providers).

Polish e-service purchasers are active prosumers on the said market. It is proved by current research [Jaciow and Wolny 2011, Jaciow et al. 2013]. The research results concerning prosumption on the selected e-service markets will be presented in the subsequent part of this report.

The subjects of observations of the Internet message boards were: sources of information about e-services; recommended and not recommended service providers, reasons for recommendation and lack of recommendation of service providers, positive and negative opinions on e-services, suggestions concerning improvements of e-services, including: modifications of the existing e-services and the suggestion of the introduction of new e-services.

Women were more active than men on the Internet message boards concerning services within e-tourism. Among the opinions concerning the functioning of e-service market (both subjective and objective side of market), many of them concerned the improvement (enhancement) of e-services. The respondents suggested modification of the existing e-services, which in terms of a customer should facilitate the process of searching tourist offers, provide more information on tourist offers, as well as facilitate the process of their purchase. The suggestions of the introduction of new services concerned both a new offer (e.g. services within thanatourism, enotourism and such kinds of tourism as: holiday, fishing, shopping), as well as modification of offers targeted at the selected groups of recipients (e.g. seniors, disabled people) – Table 4.

Table 4. Suggestions of service improvements within e-tourism – selected instances

Modification of existing e-services	• improvement in booking tourist services online • possibility of options in searching a hotel, e.g. a street name • less errors in logging on a message board • modification of option "search and browse" to improve search for offers • information should be more frequently updated • monitoring of courier company dealing with delivery of tickets
Introduction of new services	• introduction of offers within fishing, shopping, holidays tourism • introductions of offers within enotourism (travels with a map, where the best global vineyards are marked) • introduction of offers within country tourism (farming holiday – opportunity to participate in preparation of traditional regional specialities, walking, bike, horse trips, the whole set of outdoor wellness treatments) • introduction of offers targeted exclusively at: seniors, disabled people • introduction of message boards by each travel agency

Source: Own research.

Women were more active than men on the Internet message boards concerning services within e-health. Among the opinions concerning the functioning of e-service market (both subjective and objective side of market), many of them concerned the improvement (enhancement) of e-services. The respondents were suggesting modifications of the existing e-services, which in terms of a customer should facilitate the process of searching specialists, enable the electronic exchange of medical information. The suggestions of the introduction of new services concerned the introduction of the Internet evaluation of doctors or a remote conversation with a doctor (Table 5).

Table 5. Suggestions of service improvements within e-health – selected instances

Modification of existing e-services	• opportunity to make an appointment to see a doctor via the Internet • running an online verification system of qualifications and experience of psychologists • improvement of information system about given medications • improvement of online cancer screening (e.g. the increase of accuracy of obtained results) • improvement of electronic storage area of test results • provision of electronic medical information both among medical institutions and among medical institutions and residents
Introduction of new services	• designing and implementation of online Integrated Hospital Information System providing access to medical services • creating a medical register, which are to enable a patient to make appointments via the Internet and monitoring a waiting list • introduction of electronic medical record book and system of e-prescriptions • introduction of a system of Internet questionnaires on the websites of particular outpatient clinics • on-line introduction of a system of online 24-hour clinics • dialogue with a doctor via a microphone, loudspeakers and sensors • opportunity to have a videoconference with a specialist

Source: Own research.

Men were definitely more active on the Internet message boards concerning services within e-insurance. The respondents suggested a great deal of modification of the existing e-services, which in terms of a customer should facilitate the use of e-insurance. The modifications concerned the improvement of the functioning of software, ways of taking out an insurance policy and additional benefits for customers. Among the new services within e-insurance, the respondents suggested the implementation of the possibility to purchase all insurance products via the Internet and multimedia assistance for customers (Table 6).

Men were definitely more active on the Internet message boards concerning services within e-banking. The respondents suggested plenty of modifications of the existing e-services, which in terms of a customer should facilitate the use of e-banking. The modifications concerned electronic transfers, improvement of the functioning of bank interface, the extension of the objective scope of services and technical possibilities during their use. Among the new services within e-banking, the respondents suggested the implementation of new opportunities within making bank transfers and checking balance, the implementation of new applications for mobile devices (Table 7).

