ISSN 1644-0757

SCIENTIARUM POLONORUM

ACTA

Oeconomia

11 (4) 2012

ACTA SCIENTIARUM POLONORUM

Czasopismo naukowe założone w 2001 roku przez polskie uczelnie rolnicze
Scientific Journal established in 2001 by Polish Life Sciences Universities

Oeconomia

Economics

Ekonomia

11 (4) 2012

Bydgoszcz Kraków Lublin Olsztyn
Poznań Siedlce Szczecin Warszawa Wrocław

ISSN 1644-0757

Wydawnictwo SGGW, ul. Nowoursynowska 166, 02-787 Warszawa
tel. (22) 593 55 20 (-22; -25 – sprzedaż), fax (22) 593 55 21
e-mail: wydawnictwo@sggw.pl
www.wydawnictwosggw.pl

Print: Agencja Reklamowo-Wydawnicza A. Grzegorczyk, www.grzeg.com.pl

From the Scientific Board

There has been the eleventh year of the Acta Scientiarum Polonorum Oeconomia publishing. The Acta is the periodical including several thematic series with uniform graphics and similar format. The publication was set up by group of enthusiasts – employees of agricultural universities and has been published under the patronage of rectors of these universities. Current involvement of academic society in increasing substantive and editorial level of the series, with efforts of the authors, the Programming Board and the Scientific Boards, has contributed to placing the Acta Scientiarum Polonorum (and our Oeconomia series) on the noticeable position in academic research society. Articles can be prepared in Polish with English titles, abstract and keywords. Moreover, we publish also issues in English only. The Scientific Board of the Oeconomia series, concerning the publication range, focus their attention both on substantive content and precision of the form. The articles are revised in "double-blind review" process. All issues of the Acta Scientiarum Polonorum Oeconomia are available in electronic version on the following website http://acta_oeconomia.sggw.pl and abstracts on http://www.acta.media.pl. We are glad to inform that Acta Scientiarum Polonorum Oeconomia are indexed within the AGRIS-FAO, EBSCO, SIGŻ, Copernicus Index. From 2009 every article published in Acta Sci. Pol. Oeconomia is obtaining 9 points at the Ministry of Science and Higher Education ranking list.

Please send the articles on one of following e-mail addresses:

janina_sawicka@sggw.pl

acta_oeconomia@sggw.pl

While sending a printout, please attach also the electronic version on CD or DVD. Letters including note "the Acta Scientiarum Polonorum Oeconomia" should be sent on the following address:

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

Yours sincerely
Prof. dr hab. Janina Sawicka
Chairperson of the Scientific Board of the Acta Sci. Pol. Oeconomia series

List of Reviewers
11 (4) 2012

Prof. dr hab. Roman Kisiel
Prof. dr Vera Majerova
Prof. dr hab. Edward Majewski
Prof. dr hab. Marian Podstawka
Prof. dr hab. Henryk Runowski
Prof. dr hab. Janina Sawicka
Prof. dr hab. Grzegorz Spychalski
Prof. dr hab. Dorota Witkowska
Dr hab. Alina Daniłowska, prof. SGGW
Dr hab. Joanna Kisielińska, prof. SGGW
Dr hab. Maria Parlińska, prof. SGGW
Dr hab. Wojciech Pizło
Dr hab. Elżbieta Szymańska
Dr Joanna Baran
Dr inż. Agnieszka Biernat-Jarka
Dr Mariola Chmielewska
Dr Joanna Chudzian
Dr Carol J. Cumber
Dr Piotr Gołasa
Dr Aleksandra Górecka
Dr inż. Mariusz Grębowiec
Dr Michael Ireland
Dr inż. Marzena Kacprzak
Dr Monika Król
Dr inż. Marzena Lemanowicz
Dr Anna Mazurkiewicz-Pizło
Dr inż. Iwona Pomianek
Dr ing. Patrik Rovný
Dr inż. Dariusz Strzębicki
Dr Harun Ucak
Dr Aldona Zawojska

ACTA SCIENTIARUM POLONORUM *Oeconomia 11 (4) 2012, 5–13*

KNOWLEDGE ABOUT CROSS-COMPLIANCE POSSESSED BY FARMERS FROM OPOLSKIE VOIVODSHIP

Małgorzata Borkowska, Michał Kruszyński
Wrocław University of Environmental and Life Sciences

Abstract. In the article there were presented the results of survey conducted in 2011, among 250 farmholders in the area of Opolskie Voivodship. The aim of research was determination of knowledge about cross-compliance possessed by agricultural producers from Opolskie Voivodship and consequences resulting from its realization. On the basis of research it is possible to state that the level of agricultural producers' knowledge, regarding cross-compliance, is not satisfactory and, therefore, requires immediate filling. Investigation constitutes the part of broader research project involving the authors' examination of the knowledge possessed by agricultural producers from south-west Poland about the mentioned subject. The articles published so far have referred to the knowledge about cross-compliance possessed by agricultural producers from Lower Silesia and Łódzkie Voivodship.

Key words: cross-compliance rules (requirements), Common Agricultural Policy, protection of rural environment, agriculture, Lower Silesian Voivodship

INTRODUCTION

Introduction by the European Union of Single Payment System (SPS) involving three models of payment: regional, historic and hybrid (mixed), results in the fact that obtaining funds, within the frames of the payment featuring independence from the production size and structure, makes agricultural producers meet the requirements constituting the mechanism called cross-compliance.

Instrument cross-compliance, brought to life by the European Union during the summit in Luxembourg (26th June 2003), has been realized in Poland since 1st January 2009,

Corresponding author – Adres do korespondencji: Wrocław University of Environmental and Life Sciences, Institute of Economic and Social Sciences, 24A Grunwaldzki Sq., 50-362 Wrocław, Poland, e-mail: michal.kruszynski@wp.wroc.pl, malgorzata.borkowska@wp.wroc.pl.

while full implementation of all the requirements regarding cross-compliance will take place in 2013 [Borkowska and Kruszyński 2011].

So far there have been implemented regulations dealing with the requirements of Area A, involving animal identification and registration, as well as the issues regarding protection of natural environment (1st January 2009) and of Area B, dealing with public health, animal health and plant health (1st January 2011). The requirements of Area C, connected with animal welfare, will come into force on 1st January 2013.

Introduction of cross-compliance into Common Agricultural Policy (CAP), as well as agro-environmental programs, is continuation of CAP reform which aims at mercantilization of agricultural sector and, first of all, increasing the importance of environmental protection policy within agricultural policy of the whole European Union. This thesis has been confirmed by Dacian Cioloş, commissioner for agriculture and rural development, who said: "CAP is something more than only policy for farmers. There does exist apparent relation between agriculture and natural environment, biodiversity, changes in climate and sustainable management of natural resources, like water and soil. There is also evident correlation between agriculture and economic and social development of EU rural areas" [Cioloş 2010].

The task of cross-compliance implementation is to support the idea of sustainable agriculture [Berling 2007] in order to protect natural environment through rational management in agriculture, ensure food safety, as well as to secure appropriate conditions for domestic animals breeding.

Cross-compliance mechanism is not limited solely to the question of direct payments, since meeting its requirements also applies to beneficiaries making use of funds available within the frames of Rural Development Program for the years 2007–2013. It especially refers to the following activities:

– supporting farming in mountain areas and other less favourable areas (LFA),
– agro-environmental program (agro-environmental payments),
– aforestation of agricultural acreage and aforestation of other areas than agricultural acreage and also payments realized on Natura 2000 areas, as well as payments of animal welfare.

Implementation of cross-compliance and the requirements connected with ensuring animal welfare bring about the changes in the structure of economics in agriculture [Zegar 2007]. Realizing new requirements and instruments in the field of Common Agricultural Policy by The European Union, there should be undertaken all possible activities to maximally protect natural environment through reduction in negative influence of agriculture, yet not to forget that cost of the mentioned reduction must be offset by farmers. As an example of the discussed compensation can currently serve, among others: direct payments, agro-environmental payments, as well as payments for the production of biomaterials.

"The imperative of cross-compliance rules is a justification of direct payments, received by farmers, for non-agricultural part of the society" [Duer 2010].

One should believe that implementation of cross-compliance, forcing agricultural producers to realize pro-environmental activities, will contribute, in the long term, to reduced pressure on the environment by agriculture [Łuczka-Bakuła 2006].

The aim of this elaboration is determination of the knowledge about cross-compliance possessed by agricultural producers keeping their farmholds in Opolskie Voivodship. The purpose of research was to assess broadly-understood environmental awareness of the examined farmers.

METHOD OF RESEARCH

Research was conducted in 2011, according to the method of directed interview, using an interview questionnaire. The group of 300 farmers, keeping their farmholds in Opolskie Voivodship, was the subject of investigation. Selection of research material was of a stratified-randomized character and a criterion was keeping a farmhold of the area larger than 5 hectares of natural.

Another method used during collection of research material was systemic information analysis, based on desk research [Kędzior 2005], including elaborations dealing with national and EU legislation regarding cross-compliance.

Interview questionnaire was developer in such a way that it contained questions not only connected with knowledge and following cross-compliance, but also it referred to broadly-understood environmental awareness of farmers from Opolskie Voivodship.

Research material underwent economic horizontal and comparative analysis [Kopeć 1983]. Summary data were tabled and described. Opolskie Voivodship was deliberately selected for a research.

RESULTS OF RESEARCH

Cross-compliance condition obtaining by farmers financial aid, in the form of direct payments and others, of meeting determined requirements connected, among others, with environmental protection, as well as animal health and welfare.

In the investigation carried out in the second half of 2011 in the area of Opolskie Voivodship took part 300 agricultural producers, residing in Opolskie Voivodship and keeping there their farmholds.

Among people under examination, 51% represented farmers under 40, i.e. who can fully make use of Rural Development Program for the years 2007–2013 – it is age limit (under forty years of age) for beneficiaries in the case of: "Setting up young farmers" or "Modernization of farmholds" (activities connected with axis "Improvement in competitiveness of agricultural and forestry sector"). Men provided for 91% of surveyed people, while percentage of women in the analyzed sample was only 9%. As far as education was concerned, there dominated people with secondary vocational education (53%) and vocational education (34%); higher education was declared by 13% of the examined respondents. Among investigated farmers, 13% confirmed completing the course and obtaining the title of "qualified farmer". The mentioned courses were organized by agricultural advisory center, lifelong learning centers, as well as by secondary schools of agricultural profile. Assessing farmers' awareness regarding cross-compliance, it is possible to notice

immediate necessity of filling their knowledge in this field. Among 88% of the examined farmers know the notion of cross-compliance, but only 68% of them can give a correct definition connected with the analyzed problems. The level of agricultural producers' knowledge on the analyzed subject is highly diversified in particular districts of Opolskie Voivodship (Fig. 1).

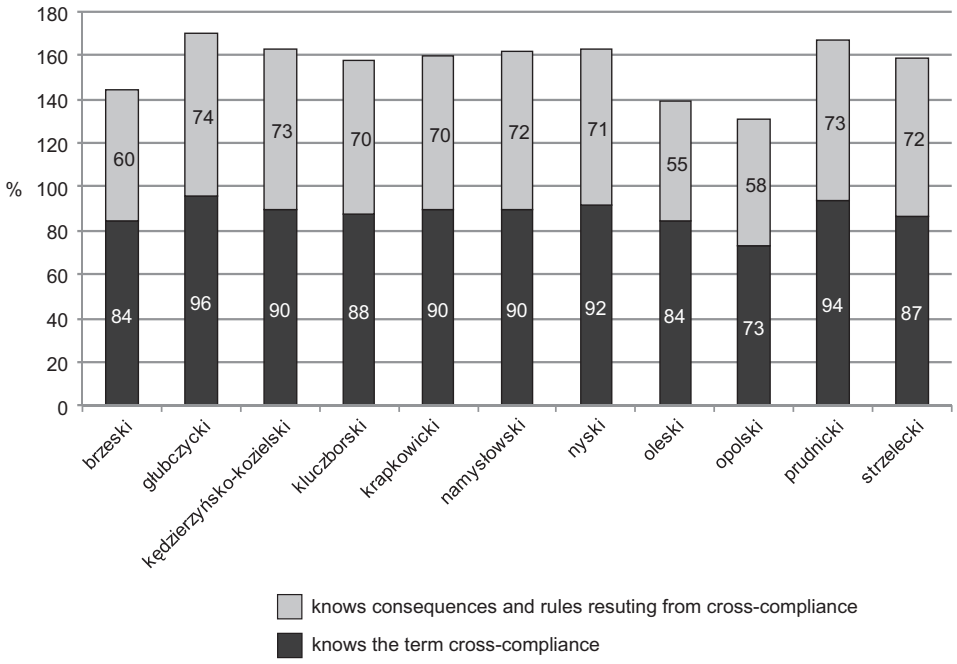

Fig. 1. Knowledge about cross-compliance in the districts of Opolskie Voivodship
Rys. 1. Znajomość zasad wzajemnej zgodności w powiatach woj. opolskiego

Source: Elaboration by the author.
Źródło: Opracowanie własne.

It is possible to notice that the broadest knowledge about cross-compliance features the farmholders from Głubczycki District, where 96% of the examined people know the notion of cross-compliance and 74% of them are able to define it properly, as well as to determine the consequences resulting from implementation of the analyzed mechanism. Satisfactory situation, regarding farmers' knowledge, characterizes the following districts: Prudnicki, Nyski, Kędzierzyńsko-Kozielski and Namysłowskim (Fig. 1). However, the lowest level of awareness, connected with cross-compliance, proved to occure in Opolski, Oleski and Brzeski District, where information about the analyzed mechanism can be given by not more than 60% of the examined farmers.

Seventy nine percent of agricultural producers are aware of the existence of three areas within cross-compliance, while 57% of the respondents possess the knowledge

about the components of the mentioned areas. Eighty percent of farmers know about full implementation of cross-compliance, which is to take place on 1st January 2013 and 67% of farmers declare the knowledge about already implemented Area A, covering: identification and registration of animals, as well as the issues concerning environmental protection, and the knowledge about public health, animal health and plant health.

Further part of research consisted in checking practical side of cross-compliance, in order to become familiar with putting to practice its implementation and, therefore, to get to know how agricultural producers protect natural environment in the area of Opolskie Voivodship. It occurred that as many as 83% of the examined farmers possess the knowledge connected with the necessity of keeping records regarding plant protection chemicals used in their farmholds. Moreover, the farmers admitted that this is advantageous for them from an economic point of view, because they can compare expenditures on particular crop within longer range of time. It is also a positively surprising fact that high percentage of farmers (57%) are aware of the necessity of recording biocides. Considering the requirements connected with the storage of animal feed, majority of agricultural producers (83%) have knowledge about appropriate feed storage and are able to put their knowledge into practice (74%). The storage of domestic animals feed in stores, together with pesticides, herbicides, fertilizers or fuels, belongs to exceptional cases.

In farmholds specializing in animal production, in the field of breeding dairy or meat cattle, and also pigs, the questions were asked about the possibility of feeding with feed containing animal protein (popular in the 1990s fish meal). All the respondents confirmed their knowledge about prohibition of using that kind of feed in animal production and 3% of the examined farmers confessed that they regularly feed their domestic animals with the mentioned feed because of economic reasons and higher production efficiency.

As far as the questions about protection of wild fauna and flora, as well as natural habitats and wild birds were concerned, the farmers admitted the fact that they had heard about Birds Directive and Habitats Directive (87%), and only 49% of the examined people could give examples of requirements written down in both legal acts by the European Union.

In further part of the questionnaire the interviewers focused on the problems connected with protection of surface and underground waters against harmful effects of nitrates of agricultural origin. The farmers were asked two questions referring to:

– knowledge about so-called annual fertilization plan,
– knowledge regarding the rules of the storage of organic fertilizer (liquid manure, slurry and manure).

Answering the question about annual fertilization plan, as many as 71% of respondents correctly indicated that it must contain the following elements: plants demand for nutrients, determination of the source of fertilizers in particular production unit (farmhold) and determination of soil reaction and richness in nutrients conditioning desired efficiency. Similarly, farmers' knowledge about the rules of organic fertilizers storage proved to be of a high level, since as many as 89% of the examined people know the

assumptions of nitrate directive, 74% can give parameters of manure concrete pad and know the length of storage period of organic fertilizers.

Then came the question about minimum standards regarding Good Agricultural Practice. Ninety nine percent of the interviewees confirmed that they possessed knowledge about compliance with the prohibition of burning grass, stubble, bounds or roadside ditches, while as many as 74% of them admitted that they apply burning, mainly of roadside ditches.

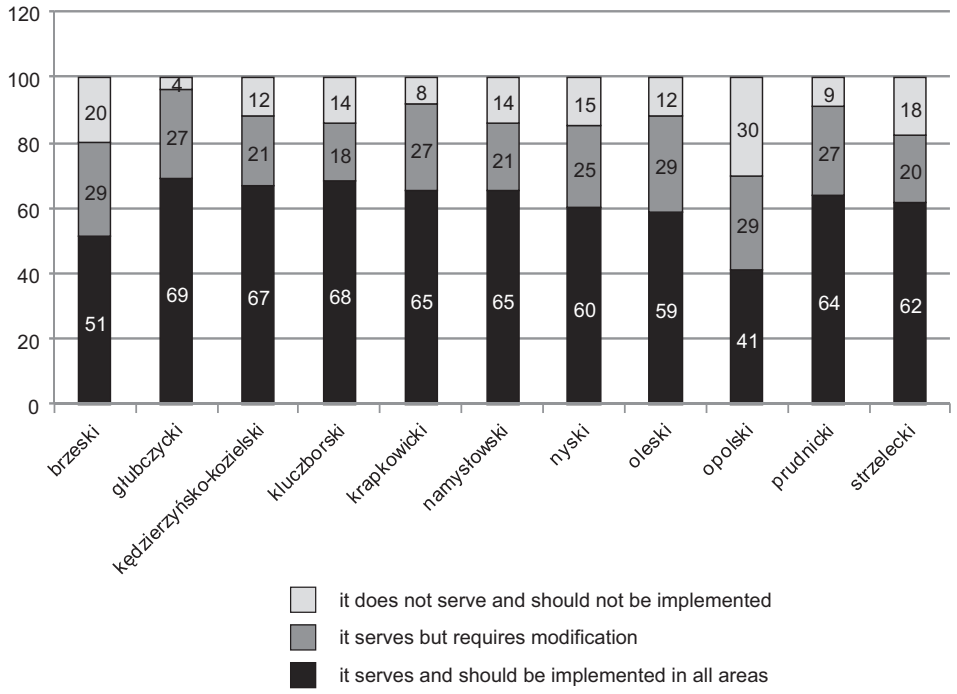

Fig. 2. Assessment of cross-compliance mechanism in the districts of Opolskie Voivodship
Rys. 2. Ocena mechanizmu cross-compliance w powiatach województwa opolskiego

Source: Elaboration by the author.
Źródło: Opracowanie własne.

The questionnaire was crowned with the question regarding the assessment of implementation of the two areas forming cross-compliance taken so far. Distribution of answers in particular districts of Opolskie Voivodship is shown in Figure 2.

The most considerable understanding for the idea cross-compliance implementation can be found among farmholders from Głubczycki District, where 69% of the respondents claimed that cross-compliance mechanism serves the improvement in natural environment of rural areas and it should be implemented, in the form of binding regulations, in all fields of issues. Głubczycki District is also the place where farmers possess the broadest knowledge about cross-compliance (Fig. 1). A satisfactory situation is also in

the following districts: Kluczborski, Kędzierzyńsko-Kozielski, Krapkowicki and Kluczborski, where understanding for the necessity of full implementation of cross-compliance is declared by over 65% of the examined agricultural producers. The highest number of opponents of cross-compliance keep their farms in Opolski and Brzeski District, 30 and 20% respectively of the examined farmholders stated that the requirements of cross-compliance do not serve protection of natural environment and they should not be implemented in Poland.

DISCUSSION

Implementation of cross-compliance has lasted too short to be thoroughly comprehended and objectively assessed, regarding environmental and economic effects of realization of this mechanism. According to the opinion by some experts, meeting the requirements specified as cross-compliance, is not connected with considerable financial outlays on the part of farmholders implementing this mechanism [Jones 2006]. Yet different opinions have also occurred: "…Beneficiaries of direct payments will have to be prepared for additional expenses connected with adjustment to the requirements of cross-compliance. Many farmholds currently benefiting from direct payments within the frames of SAPS, might be not able to finance necessary financial outlays…" [Drygas and Spychalski 2006].

Realization of cross-compliance in the A and Area B contributes to multifunctional development of rural areas through access to diversified CAP mechanisms WPR [Bisaga 2009].

Apart from positive opinions, some criticism regarding analyzed mechanism can also be heard. COPA-COGECA (Committee of Professional Agricultural Organisations – General Confederation of Agricultural Cooperatives) claims that realization of cross-compliance results in the occurrence of uneven conditions of competition in the European Union. Doubts are connected with cost of cross-compliance implementation requirements.

CONCLUSIONS

On the basis of conducted research there can be drawn the following conclusions:

1. The level of awareness of agricultural producers from Opolskie Voivodship in the range of cross-compliance requires filling. Out of 88% of the examined farmholders, familiar with the term cross-compliance, only 68% can indicate detailed aims and requirements to be followed during implementation of this mechanism.
2. The highest level of knowledge and conviction to cross-compliance represent farmholders from Głubczycki District, where 69% of the examined farmers claim that cross-compliance mechanism serves the improvement in natural environment of rural areas and, therefore, it should be implemented in all problem areas in a binding form.

3. The fact that farmholders keep record of using plant protection products, as well as lack of drastic violation of environmental protection within their farms, is a positive phenomenon.
4. To the activities that should be immediately eliminated from agricultural practice belong: grass, stubble, bounds and roadside ditches burning, as well as rare, yet extremely dangerous, usage of fish meal in animal production.

REFERENCES

Berling A., 2007. Sprawozdanie dla Rady z wdrażania systemu wzajemnej zgodności. Komisja Europejska Bruksela, Dyrekcja Generalna ds. Rolnictwa i Rozwoju Obszarów Wiejskich. Prezentacja na konferencji „Centralny element wspólnej polityki rolnej – Wymagania cross-compliance", Warszawa 17–18.04.2008.

Bisaga A., 2009.Wpływ zasady cross-compliance na kształtowanie nowej ekonomiki rolnictwa na przykładzie badań w regionie opolskim. J. Agribus. Rural Dev. 2 (12), 29.

Borkowska M., Kruszyński M., 2011. Znajomość wymogów wzajemnej zgodności (cross-compliance) wśród rolników z województwa dolnośląskiego. Zeszyty Naukowe SGGW, Ekonomika i Organizacja Gospodarki Żywnościowej 90, 99–109.

Cioloş D., 2010. Jakie rolnictwo dla Europy jutra? Wezwanie do debaty publicznej. Wystąpienie przed Komisją Rolnictwa Parlamentu Europejskiego, Bruksela 12.04.2010.

Drygas M., Spychalski G., 2006. Bariery i zagrożenia. Zmiany sposobu naliczania płatności bezpośrednich dla unijnych producentów rolnych wynikają z reformy Wspólnej Polityki Rolnej przyjętej na szczycie w Luksemburgu w 2003 r. Nowe Życie Gospodarcze 20, 8–11.