Table 6. Suggestions of service improvements within e-insurance – selected instances

Modification of existing e-services	• improvement of the functioning of calculators to calculate expenses • improvement of security of accounts on the Internet services • improvement of software for smart phones • possibility to take out an insurance policy online together with a loan • reductions for cars with GPS
Introduction of new services	• investment policies • Skype contact with customers via Skype • implementing of all types of insurance online • posting instructional films, teaching how to take out Internet policies

Source: Own research.

Table 7. Suggestions of service improvements within e-banking – selected instances

Modification of existing e-services	• improvement of completion time of Internet transfers • creation of a clear bank interface • facilitation in the use of e-banking via the change in the way of logging in/out • option of demonstrating a precise time of registering a transaction • balance updated and visible after each transaction • comparison of balance with planned transactions • the increase of account availability via text messaging
Introduction of new services	• implementation of checking balance via text messaging • monthly turnover statement on brokerage account • bank statement on e-mail • implementation of virtual currency exchange • possibility of mutual finance management for marriages • possibility to make transfers with the use of e-mail address or phone number instead of bank account number • implementation of rating observations on mobile devices

Source: Own research.

CONCLUSIONS

The development of e-service market is accompanied by the development of a phenomenon of prosumption. E-service prosumption allows for their further development and improvement, which also contributes to the occurrence of subsequent customers. Technical possibilities which are provided by the Internet favour a phenomenon of prosumption. In the future, we may also expect a bigger participation in the creation of e-services and active participation in designing individualized e-services. Consumers want to feel awarded and exceptional. They want to use e-services dedicated for them and fully satisfying their needs. The development of prosumption is determined by economic and social trends, technological advancement, as well as by knowledge development. The companies also willingly use the consumers' knowledge running outsourcing of the part of activity based on them as well as using the consumers' knowledge in the process of product development. Gained knowledge on new e-services may contribute to the development of a new offer. Even if some e-services may seem to be too futuristic these days, they may be surely implemented in the future.

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OD E-KONSUMENTA DO E-PROSUMENTA – ZMIANY W POSTĘPOWANIU NABYWCÓW E-USŁUG

Streszczenie. Rozwojowi rynku e-usług towarzyszy rozwój zjawiska prosumpcji. Możliwości techniczne, jakie obecnie daje sieć internetowa, sprzyjają zachowaniom prosumenckim. Konsumenci e-usług nie są już jednie biernymi beneficjentami oferty e-usługodawców, ale przejmują inicjatywę, współuczestniczą w tworzeniu i projektowaniu zindywidualizowanych e-usług. W artykule przedstawiono tematykę związaną z postępowaniem nabywców e-usług i zaprezentowano wyniki badań jakościowych w tym zakresie. Materiały empiryczne zebrano techniką obserwacji nieuczestniczącej, w 2015 roku, badając uczestników dyskusji na branżowych forach internetowych poświęconych e-usługom.

Słowa kluczowe: e-usługi, prosumpcja, badania jakościowe

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1. **Size of the research paper** including tables, figures and photographs should not exceed 12 pages of A-4 format.
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Chełkowski, Z. (1966). Introdukcja troci do rzeki Gowienicy. (Introduction of brown trout into the Gowienica river). Gosp. Ryb., 1 (2), 18–19.

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Pisulewski, P., Strzetelski, J., Antoniewicz, A. (2009). Podstawowe założenia IZ PIB-INRA norm żywienia przeżuwaczy (Basic objectives of nutritional standards for ruminants of the IZ PIB-INRA). [In:] J. Strzetelski (Ed.), IZ PIB-INRA. Normy żywienia przeżuwaczy. Wartość pokarmowa francuskich i krajowych pasz dla przeżuwaczy. Wyd. IZ PIB, Kraków, 11–20.

Patkowska, E., Konopiński, M. (2008a). Pathogenicity of selected soil-borne microorganisms for scorzonera seedlings (*Scorzonera hispanica* L.). Folia Horticul., 20 (1), 31–42.

Patkowska, E., Konopiński, M. (2008b). Pathogenicity of selected soil-borne fungi for seedlings of root chicory (*Cichorium intybus* L. var. *sativum* Bisch.). Veg. Crops Res. Bull., 69, 81–92.

Turski, W. (1972). Projektowanie oprogramowania systemów liczących. (Software design of computing systems). Mat. konf. Projektowanie maszyn i systemów cyfrowych. Warszawa 2–5 czerwca 1971. PWN, Warszawa, 132–139.

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