Duer I., 2010. Współzależność wymogów wzajemnej zgodności (cross-compliance) z programem rolnośrodowiskowym. Możliwości rozwoju obszarów problemowych rolnictwa (OPR) w świetle PROW 2007–2013. Studia i Raporty IUNG-PIB 21, 74.

Jones J., 2006. How do farmers regard the cross-compliance conditions attache to Single Payment Scheme in England. Root Rural Research Conference 4–5.04.2006.

Kędzior Z., 2005. Badania rynku. Metody zastosowania. PWE, Warszawa.

Kopeć B., 1983. Metodyka badań ekonomicznych w gospodarstwach rolnych. Wybrane zagadnienia. Wyd. AR we Wrocławiu, Wrocław.

Łuczka-Bakuła W., 2006. W kierunku rolnictwa zrównoważonego – od programów rolnośrodowiskowych do cross-compliance. Zeszyty Naukowe AR we Wrocławiu 540, Rolnictwo LXXXVII, 291–296.

Zegar J., 2007. Przesłanki nowej ekonomiki rolnictwa. Zagad. Ekon. Roln. 4, 23–25.

ZNAJOMOŚĆ ZASAD WZAJEMNEJ ZGODNOŚCI (CROSS-COMPLIANCE) WŚRÓD ROLNIKÓW Z WOJEWÓDZTWA OPOLSKIEGO

Streszczenie. W artykule przedstawiono wyniki badań ankietowych przeprowadzonych w 2011 roku wśród 250 rolników prowadzących gospodarstwa rolne na terenie województwa opolskiego. Celem badań było poznanie stanu wiedzy opolskich producentów rolnych na temat zasad wzajemnej zgodności (cross-compliance) oraz konsekwencji, jakie wynikają z tytułu ich realizacji. Na podstawie przeprowadzonych badań stwierdza się, że poziom wiedzy producentów rolnych w zakresie cross-compliance jest niewielki i wymaga

natychmiastowego uzupełnienia. Badania stanowią część większego projektu badawczego, w ramach którego autorzy pragną poznać poziom wiedzy w obszarze cross-compliance producentów rolnych z terenu południowo-zachodniej Polski. Dotychczas opublikowano artykuły nt. znajomości zasad wzajemnej zgodności wśród dolnośląskich i łódzkich producentów rolnych.

Słowa kluczowe: zasady (wymogi) wzajemnej zgodności, wspólna polityka rolna, ochrona środowiska terenów wiejskich, rolnictwo, województwo dolnośląskie

Accepted for print – Zaakceptowano do druku: 14.11.2012

ACTA SCIENTIARUM POLONORUM *Oeconomia 11 (4) 2012, 15–22*

FINANCIAL DETERMINANTS OF CARRY TRADE ACTIVITY

Katarzyna Czech, Adam Waszkowski
Warsaw University of Life Sciences – SGGW

Abstract. Recently, the yen carry trade is perceived to be one of the most widely used currency speculation strategy. The aim of the paper is to examine the relationship between the yen carry trade activity and the related variables. The study is focused on the Japanese and U.S. financial variables. It is assumed that carry trade activity is affected by the interest rate differential between U.S. and Japan, JPY/USD exchange rate and the S&P 500 option implied volatility index (VIX). The paper investigates above relationship by the structural vector autoregression (SVAR) model. The results suggest that JPY/USD exchange rate is the only variable which has a significant impact on carry trade activity. It is shown that the depreciation of Japanese yen against U.S. dollar leads to the increase in yen carry trade activity.

Key words: carry trade strategy, JPY/USD exchange rate, SVAR, Granger causality

INTRODUCTION

Market evidence suggests that carry trades are the most widely used currency speculation strategy [Galati and Melvin 2004]. The strategy is based on borrowing in currency with a relatively low interest rate and using the funds to invest in high interest rate currencies [Fong 2010]. Carry trades are profitable if the interest rate differential is not completely offset by the change in the value of exchange rate. Thus, the profitability of carry trade directly violates the uncovered interest rate parity (UIP) condition. Moreover, an increase in carry trade activity tends to weaken the low interest-yielding currency and strengthen the high interest rate currencies, which is also contrary to the UIP predictions.

Corresponding authors – Adres do korespondencji: Katarzyna Czech, Adam Waszkowski, Warsaw University of Life Sciences – SGGW, Faculty of Economic Sciences, 166 Nowoursynowska St., 02-787 Warsaw, Poland, e-mail: katarzyna_czech@sggw.pl, adam_waszkowski@sggw.pl.

The paper investigates the relationship between carry trade activity and the related financial variables. The study is focused on the Japanese and U.S. financial variables. It needs to be stressed that Japanese yen is one of the most popular funding currency in carry trades because of prolonged low interest rate policy of the Bank of Japan [Gagnon and Chaboud 2007]. The yen carry trade activity is measured by net open positions of non-commercial traders in the Japanese currency FX futures. Non-commercial traders are classified by Commodity Futures Trading Commission as those who use futures not for hedging but for speculative purposes. It is worth to emphasize that there is some imperfect classification of commercial and non-commercial traders. Besides, there is possibility that some commercial traders also take speculative positions or non-commercial traders, identified as speculative, may not result from carry trade. Moreover, much of the liquidity in the currency market is in the over-the-counter forward market. Subject to these caveats, however, these data are the best publicly available data which reflect the carry trade activity [McGuire and Upper 2007].

In the paper we assume that carry trade activity is affected by the interest rate differential between U.S. and Japan, JPY/USD exchange rate and the S&P 500 option implied volatility index (VIX). With regard to the relationship between the interest rate differential and carry trade activity, a larger differential seems to be associated with the increase of carry trade activity. It concerns mainly the level of interest rates in Japan. Tightening monetary policy by the Bank of Japan may imply that the investors will borrow less money in Japan and invest less elsewhere. The second factor that can have an impact on the carry trade activity is the level of exchange rate. It is commonly believed that the Japanese yen depreciation brings about the growth in carry trade activity. Therefore, we can expect that the higher the JPY/USD exchange rate, the higher the yen carry trade activity is supposed to be. As far as the VIX is concerned, we can assume that the higher the level of the S&P 500 option implied volatility index the lower the carry trade activity. VIX is perceived as the popular measure of investors' attitude towards risk [Coudert and Gex 2008]. The greater the value of VIX, the higher the risk aversion among the market participants. The increase in VIX tends to be associated with appreciation of the low yielding currency and a lower carry trade returns [Clarida, Davis and Pedersen 2009]. In turn, the lower the carry trade returns, the lower the carry trade activity. It altogether implies the negative relationship between the S&P 500 option implied volatility index and the carry trade activity.

The aim of the paper is to examine the relationship between the yen carry trade activity and the related financial variables. The remainder of the paper is organized as follows. Section 2 reviews the relevant literature. The subsequent one presents the structural vector autoregression methodology and data. The empirical results are described in section 4. The last section provides concluding remarks drawn from the empirical research.

LITERATURE REVIEW

Although the activity of carry trades has been examined in a number of papers recently, we focus mainly on three works that more directly matter to our aims. Similar researches have been conducted by Klitgaard and Weir [2004], Nishigaki [2007] and Mutafoglu [2011]. Klitgaard and Weir [2004] examine the relationship between weekly

net position data on futures traded on Chicago Mercantile Exchange and the level of exchange rates. They have found strong and stable contemporaneous connection between changes in speculators' positions and exchange rate movements of the major currency pairs over a ten-year period. It implies that there may be strong and significant link between carry trade activity and the value of chosen currency.

Both Nishigaki [2007] and Mutafoglu [2011] investigate the relationship between carry trade activity and related financial variables. They both use the net positions of non-commercial traders in the Japanese currency futures as a measure of carry trade activity. Their researches are focused on the U.S. and Japanese financial markets and cover the period from January 1993 to January 2007. Although, Nishigaki and Mutafoglu conduct similar researches, they obtain different results. Nishigaki [2007] observes that the interest rate differential between the U.S. and Japan insignificantly affects the yen carry trade activity. Moreover, he discovers that U.S. stock prices have a positive impact on the movement of the yen carry trade. And last but not least, he finds that the carry trade activity significantly affects the nominal JPY/USD exchange rate. Mutafoglu [2011], in turn, observes the significant impact of the JPY/USD exchange rate on the yen carry trade activity. He finds that when the Japanese yen depreciates against U.S. dollar, the yen carry trade increases.

According to Mutafoglu, the results obtained by Nishigaki are not robust. Nishigaki uses monthly positioning data of non-commercial traders in currency futures. Mutafoglu, however, applies weekly positioning data to the same methodology and sample period and he has obtained completely different results. Mutafoglu claims that aggregating data from higher to lower frequencies may imply some risk and cause the lack of robustness. Temporal aggregation loses information about the underlying data processes [Marcellion 1999]. Therefore, the application of weekly positioning data to the study of relationship between carry trade activity and related financial variables, seems to be more appropriate.

DATA AND METHODOLOGY

The paper examines the relationship between carry trade activity and the related financial variables. We have chosen three variables which are related to yen carry trade. There are interest rate differential (IRD), JPY/USD exchange rate and the S&P 500 option implied volatility index (VIX). The interest rate differential (IRD) reflects the difference between U.S. and Japan 3-month LIBOR interest rates. As a proxy for carry trade activity (CTA) we apply data on the net positions of non-commercial traders on the Japanese yen futures market traded on the Chicago Mercantile Exchange. The data are published in the weekly Commitments of Traders Report released by the U.S. Commodity Futures Trading Commission. The net yen position is measured as a ratio of short to long yen positions. The higher the ratio, the higher the yen carry trade activity. The analysis is carried out on the basis of weekly data from January 1997 to December 2010, with a total of 725 observations. The data are obtained from Reuters Datastream, except CTA which is calculated from the Commitments of Traders reports. All variables apart from IRD are entered into natural logarithms.

The relationship between carry trade activity and the chosen financial variables is examined by a structural vector autoregression (SVAR) model. The assumptions can be summarized in the following equations that link the reduced-form errors to the structural shocks:

$$\begin{bmatrix} e_{IRD} \\ e_{VIX} \\ e_{USD/JPY} \\ e_{CTA} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ g(VIX, IRD) & 1 & 0 & 0 \\ g(JPY/USD, IRD) & g(JPY/USD, VIX) & 1 & 0 \\ g(CTA, IRD) & g(CTA, VIX) & g(CTA, USD/JPY) & 1 \end{bmatrix} \begin{bmatrix} u_{IRD} \\ u_{VIX} \\ u_{USD/JPY} \\ u_{CTA} \end{bmatrix}$$

where e_j are the structural disturbances, u_j represent the residuals in the reduced-form VAR equations, IRD is the interest rate differential between U.S. and Japan and CTA is the carry trade activity ratio.

The IRD is treated as the exogenous to the other variables. Further, the volatility index VIX is assumed to be affected only by shocks to IRD. As far as the JPY/USD is concerned, we assume that the exchange rate depends on both IRD and VIX. The last equation depicts the carry trade activity. CTA is expected to be influenced by shocks to all other variables. The theoretical reasoning of this relationship is included in the introduction part of the paper.

SVAR MODEL – EMPIRICAL RESULTS

The first step before conducting the SVAR analysis is to test the stationarity of each time series. The results of the Augmented Dickey-Fuller (ADF) test are reported in the Table 1.

Table 1. Augmented Dickey-Fuller test
Tabela 1. Rozszerzony test Dickey-Fullera

	Intercept		Intercept and Trend	
	Level	**First Difference**	**Level**	**First Difference**
IRD	–0.67	–13.60***	–1.31	–13.60***
VIX	–3.43**	–33.76***	–3.47**	–33.74***
USDJPY	–0.79	–26.66***	–2.21	–26.68***
CTA	–6.42***	–18.27***	–6.42***	–18.26***

Note: *** H_0 of a unit root is rejected at the 1%, **5%, and *10% significance level.

Source: Own calculations.
Źródło: Opracowanie własne.

The Augmented Dickey-Fuller test is applied to the level and first difference. The ADF tests indicate that the hypothesis of a non-stationary level cannot be rejected at the 1% significance level for any of the series except CTA. The results for the first difference, however, show that the null hypothesis of a unit root is rejected. Consequently, all variables apart from CTA, are integrated of order one.

The optimal lag length of the VAR estimation is determined on the basis of the Akaike information criterion (AIC) and Schwarz criterion (SC) and the residuals are tested for autocorrelation. Both tests suggest a lag of the second order. The Lagrange multiplier test suggests that the residuals are not serially correlated. The LM statistics for 2 lags is equal 16.47 and the corresponding *p*-value equals 0.42. Therefore, on the basis of the following results we cannot reject the null hypothesis that there is no serial correlation in the residuals. Moreover, the estimated model is stable. It results from the AR Roots graph (Fig. 1). All of the roots have modulus less than one and lie inside the unit circle.

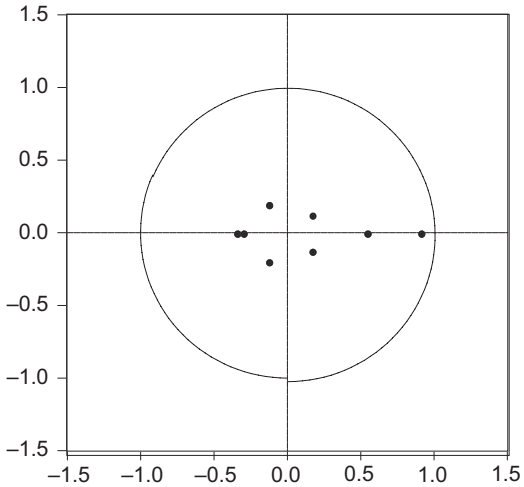

Fig. 1. Stability of the model – graphical representation of root
Rys. 1. Stabilność modelu – pierwiastki równania charakterystycznego
Source: Own calculations.
Źródło: Opracowanie własne.

The study of the relationship between carry trade activity and related financial variables is based on the impulse response functions, variance decompositions and VAR Granger causality test. An impulse response function traces the effect of shock to one endogenous variable on the other variables in SVAR model. The shocks underlying the impulse responses are based on a Choleski decomposition with the ordering IRD, VIX, USDJPY and CTA. The impulse response functions play the central role in assessing how and to what extent structural shocks influence carry trade activity (CTA). Figure 2 displays the estimated responses of CTA to particular structural shock on all analysis variables over a 20-weeks period range and contains ±2 standard error bands. The results suggest that a one-standard deviation shock to the JPY/USD exchange rate is associated with the increase in yen carry trade activity (CTA). It means that when the Japanese yen depreciates against U.S. dollar then the CTA increases. Therefore, we can expect that the higher the JPY/USD exchange rate, the higher the yen carry trade activity is supposed to be. None of the other variables have a significant impact on the level of speculative yen carry trade activity.

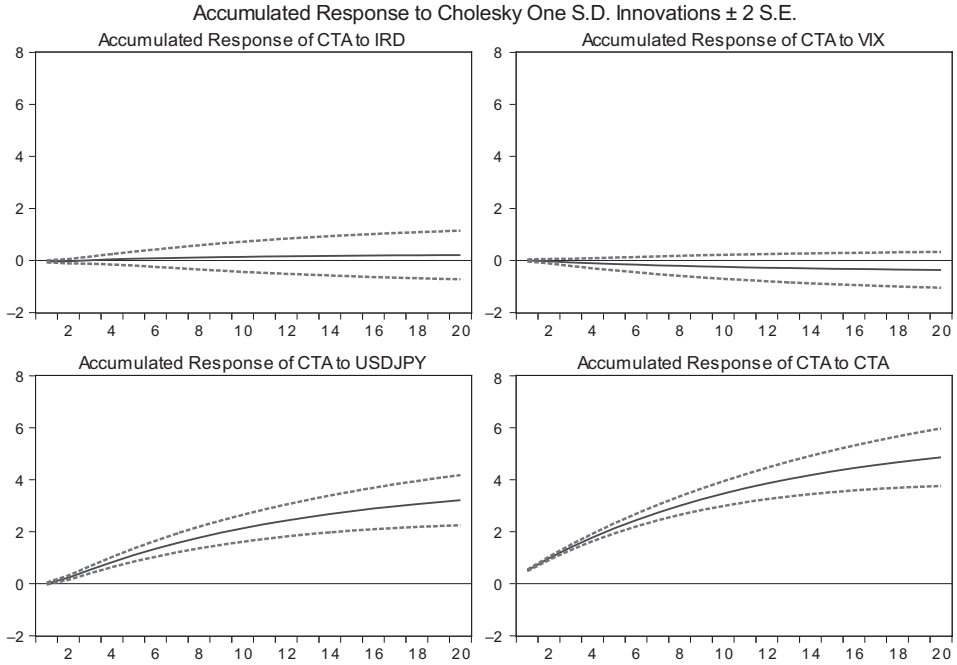

Fig. 2. Impulse responses of CTA to a shock on IRD, VIX and USDJPY variables
Rys. 2. Wykres funkcji reakcji na impuls dla CTA na szok IRD, VIX i USDJPY

Source: Own calculations.
Źródło: Opracowanie własne.

As far as the variance decomposition analysis is concerned it provides the information about the relative importance of each random shock to one endogenous variable in affecting the other variable. Table 2 reports the estimated variance decompositions of carry trade activity variable (CTA).

The variance decomposition of CTA suggests that shocks in JPY/USD exchange rate explain about 26.09% of the variance in CTA six weeks after a shock. Moreover, the explanatory power of shocks to JPY/USD increases to almost 30% after twenty weeks. The outcomes of variance decompositions analysis are consistent with the results from impulse responses functions analysis.

Table 2. Variance decompositions of CTA
Tabela 2. Dekompozycja wariancji zmiennej CTA

Period	S.E.	IRD	VIX	JPY/USD	CTA
1	0.51	0.58	0.00	0.00	99.42
6	1.18	0.38	0.41	26.09	73.12
12	1.39	0.32	0.41	29.17	70.10
20	1.47	0.30	0.41	29.96	69.33

Note: S.E. is the estimated standard error.

Source: Own calculations.
Źródło: Opracowanie własne.

Finally, we perform the Granger causality test, which indicates whether the lagged independent variables affect a particular dependent variable. In our analysis the dependent variable is the carry trade activity (CTA). We arrange the data in the order IRD, VIX, JPY/USD and CTA. The results of the test are provided in Table 3.

Table 3. VAR Granger causality test (*p*-values)
Tabela 3. Test przyczynowości w sensie Grangera (wartości *p*-value)

Independent variable	Chi-square test statistic	df	*p*-value
IRD	0.75	2	0.69
VIX	0.65	2	0.72
JPY/USD	166.88	2	0.00

Note: Carry trade activity (CTA) – dependent variable.

Source: Own calculations.
Źródło: Opracowanie własne.

According to the results of Granger causality test the changes in JPY/USD exchange rate significantly Granger-causes the speculative carry trade activity. None of the other variables have any causal effect on the yen carry trade. Therefore, the carry trade activity is affected mainly by the changes in dollar against yen exchange rate. The obtained results are in line with the outcomes of impulse response functions and variance decompositions analysis.

CONCLUSIONS

The aim of the paper is to examine the relationship between the yen carry trade activity and the related financial variables. The study is focused on the Japanese and U.S. financial markets. The paper assumes that carry trade activity is affected by the interest rate differential between U.S. and Japan, JPY/USD exchange rate and the S&P 500 option implied volatility index (VIX). The results of SVAR analysis suggest that JPY/USD exchange rate is the only variable which has a significant impact on carry trade activity. It is shown that the depreciation of Japanese yen against U.S. dollar leads to the increase in yen carry trade activity. The outcomes of impulse response functions analysis, variance decompositions analysis and Granger causality test confirm the findings. Above conclusions are in line with the results obtained by Mutafoglu [2011].

The most surprising research result is that the interest rate differential between U.S. and Japan does not significantly affect the yen carry trade activity. It implies that interest rate differential does not play a crucial role in assessing the attractiveness of carry trade strategy. Investors are likely to pay more attention to the level of exchange rates than to interest rate differentials. It needs to be emphasized, however, that the outcomes concern the interest rate differential and exchange rate of U.S. and Japan. There is high possibility that the results will differ dramatically when we take into account country with higher interest rates than the U.S. Hence, an interesting issue for future research would be to replicate the SVAR analysis based on the JPY/AUD, JPY/NZD or JPY/TRY exchange rates and the corresponding interest rate differential. Australian dollar, New Zealand dollar and

Turkish lira are becoming more and more popular as a targeting currency in carry trade strategy. The role of U.S. dollar as a targeting currency, however, has been reduced after the financial crisis of 21st century.

REFERENCES

Clarida R., Davis J., Pedersen N., 2009. Currency carry trade regimes: Beyond the Fama regression. Journal of International Money and Finance 28, 1375–1389.

Coudert V., Gex M., 2008. Does risk aversion drive financial crisis? Testing the predictive power of empirical indicators. Journal of Empirical Finance 15 (2), 167–184.

Fong W.M., 2010. A stochastic dominance analysis of yen carry trades. Journal of Banking & Finance 34, 1237–1246.

Gagnon J.E., Chaboud A.P., 2007. What can the data tell us about carry trades in Japanese Yen? International Finance Discussion Papers 899, 2.

Galati G., Melvin M., 2004. Why has FX Trading Surged? Explaining the 2004 Triennial Survey. BIS Quarterly Review, December, 67–74.

Klitgaard T., Weir L., 2004. Exchange Rate Changes and Net Positions of Speculators in the Futures Market. Federal Reserve Bank of New York Economic Policy Review, May, 17–28.

Marcellion M., 1999. Some Consequences of Temporal Aggregation in Empirical Analysis. Journal of Business and Economic Statistics 17 (1), 129–136.

McGuire P., Upper C., 2007. Detecting FX carry trades. BIS Quarterly Review, March, 8–9.

Mutafoglu T.H., 2011. A Note on Carry Trade and the Related Financial Variables. International Journal of Economics and Finance 3 (3), 91–96.

Nishigaki H., 2007. Relationship between the yen carry trade and the related financial variables. Economics Bulletin 13 (2), 1–7.

FINANSOWE DETERMINANTY POZIOMU ZAANGAŻOWANIA INWESTORÓW W STRATEGIĘ SPEKULACYJNĄ „CARRY TRADE"

Streszczenie. W ostatnich latach zauważalny jest znaczny wzrost zainteresowania walutową strategią spekulacyjną „carry trade". Celem artykułu jest identyfikacja zależności między poziomem zaangażowania inwestorów w strategię „carry trade" a wybranymi zmiennymi finansowymi. Badania oparto na analizie zmiennych powiązanych z gospodarką Japonii i Stanów Zjednoczonych Ameryki Północnej. W artykule założono, że atrakcyjność strategii „carry trade" zależna jest od różnicy w poziomie stóp procentowych w USA i Japonii, poziomu kursu walutowego JPY/USD i wskaźnika implikowanej zmienność opcji na indeks S&P 500 (VIX). Powyższa relacja została zbadana na podstawie strukturalnego modelu wektorowej autoregresji. W artykule wykazano, że jedyną zmienną mającą istotny wpływ na poziom zaangażowania inwestorów w strategię „carry trade" jest kurs walutowy JPY/USD. Deprecjacja jena japońskiego względem dolara amerykańskiego przyczynia się bowiem do wzrostu zainteresowania spekulacyjną strategią walutową „carry trade".

Słowa kluczowe: strategia spekulacyjna „carry trade", kurs walutowy JPY/USD, SVAR, przyczynowość Grangera

Accepted for print – Zaakceptowano do druku: 22.11.2012

ACTA SCIENTIARUM POLONORUM *Oeconomia 11 (4) 2012, 23–34*

MARKETING ANALYSIS OF THE REVENUE IMPACT ON THE SLOVAK HOUSEHOLDS DEMAND FOR MEAT AND MEAT PRODUCTS

Ľubica Kubicová, Zdenka Kádeková, Patrik Rovný
Slovak University of Agriculture in Nitra

Abstract. The paper deals with development in nominal incomes and household expenditures for food and their share in total expenditures from the perspective of various social groups of households in Slovakia. There are analyzed the changing patterns in the structure of demand for meat prices and the impact on total expenditure on meat and meat products in the households of employees, households of self-employed persons and households of pensioners. During examining the sensitivity of demand to changes in consumer meat prices in different social groups of households own-price elasticity of demand was estimated, as well as cross-price elasticity.

Key words: income and expenses for food, own-price, income and cross-price elasticity of demand, households of employees, self-employed person and pensioners

INTRODUCTION

The consumer market is created by final consumers, individuals and households as specific social groups, that buy products for their personal use. Everyday consumer purchase decisions are made influenced by marketing stimuli.

Marketers and commercial production companies have to be interested in buying behavior and consumer decision-making and thus analyze the consumer demand. Examination of consumer behavior is important precisely because the factors on which this behavior depends are constantly changing and it is important to know about current consumer needs and wishes. The consumer is a unique person with his or her own opinion and this should be considered by each company or production unit wanting to attract and retain the customers by respecting their needs and adapting to its.

Corresponding authors – Adres do korespondencji: Slovak University of Agriculture in Nitra, Faculty of Economics and Management, Department of Marketing, Tr. A. Hlinku 2, 949 76 Nitra, Slovak Republic, e-mail: Lubica.Kubicova@uniag.sk, zdenka_kadekova@yahoo.com, patrik_rovny@yahoo.com.

Customer response depends on many factors, which include age, education, interests, attitudes, lifestyle, family etc. In addition to marketing stimuli consumer is influenced by many other incentives, based on surrounding environment. These are factors such as economics, culture, technology and politics. Food consumption refers to each inhabitant and reflects the overall standard of living [Kubicova 2008a, 2008b].

Changing social and economic conditions induce differentiation in the behavior of individual households on the consumer market, which is influenced by household income and by changes in the price development of goods and services. Downward trend is in the average size of households and growing pluralism of the various forms of coexistence. The share of single person households and proportion of retired citizens households are rising. Increasing is also the share of households of single-parent families.

MATERIAL AND METHODS

The aim of the paper is an analysis of the on the meat and meat products consumption and identification of differences in demand and household expenditures in Slovakia. Commodity meat has its substitutes, which allow the consumer to respond and exploit price changes of individual kinds of meat to meet their nutritional needs. In terms of economic status of head of household and his employment and consequent income, we focused on the demand for beef, pork and poultry meat and poultry products in the households of employees, households of self-employed persons and households of old-age pensioners. The grounds for such an analysis were drawn from the officially published results of family accounts by Statistical Office representing so-called panel data, which includes time and cross-sectional component. This means that several objects are observed in time t (t = 1, 2, 3, ..., T) and cross-sectional component (household) is observed within the household (k = 1, 2, 3, ..., N). In 2011, surveyed incomes of private households at random for a total of 4705 households of which 2285 were the households of employees, 545 households of self-employed persons, 1447 households of pensioners and 428 other households (unemployed, students etc.). The analysis focuses on the income and expenditure referred to social groups and household consumption of beef, pork and poultry production and consumer prices of these products.

In examining the development of inter-annual changes in the values of monitored indicators extensive (q_i) and intensive variables (p_i) were used relative characteristics and time series analysis.

$$\text{Chain index} \quad k_i = \frac{q_i}{q_{i-1}} \quad \text{or} \quad k_i = \frac{p_i}{p_{i-1}} \quad \text{in years} \quad i = 2, 3, ..., \text{T} \tag{1}$$

$$\text{The average coefficient of the growth} \quad k' = \sqrt{k_1 \cdot k_2 \cdot ... k_i ... \cdot k_T} \tag{2}$$

In order to determine what is the part in a change in annual expenditure on meat and meat products accounted for changes in prices of meat (p_i) per kg and their contribution in changes in quantity of consumed meat (q_i), we have used decomposition of extensive values index q_1

$$I = \frac{\sum q_1 p_1}{\sum q_0 p_0} = \frac{\sum q_1 p_1}{\sum q_0 p_1} \cdot \frac{\sum q_0 p_1}{\sum q_0 p_0} \tag{3}$$

where: q_1 – meat consumption in the current period, in kg per person per year;
q_0 – meat consumption in the base period, in kg per person per year;
p_1 – meat prices in the current period, in EUR per kg;
p_0 – meat prices in the base period, in EUR per kg.

For the empirical analysis of the relationship and dependency of demand and consumption of individual kinds of meat and meat products on the net cash income and consumer price of meat and elasticity response of the household social group to these changes the linear model of demand function has been used:

$$q_i = f\left(p_1, p_2, p_3, CPP\right) + u_i \tag{4}$$

where: q_i – consumption of individual meats, in kg per person per year;
p_i – price of the *i*-th kind of meat, in EUR per kg;
p_1 – price of beef, in EUR per kg;
p_2 – price of pork, in EUR per kg;
p_3 – price of poultry and poultry products, in EUR per kg;
CPP – net cash income, per person per year;
u_i – random – residual component.

In marketing decisions, it is useful to know the degree of sensitivity – elasticity of consumer demand to changes in product prices and other relevant factors and substitution relations. Based on the linear regression model of the demand function, we have determined from the relation:

Own-price elasticity of demand for meat (q)

$$Eq_i, p_i = \frac{\partial q}{\partial p_i} \cdot \frac{p_i}{q_i} = b_i \left(\frac{p_i}{q_i}\right) \tag{5}$$

Cross-price elasticity of demand for meat (q_i)

$$Eq_i, p_j = \frac{\partial q}{\partial p_j} \cdot \frac{p_j}{q_i} = b_j \left(\frac{p_j}{q_i}\right) \tag{6}$$

Income elasticity of demand for meat

$$Eq_i = \frac{\partial q_i}{\partial I} = \frac{I}{q_i} = b_i \left(\frac{I}{q_i}\right) \tag{7}$$

where: q_i – *i*-th consumption of meat, in kg per person per year;
p_j – *i*-th price of meat, in EUR per kg;
p_j – price of substitute q_j, in EUR per kg;
I – net cash income of households in social groups, in EUR per person per year.

RESULTS

Incomes and Expenditures

According to macroeconomic theory, consumption depends on disposable income. When disposable income grows, the households are willing to increase their consumption. Consumer decisions connected with demand for food is greatly influenced by the purchasing power of the population, which is determined by development of net cash income. Household income sources and their structure are determined by their social position particularly in the labor market. Breakdown of households in social groups is shown and evaluated by the official statistics on the basis of economic status of the head of household in employment. According this could be distinguished households of employees, self-employed (owner), households of pensioners and others (unemployed, students etc.) [Simo and Rovny 2010].

It can be noted that the highest income group in the net income zone per household member is found (except the year 2009) in the households of self-employed. With lower average annual income is presented a group of households of employees, which is closely followed by a group of households of old-age pensioners. Hidden remains the income from economic activities of pensioners as a result, some of these households in terms of income ranks over society-wide average.

Development of households cash income shows an upward trend (Table 1), which for the spotted period increased by 6.2%. From the perspective of different social groups, the highest average annual revenue growth (6.6%) was recorded in old-age pensioners households. Lower (4.4%) average annual growth was recorded in the income in the households of self-employed. Development of cash expenditure in the average Slovak

Table 1. Net cash incomes, cash expenses and expenses for food and soft drinks per household member in 2005, 2007, 2009–2011

Tabela 1. Przychody gotówkowe netto, wydatki gotówkowe oraz wydatki na żywność i napoje bezalkoholowe w przeliczeniu na członka gospodarstwa domowego w latach 2005, 2007, 2009–2011

Households	Indicator	Year					
		2005	2007	2009	2010	2011	k'
Employees	Net cash incomes (EUR)	3099.2	3913.1	4295.6	4338.1	4456.1	1.062
	Net cash expenses (EUR)	2984.5	3754.3	3730.9	3818.9	3936.5	1.047
	Expenses for food and soft drinks (%)	22.80	20.70	20.20	20.20	20.45	×
Self-employed	Net cash incomes (EUR)	3429.9	4158.3	4142.2	4419.3	4451.5	1.044
	Net cash expenses (EUR)	3211.0	3793.9	3682.8	3782.8	3910.8	1.033
	Expenses for food and soft drinks (%)	21.10	20.10	20.00	21.10	19.74	×
Pensioners	Net cash incomes (EUR)	3080.0	3743.8	4357.5	4467.6	4526.8	1.066
	Net cash expenses (EUR)	3097.6	3550.9	3674.1	3933.5	3984.9	1.043
	Expenses for food and soft drinks (%)	29.40	27.30	26.70	26.70	26.20	×

Source: Own calculations based on Statistical Office of the Slovak Republic [2010].
Źródło: Obliczenia własne na podstawie danych Urzędu Statystycznego Republiki Słowackiej [2010].

households also shows an upward trend and total household expenditure in total increased by 4.1% and the highest growth by 4.3% was in the households of pensioners, while the average annual expenditure growth in the households of self-employed was 3.3%.

Development of expenditures on food items indicates the change in the structure of expenditures and has a declining trend. The highest share of food expenditures in the structure of consumption expenditures was recorded in the households of pensioners, which declined from 30.6% (year 2004) to 26.2% in 2011 [Recky and Dobak 2011]. Expenditures on food in the households of pensioners are by 6.5% higher than those paid by households of employees and households of self-employed persons. Similar developments can be observed in the Czech Republic. As stated by Sekavova [2010] households of pensioners in 2008 in the Czech Republic spent on food and non-alcoholic beverages 26.1%, while the families of employees and self-employed only 18.6%, respectively 18.7%.

MARKETING ANALYSIS OF DEMAND FOR MEAT AND MEAT PRODUCTS

Meat and meat products are most often discussed and analyzed food home as well as abroad [Gulbicka and Kwasek 2006, Thiele 2008]. Production costs and consumer prices of meat are relatively high and the meat consumption is used as a criterion for measuring standard of living. In human nutrition meat is a source of many essential nutrients (full-fledged proteins, vitamins and minerals), although the high consumption of meat is criticized by the health professionals for its high fat content, the predominant-saturated fatty acids, cholesterol and purine substances. The production process of meat is relatively long (especially beef carcass) and requires a thoughtful response to changes in producer and market requirements. Knowing the price of not only producers and processors, but most consumer prices is important information for market participants with meat and meat products [Kleinova and Kretter 2010].

Meat consumption in Slovakia is from 1989 and 1990, when it was probably the highest (84 kg per capita per year), gradually decreasing. Since 1995, annual average consumption fell by 0.7% to 53.7 kilograms per capita in 2011. The largest drop in consumption is reflected in beef and veal by 6.7%, while consumption of poultry and poultry meat has increased annually by 2.8% to 18.6 kg per capita (2011) and substituted the decrease in consumption of beef and veal in the lower extent also the decline in consumption of pork. In the structure of Slovak household consumption dominated consumption of pork (57.2%), poultry and poultry meat (34.2%).

In comparison, in Austria, there was the total consumption of 98.4 kilograms meat per capita, the share of poultry was 19.6% (19.3 kg), the share of pork meat was 57.3% (56.4 kg) and the proportion of beef 18.7% (18.4 kg), the substitution in consumption of beef meat by poultry meat was lower.

Poultry significantly enriched the menu of consumers and offers a broad view of the track (chickens, hens, turkey, guinea fowl, geese, ducks). Appreciable is also a short manufacturing process of poultry used for the slaughter and consumption [Nagyova et al. 2011]. In terms of demand for meat and meat products in various social groups of households and their disposable income, the highest proportion in the structure of food expenditure, excluding expenditure on bread (17.56 to 20.9%) in 2011 was spent on pork

by pensioners 7.59% and 6.72% by employees. Second in order of consumption the expenditures on poultry meat were 7.06% in the households of pensioners and 7.01% in the households of employees (Table 2).

Table 2. Structure of expenditures on selected food of the total food expenditures per person per year (%) in 2004 and 2011

Tabela 2. Udział wydatków na wybrane produkty żywnościowe w wydatkach na żywność ogółem na osobę rocznie (%) w latach 2004 i 2011

Food	Structure of expenditures in total food expenditures per person (%) per year					
	Employees		Self-employed		Pensioners	
	2004	2011	2004	2011	2004	2011
Bread and cereals	19.13	20.55	17.54	20.98	17.64	19.22
Beef including veal	1.99	1.37	2.37	2.08	2.03	1.69
Pork	7.19	6.72	7.82	5.79	8.21	7.59
Poultry and poultry products	7.49	7.06	7.49	7.12	7.91	7.01

Source: Own calculations based on Statistical Office of the Slovak Republic database [2010].
Źródło: Obliczenia własne na podstawie danych Urzędu Statystycznego Republiki Słowackiej [2010].

Other food expenditures like the expenditures on milk and milk products, vegetables, fruits, beverages occupy the structure of expenditure on food in less than 6% share. On the basis of decomposition of binary index of compounded extensive values (3) and spending time series analysis is shown that the average annual amount of cash outflows in a subset of the commodity beef and veal were affected the most by prices (p_i), which in all social groups of households increased annually (except in 2009 for pensioners) by around 3%. The rise in prices of beef, at a given income, reflected the fall in demand and consumption of meat (q_i). The decrease in consumption, expressed by an average annual growth coefficient (k'), was the most significant 4.8% in the households of self-employed ($k' = 0.952$) and 6.3% in the households of employees ($k' = 0.921$). Market forces and developments in food prices, goods and services were reflected in consumer preferences. Households of pensioners, who have more free time to watch the price offers of goods and services, were reflected in a higher overall average consumption of meat and meat products (Table 3) at a lower price level. Families of pensioners increase using of discount sales, discounts and different tools of communication mix.

Table 3. Average consumption (kg per capita) and average consumer prices (EUR) of selected food for 2004–2011

Tabela 3. Przeciętna konsumpcja (kg per capita) i przeciętne ceny konsumenta (euro) wybranych produktów żywnościowych w latach 2004–2011

Food	Employees		Self-employed		Pensioners	
	Consumption (kg per capita)	Price (EUR)	Consumption (kg per capita)	Price (EUR)	Consumption (kg per capita)	Price (EUR)
Beef including veal	2.222	4.84	2.695	4.99	3.681	4.59
Pork	12.673	3.79	12.502	3.81	19.376	3,64
Poultry and poultry products	17.885	2.76	17.458	2.83	26.433	2.52

Source: Own calculations based on Statistical Office of the Slovak Republic database [2010].
Źródło: Obliczenia własne na podstawie danych Urzędu Statystycznego Republiki Słowackiej [2010].

Results of decomposition of binary index of aggregated extensive value of demand for beef (Table 4) shown that spending had increased in two of the six experimental years, when the summary index in households of employees and in the households of self-employed in 2007, 2008 and 2010 was higher than one. The increase in expenditure was due to the change in beef consumption q_i, as well as due to the annual growth in unit prices of meat p_i.

Table 4. Aggregated expenditure index of changes for beef due to the consumed amount (q_i/q_{i-1}) and the influence of changes in prices (p_i/p_{i-1}) in the households of particular social groups in 2004–2011

Tabela 4. Zagregowany indeks zmian wydatków na mięso wołowe ze względu na ilość skonsumowaną (q_i/q_{i-1}) oraz wpływ zmian cen (p_i/p_{i-1}) w gospodarstwach domowych poszczególnych grup społecznych w latach 2004–2011

Year	Employees			Self-employed			Pensioners		
	Influence		Expenditure Index	Influence		Expenditure Index	Influence		Expenditure Index
	Amount	Price		Amount	Price		Amount	Price	
2004	×	×	×	×	×	×	×	×	×
2005	0.8241	1.0491	0.8645	0.6649	1.1121	0.7395	1.0234	1.0356	1.0598
2006	0.9231	1.0668	0.9848	1.0403	0.9897	0.9514	0.8101	1.0668	0.8642
2007	1.0463	1.0084	1.0550	1.0543	1.0229	1.0784	1.0028	1.0403	1.0432
2008	0.9735	1.0331	1.0057	1.0110	1.0366	1.0480	0.7111	1.0495	0.7463
2009	0.8773	1.0020	0.8791	0.7382	1.0039	0.7411	0.9935	0.9754	0.9691
2010	1.0674	0.9901	1.0567	1.2956	1.0371	1.3436	0.9995	1.0105	1.0099
2011	0.8932	1.0879	0.9717	1.0038	1.0321	1.0359	0.9292	1.0231	0.9504

Source: Own calculations.
Źródło: Obliczenia własne.

Favorable development of expenditures can be seen in the demand for pork and poultry (Table 5 and Table 6).

Table 5. Aggregated expenditure index of changes for pork due to the consumed amount (q_i/q_{i-1}) and the influence of changes in prices (p_i/p_{i-1}) in the households of particular social groups in 2004–2011

Tabela 5. Zagregowany indeks zmian wydatków na mięso wieprzowe ze względu na ilość skonsumowaną (q_i/q_{i-1}) oraz wpływ zmian cen (p_i/p_{i-1}) w gospodarstwach domowych poszczególnych grup społecznych w latach 2004–2011

Year	Employees			Self-employed			Pensioners		
	Influence		Expenditure Index	Influence		Expenditure Index	Influence		Expenditure Index
	Amount	Price		Amount	Price		Amount	Price	
2004	×	×	×	×	×	×	×	×	×
2005	0.9921	1.0266	1.0185	0.7917	1.0469	0.8288	1.0400	0.9843	1.0237
2006	0.9864	1.0414	1.0273	0.9495	1.0429	0.9897	0.9723	0.9947	0.9671
2007	1.0679	0.9353	0.9988	1.1945	0.8974	1.0719	1.0952	0.9653	1.0572
2008	0.9485	1.0558	1.0015	1.1390	1.0372	1.8140	0.9770	1.0497	1.0256
2009	0.9967	0.9345	0.9314	0.9520	0.9179	0.8738	0.9872	0.9368	0.9248
2010	1.0494	0.9622	1.0097	1.0593	0.9637	1.0209	0.9991	0.9522	0.9513
2011	1.0353	1.0314	1.0678	0.7876	1.0768	0.8481	1.0597	1.0103	1.0706

Source: Own calculations.
Źródło: Opracowanie własne.

Table 6. Aggregated expenditure index of changes for poultry due to the consumed amount (q_i/q_{i-1}) and the influence of changes in prices (p_i/p_{i-1}) in the households of particular social groups in 2004–2011

Tabela 6. Zagregowany indeks zmian wydatków na mięso drobiowe ze względu na ilość skonsumowaną (q_i/q_{i-1}) oraz wpływ zmian cen (p_i/p_{i-1}) w gospodarstwach domowych poszczególnych grup społecznych w latach 2004–2011

Year	Employees			Self-employed			Pensioners		
	Influence		Expenditure	Influence		Expenditure	Influence		Expenditure
	Amount	Price	Index	Amount	Price	Index	Amount	Price	Index
2004	×	×	×	×	×	×	×	×	×
2005	1.0152	1.0038	1.0191	0.9754	1.0072	0.9825	1.0461	0.9759	1.0209
2006	0.9920	0.9401	0.9326	0.9540	0.9065	0.8648	0.9626	0.9547	0.9190
2007	0.9581	1.0956	1.0497	0.9633	1.1267	1.0856	0.9451	1.0733	1.0144
2008	0.9882	1.0909	1.0780	1.0614	1.0775	1.1436	0.9818	1.0803	1.0606
2009	0.9563	0.9367	0.8957	0.9551	0.9183	0.8771	1.0335	0.9554	0.9874
2010	1.0487	0.9644	1.0114	1.0388	0.9893	1.0277	0.0229	0.9689	0.9811
2011	1.0334	1.0911	1.0948	0.9055	1.1129	1.0078	0.9160	1.0911	0.9991

Source: Own calculations.
Źródło: Opracowanie własne.

Decomposition of binary index of aggregated extensive value (Tables 4, 5 and 6) indicates that although year on year rising expenditures on these commodities in two respectively three years was maintained the constant level of consumption and expenditures for pork and poultry. Average consumption growth rates are just below 1 ($k' = 0.98$ to 0.99) and almost identical was the evolution of changes in unit prices of the meat (p_i) ($k' = 0.881$ and 1.016). These changes in expenditures suggest relatively consistent behavior of particular social groups of households, in terms of spending money on pork and poultry, as well as the poultry products. From the questionnaire survey (Hes et al. 2009) is proven the Slovak consumer feedback on the overall level of prices of meat and poultry products is proved that 59.12% of respondents considered the price reasonable for the Slovak market and 21.9% of respondents assessed the prices as really high. Most respondents (79.56%) indicated that the increasing price of poultry meat would not change their purchasing behavior, 20.43% of respondents would change its demand for poultry meat when the price had grown and 19.34% would reduce the volume of purchased quantity of these products.

Income and Price Elasticity of Demand for Different Types of Meat by Different Social Groups of Households

For the empirical assessment of addiction and response of consumer demand for different types of meat analyzed by disposable income and price trends for individual types of meat a linear model of demand function was used.

The results of the analysis of demand for individual kinds of meat observed in the particular social groups of households showed that the meat is the standard good, and in 2011 took up the largest share of 26.1% in the structure of consumption expenditure. In old-age pensioners' households was share the highest one (26.8%) amounted to €254.47

per person. In 2011 in the households of employees and households of self-employed was the average expenditure amounted to €186.3, respectively €174.7, that represented 25.7 to 26.76% of total food expenditures. This led also to the response of demand in particular households to convert their own prices for individual kinds of meat, depending on income.

As can be seen in Table 7, the households react on demand for different types of meat on its own conversion price of meat differently. Meat consumption has a negative slope, decreases when the price grows and vice versa. Households responded to consumption, especially beef price elastic and the households of self-employment reacted by this way also on the consumption of poultry and poultry products. When increasing its own price for beef and veal, 1% of the households of self-employed responded by reducing demand by 5.11% (while the average consumption was 2.69 per kg and the price was €4.96 per kg).

Table 7. Estimated parameters of demand functions of price and income elasticities of demand for different types of meat in households

Tabela 7. Oszacowane parametry popytowych funkcji cenowej i dochodowej elastyczności popytu dla różnych rodzajów mięsa w gospodarstwach domowych

Meat	Households	Parameter of function			Elasticities		Correlation Index R^2
		b_0	b_1	b_2	Eq_i, p_i	Eq_i, I	
Beef including veal	Employees	9.819	–1.957	0.00047	–3.90	0.759	0.924
	Self-employed	13.917	–3.008	0.00089	–5.11	1.26	0.920
	Pensioners	9.246	–1.239	0.000028	–1.48	–0.027	0.830
Pork	Employees	15.039	–0.563	–0.00008	–0.17	0.023	0.640
	Self-employed	25.276	–3.813	0.00056	–1.17	0.168	0.681
	Pensioners	20.673	–1.225	0.001	–0.239	0.152	0.784
Poultry	Employees	22.849	–0.336	–0.0010	–0.051	–0.217	0.781
	Self-employed	14.888	–3.879	–0.0021	–0.614	–0.456	0.878
	Pensioners	28.021	–3.930	–0.00098	–0.368	–0.131	0.686

Source: Own calculations based on Statistical Office of the Slovak Republic database [2010].
Źródło: Opracowanie własne na podstawie danych Urzędu Statystycznego Republiki Słowackiej [2010].

In the households of employees with the average consumption of 2.22 kg and the average price of meat €4.83 per kg, demand was reduced by 3.9%. Households of pensioner that purchased beef at lower prices (Table 3) and hence lower quality meat responded to transformation of their own price also elastic and at 1% price increase (at a price of €4.59 per kg) the demand decreased on average by 1.48% per annum.

The income elastic demand for beef responded only in the households of self-employed which reported the highest income group in the society of the surveyed groups (Table 1) and 1% increase in income has increased demand on average by 1.26% per annum. Demand for pork and poultry meat was reflected as a cost as well as income inelastic and on the basis of the income elasticity of demand, we classify them affirmative with basic goods [Fendekova and Strieska 2007]. Demand for pork is price elastic only in the households of self-employed and 1% increase in poultry prices caused decrease of

demand by 1.17%. Income slightly elastic and contrary to theoretical assumptions was reflected demand for poultry meat in the households of self-employed, employees and pensioners. Increased income by 1% also decreased demand for poultry meat by 0.131% in the households of pensioners, even bolder in the households of self-employed (E_{qi}, I = –0.456). Higher income level of the households of self-employed allowed the higher consumption of beef and veal, and partly of pork. Through the linear demand function, we analyzed multiple dependence of beef demand (q_1) in relation to consumer prices of beef (p_1), the price of pork (p_2), poultry prices (p_3) and income (p_4).

Based on the linear demand function (Table 8) can be stated that the demand for beef is in households of employees and households of self-employed can be substituted mainly by demand for pork. Growth in pork prices by 1% caused the increase in demand for beef in the households of employees by 0.856% (E_{qi}, p_2 = 0.856) and in the households of self--employed by 0.706%, and are mutually complementary. Demand for poultry and poultry products in these households implemented interchangeable function. In the households of pensioners compared with the other groups in society, replacement function of demand for beef was fulfilled by the increased demand for poultry meat. Households of pensioners responded on 1% increase in prices of poultry meat by increased demand for beef by 0.625% (E_{qi}, p_3 = 0.625). With the increase in the price of one product increases the demand for other product and vice versa. With income growth would increase demand for beef only in the group of pensioners.

Table 8. Estimated parameters of demand functions and substitution of demand for beef and pork in particular social groups of households

Tabela 8. Oszacowane parametry funkcji popytu oraz substytucja popytu na mięso wołowe i wieprzowe w poszczególnych grupach społecznych gospodarstw domowych

Meat	Households	Parameter of function				Elasticities			Correlation Index R^2
		b_1	b_2	b_3	b_4	E_{qi}, p_1	E_{qi}, p_2	E_{qi}, p_3	
Beef including veal	Employees	–0.843	–0.502	1.213	–0.0003	–1.834	–0.856	1.504	0.689
	Self-employed	–1.260	–0.500	1.273	–0.0002	–2.336	–0.706	1.337	0.782
	Pensioners	–1.691	–0.039	0.910	0.0002	–2.108	–0.039	0.625	0.952

Source: Own calculations.
Źródło: Obliczenia własne.

Pensioners in terms of demographic development and thanks to rising standards of living, economic climate and the level of health care, represent one of the fastest growing segments of the population [Hambalkova et al. 2011]. However, they do not form a homogenous group, nor as to the level of pensions, as well as to the structure of consumption expenditures and expenditures on food. They can be divided into at least three groups. To the group of active retirees (go-gos) dedicated to the business, then to the group of pensioners with certain health problems (go-slows) and to the group of pensioners needing constant care and medical care (no-gos) [Kotler 1995]. In the structure of consumption expenditure report (Table 1) the pensioners reached the highest share in expenditures on food and the lowest share of expenditures on catering services in hotels, cafes and restaurants.

CONCLUSIONS

In recent years the Slovakia residents have recorded not only increase of income but also increase of food expenditures. Income growth has been more noticeable in the households of the old-age pensioners, where since 2004 the net cash receipts have increased on average by 8.5% and in the year 2011 reached the level of €4526.8 per person. Lower increase of incomes (6.6%) was in the households of employees and 4.4% increase of incomes was in the households of self-employed. In the households were annually also increasing the expenses on food and soft drinks. The share of expenditure on food and soft drinks in the Slovak households is gradually decreasing. In 2011 the food expenditures in households of pensioners still occupied 26.2%, while in households of employees and self employed persons ranged on the level of 20.2%. In recent years the decline in food spending slows. In the structure of food expenditures in all groups of households the highest part was taken by the expenditures for bread and meat and meat products. Expenditures for this food had decreasing trend except for expenses for bread, which increased in the pattern of spending from 10.8% (year 2004) to 20% in 2011. On the basis of the aggregated index of expenditure changes could be concluded that the increase in annual expenditure on meat and meat products occurred mainly due to rising prices. The price effect was seen in all social groups of households mostly in the growth of expenditures on beef and veal.

Based on the dramatic decrease of this year's crop we have to be ready for the incresing the food prices, as the prices of key food commodities such as the wheat or the corn have already started to grow. Increasing of food prices will cause also increasing in spending on basic foods such as bread, meat, and milk products, however it should not mean a dramatic deterioration in the population standard of living. In the future increasing of the food cost could threaten food quality, because the price factors have an intensive impact on the purchase decisions, which affects more than half of the Slovaks [Horska, Urgeova and Prokeinova 2011].

When mentioning the meat consumption based on the parameters of multiple linear demand function can be reported that in households of employees and self employed persons, the falling demand for more expensive beef and veal is substituted by demand for pork, while demand for poultry and poultry products performs a complementary function [Bielik and Hupkova 2010].

In the observed period the meat consumption decreased. Also the structure of consumption of different kinds of meat was unfavorable and the level of meat consumption in Slovakia significantly lags behind the EU. Based on increase in food prices and stagnating incomes of the population, improvement of this situation can not be expected.

REFERENCES

Bielik P., Hupkova D., 2010. Market relationships in vertical food animal products. SUA Nitra, Nitra, 128.

Fendekova E., Strieska L., 2007. Microeconomics. EKONOM Publishing, Bratislava 256.

Gulbicka B., Kwasek M., 2006. Effect of income on food consumption – food premise of the politics. Agricultural Economics 1, 306.

Hambalkova M., Rovny P., Cepilek B., 2011. System of support of foreign agrarian trade in the Slovak Republic. SUA Nitra, Nitra, 124.
Hes A. et al., 2009. Behavior of consumers when purchasing the food. Alfa Publishing, Prague, 146.
Horska E., Urgeova J., Prokeinova R., 2011. Consumer' food choice and quality perception: Comparative analysis of selected Central European countries. Agricultural Economics Vol. 57, 10, 493–499.
Kleinova K., Kretter A., 2010. Image of the domestic and foreign food on the market in the Slovak republic. SUA Nitra, Nitra, 98.
Kotler P., 1995. Marketing management. Victoria Publishing, Prague, 789.
Krizova S., 2007. Food consumption in relation to household income and expenditure SR. Agricultural Economics, Vol. 4, 6, 44–51.
Kubicova L., 2008a. Development of consumer demand for food. SUA Nitra, Nitra, 85.
Kubicova L., 2008b. Impact on consumer price developments in meat consumption in Slovakia. (in:) Proceedings of the international scientific conference "In the company of competitive environment". PEF MZLU Brno, Brno, 225–231.
Nagyova L., Horska E., Kadekova Z., 2011. Food Quality Policy and Labeling. Dehli Business Review Vol. 12, 1, 85–100.
Recky R., Dobak D., 2011. Comparation of production-economic dependence by oil rape growing in the Slovak republic. (in) Proceedings from the international scientific conference "Enterpreunership in rural areas", Polny Kesov. SUA Nitra, Nitra, 230–232.
Sekavova H., 2010. Expenditures for food in the households. Nutrition and Health Vol. 3, 74–77.
Simo D., Rovny P., 2010. Agrarian marketing. SUA Nitra, Nitra, 279.
Statistical Office of the Slovak Republic, 2010. Incomes, expenditures and consumption of private households in SR. Statistical Dep. 2000–2009, Bratislava.
Thiele S., 2008. Elasticities of demand for food by households and their de-estimation based on the income and expenditure survey. Agriculture Vol. 5, 57.

ANALIZA MARKETINGOWA WPŁYWU PRZYCHODÓW NA POPYT NA MIĘSO I PRODUKTY MIĘSNE W SŁOWACKICH GOSPODARSTWACH DOMOWYCH

Streszczenie. Artykuł podejmuje zagadnienie zależności dochodów nominalnych i wydatków gospodarstw domowych na żywność oraz ich udziału w wydatkach ogółem z perspektywy gospodarstw domowych różnych grup społecznych Słowacji. Autorzy analizują zmienne wzorce w strukturze popytu na mięso, ceny i wpływ na ogół wydatków na mięso i produkty mięsne w gospodarstwach domowych pracowników, osób samozatrudnionych oraz emerytów. Przeprowadzono oceny wrażliwości popytu na zmiany cen konsumpcyjnych mięsa w różnych grupach gospodarstw domowych. Autorzy oszacowali elastyczność cenową popytu oraz elastyczność krzyżową popytu.

Słowa kluczowe: przychody i wydatki na żywność, cena, dochodowa i krzyżowa elastyczność popytu, gospodarstwa domowe pracowników, osób samozatrudnionych i emerytów

Accepted for print – Zaakceptowano do druku: 22.11.2012

ACTA SCIENTIARUM POLONORUM *Oeconomia 11 (4) 2012, 35–46*

ACCESS TO INFORMATION AS A DETERMINANT OF THE CONSUMER BEHAVIOR AT THE FOOD MARKET

Anna Mazurkiewicz-Pizło
Jozef Pilsudski University of Physical Education in Warsaw

Beata Pachuca-Smulska
University of Warmia and Mazury in Olsztyn

Abstract. The article discusses[1] the right to information as one of the most important foundations for protection of consumer rights in the context of The Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011. The authors present the definition of a consumer under the Polish law and principal EU regulations. They discuss changes in consumer needs which took place over the last 30 years, and expectations consumers have regarding the food products. They evaluate disclosure requirements as set forth in the Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers in light of those needs and expectations. For now this assessment needs to be restricted to legal aspects as the implementation aspects will not be evident until 2014 when the Regulation comes into effect for food producers.

Key words: consumer, consumer protection, food products, information, right to information, Poland

Corresponding author – Adres do korespondencji: Anna Mazurkiewicz-Pizło, Jozef Pilsudski University of Physical Educatrion in Warsaw, Faculty of Tourism and Recreation, 34 Marymoncka Str., a.mazurkiewicz@awf.edu.pl; Beata Pachuca-Smulska, University of Warmia and Mazury in Olsztyn, 98 Warszawska Str., 10-702 Olsztyn, Poland, beatapachuca@gmail.com.

[1]This publication is an extended version of a paper presented at the XIIth International Conference on Human Rights "Communication as a Measure of Protection and Limitation of Human Rights", 1–2 June 2012, Bratislava. The paper was entitled "The Right to information vs consumer protection in the light of Regulation (EU) No 1169/2011 of the European Parliament and of the Council".

INTRODUCTION

The Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers (the "Regulation") was issued to provide more certainty in and consistency of the law. The existing EU food directives were superseded by this Regulation, which comprehensively sets forth food law in order to provide more certainty for consumers and to lower the related administrative burden. It is designed to be flexible so that it may be adapted to changing information needs of consumers, and ensure a balance between protection of internal markets and different perceptions and expectations of consumers in member states (recital 16 from Regulation (EU) No 1169/2011). This Regulation is also meant to contribute to the fight against obesity and other chronic illnesses, a growing problem in the European Union.

The objective of this paper is to present the consumer's right to information as provided under Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011. The authors evaluate the subject regulation in the context of current law in Poland as well as in relation to the education and awareness of consumers. The method employed is analysis of related legal acts and publications. Where applicable, the authors also refer to reports, studies and surveys conducted by CBOS[2] [2005].

DEFINITION OF THE CONSUMER

No universal definition of the consumer has been proposed, notwithstanding the fact that this notion is used by many scientific disciplines. Even in legal studies, one may only point out to certain common features appearing in various regulations defining the consumer. This problem exists both in Polish [Pachuca 2009] and EU regulations.

It should be underlined that the consumer is an economic, legal and sociological concept. In economics, the consumer is primarily associated with a household. In contrast to the businessperson – a professional, a trader or a commercial user, the consumer is viewed as weaker and therefore requiring special protection [Żuławska 2007]. It is this view that has been reflected in the law. Both public and private laws afford protection to the consumers. A special place should be reserved for regulations of public law, which guarantee provision of knowledge and information about goods, services and rights to weaker market participants (art. 76 of the Constitution of the Republic of Poland) [Kowalska 2011].

The Polish legal doctrine offers no agreement on interpretation of the definition of the consumer. There are proponents of both broad and narrow interpretations [Frąckowiak 2003, Koroluk 2003, Rejdak 2006, Haberko 2007]. The definition of the consumer in the Civil Code narrows its meaning to natural persons (In contrast to a prior regulation, which concerned the consumer as a subject of the law, but did not delineate her specific traits.), as such, it is not precise, and therefore subject to a broader interpretation. This

[2]The Public Opinion Research Center (CBOS) established in 1982, is a publicly funded independent research centre. It is one of the largest and most renowned public opinion research institutes in Poland.

definition may encompass natural persons engaged in business undertakings and afford them protection even though they may be considered professionals [Mostowik 2003]. We lean here toward the narrower view restricting this definition only to those natural persons who purchase goods and/or services for private, household use.

Special note should be made for protection which was provided to consumers by EU regulations. Article 169 of the Treaty on the Functioning of the EU states that "in order to promote the interests of consumers and to ensure a high level of consumer protection, the Union shall contribute to protecting the health, safety and economic interests of consumers, as well as to »promoting their right to information«, education and to organize themselves in order to safeguard their interests". Already article 2 of the Treaty of Rome of 1957 on the establishing of the European Economic Community assumed "an accelerated rising of the standard of living", impossible without bettering the situation of consumers. Nevertheless it was only after the Paris meeting of the Heads of EEC states in 1972 that the issue of consumer protection gained significant traction.

The consumer protection law has been developed over a period of over thirty years. The first strategy plan for 1975–1980 indicated as one of its five fundamental rights the right to information and education. Subsequent plans enacted by the EC member states served to realize and strengthen those regulations [Łętowska 2004]. The principle of consumer protection assumed a very significant place in the Amsterdam Treaty, whose main goals were protection of health, safety and economic interests. These aims were to be achieved by facilitating conditions for provision of better education and information to consumers [Żuławska 2007].

EU directives have had a fundamental role in forming (and framing) consumer protection regulations. Almost 20 directives regulating consumer protection have been passed since the 1980s. Over the past 20 years the Polish law has implemented numerous directives of the European Community law. The definition of a consumer in those directives very frequently became part of the Polish system of law within the scope of a given regulation. The directive deserving special mention here is Council Directive 84/450/ /EEC of 10 September 1984 relating to the approximation of the laws, regulations and administrative provisions of the Member States concerning misleading advertising (Directive 2006/114/EC concerning misleading and comparative advertising). It was the first EU regulation dealing with advertising and the need to protect consumer in this respect. Although twenty years have passed since the aforementioned directive was issued, newer regulations put equal stress on access to information and ability to make well-informed choices by consumers.

In the "Consumer Strategy Policy for 2007–2013" presented by the European Commission a special place is occupied by actions aimed at strengthening the (market) position of consumers, increasing their welfare, and ensuring their protection. The document emphasizes that facilitating conscious consumer choices is paramount not just for fostering market competition, but also for the good of consumers.

In contrast to domestic legal systems of the EU member states, which by and large rely on some definition of the consumer, EU regulations do not provide a universal (common to all acts) definition. Numerous consumer directives make use of this term; however, each defines it specifically for its own purposes. Of particular interest is the definition given in the Unfair Commercial Practices Directive (Directive 2005/29/WE of the Euro-

pean Parliament and of the Council of 11 May 2005 on Unfair Commercial Practices). In addition to the term "consumer", it also employs the term "average consumer", by whom it means a consumer "who is reasonably well-informed and reasonably observant and circumspect". This evaluation is made taking into account social, cultural and linguistic factors as well as membership of this consumer in a special group of consumers. The latter is defined as a uniquely identifiable group of consumers whose characteristics make them particularly vulnerable to a given unfair commercial practice or product (to which the unfair commercial practice applies) because of special attributes such as age, mental or physical disability.

Apart from the aforementioned directive, an important place in consumer protection belongs to Regulation (EC) No 1830/2003 of the European Parliament and of the Council of 22 September 2003 concerning the traceability and labeling of genetically modified organisms and the traceability of food and feed products produced from genetically modified organisms and amending Directive 2001/18/EC – 3 2003 R 1830, Law Journal of the EU 268, 18/10/2003. This Regulation uses the term „final consumer" in article 3 point 6. It means "the ultimate consumer who will not use the product as part of any business operation or activity".

It is the consumer so defined who is the subject of Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers, amending Regulations (EC) No 1924/2006 and (EC) No 1925/2006 of the European Parliament and of the Council, and repealing Commission Directive 87/250/EEC, Council Directive 90/496/EEC, Commission Directive 1999/10/ /EC, Directive 2000/13/EC of the European Parliament and of the Council, Commission Directives 2002/67/EC and 2008/5/EC and Commission Regulation (EC) No 608/2004.

It should be underlined that the model of a consumer subject to protection under the EU and Polish regulations is the consumer conscious of his/her rights, having at disposal knowledge about surrounding reality, discerning and analytical of information that reach him/her, including advertising. He/she is an average consumer, but a well-informed commercial decision-maker. This model of the conscious consumer also found a reflection in verdicts of the Polish Supreme Court. In the decision of 3 December 2003, I CK 358/02, the Supreme Court indicated that the Polish consumer should not be treated as "not careful enough and easily influenced by the suggestions made by the information stream that reaches him (…). On the contrary, one may assume a model of consumer who is well-informed, circumspect and careful". This view of the consumer requires the government to create consumer regulation in such a way as to make commercial enterprises provide full and reliable information. The Regulation (EU) No 1169/2011 is a step in this direction, and sets the bar high for producers and sellers. A question arises, however, whether a real consumer is ready to make gainful use of the information that will be provided to him.

TYPES OF BUYERS IN THE MARKET

The demand side of the market is represented by both natural persons and businesses. They can be divided into two major groups. The first group purchases goods to fulfill their personal needs. The second group acts as intermediaries for wholesale and retail trade, in

essence buying in order to resell it later. The first group may be further subdivided into three categories of buyers: individual consumers, industrial enterprises, institutions and other organizations [Sztucki 1999].

By far the most numerous group are individual customers: one- or multiperson households buying goods to fulfill their own needs. (These customers may of course also be motivated to buy a gift for someone else.) They are unique in the way they make purchase decisions. Unlike commercial enterprises and other institutions, whose purchase decisions are (by and large) based on a rational analysis, purchases by retail consumers may be idiosyncratic and frequently emotional depending on the type of the good purchased. Because of the scope and subject of this paper, further discussion will concern exclusively this group of individual consumers.

CHARACTERISTICS OF CONTEMPORARY RETAIL CUSTOMERS

Recent years witnessed deep economic, industrial, technological and socio-cultural changes. As a consequence, consumer behavior also changed to satisfy frequently expanded needs – a direct result of marketing campaigns by commercial enterprises. Consumers have become more demanding of goods having experienced an increase in wealth (at least for part of the society) [Czapiński and Panek 2011, Ozimek 2010], having had their basic needs already fulfilled, and having witnessed increased competition for their attention on the part of marketing professionals.

In addition to high quality, aesthetic appeal and easy-to-use functionality, they now expect pre- and post sale service such as for example free delivery and installation, periodic maintenance, and extended warranty. Consumers are more aware of their rights and have well-formed expectations of producers. Further, they expect concrete, reliable information from producers not just with regard to products, but also with regard to the way in which their needs may be fulfilled. They want easy access both to the information and the product.

One has to bear in mind that the modern consumer is often contradictory in his/her behavior, consciously making inconsistent decisions in order to stand out from the crowd. He/she behaves unconventionally, changes determinants of social status, and may even create needs bordering on the unrealistic [Kieżel 2010].

CONSUMER PROTECTION

Consumer protection characterizes various actions aimed at protecting the consumer against threats to his/her rights and interests. The essence of consumer protection stems from three premises: economic, social and legal. The economic premises relate to increasing production, turnover of goods, and their competitiveness. One should pay attention here to improper, frequently manipulative use of marketing, purposeful worsening of quality of certain products, or introducing goods harmful to consumers' health. Social motives for consumer protection relate to the care for consumers' health, health benefits of food, safety of consumers as well as care for the natural and social environment and a

range of social premises related to education and culture [Woś, Racocka and Kasperek--Hoppe 2004]. Therefore an important element of consumer protection is the right to information.

THE RIGHT TO INFORMATION

The obligation to provide information is one of the most significant elements in the complex relationships that binds; entities participating in the trading of goods and services. The principle of fair trading dictates that a certain minimum amount of information be provided to a counterparty [Lewaszkiewicz-Petrykowska 1999]. The obligation to provide full and reliable information is incumbent upon every professional, and therefore "the producer and the seller share in the liability toward a buyer for the damage caused by insufficient warning to the buyer of the danger, which may be caused by the use of the purchased good". This principle was elucidated by the (Polish) Supreme Court in its verdicts. The Supreme Court has ruled that a warning prepared by the producer "should be formulated in a sufficiently clear manner, and should distinguish between general harmfulness in the common sense of the word from the harmfulness which may lead to a loss of life" [3].

The information disclosed by a producer carries particular significance when one of the parties (to a legal relationship) is a consumer, whose position in relation to the professional is much weaker. In these types of one-sided relationships, the law generally protects the weaker side. This principle also applies to consumer protection.

In the relationships among producers, sellers of food products and consumers, the restrictive information requirement has been regulated in a detailed manner in the EU law over the recent few years[4]. Regulations existing thus far had been dispersed, complicated, and clearly called for simplifying amendments.

The Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers (in accordance with the recital 9 thereto) was enacted "streamline it in order to ensure easier compliance and greater clarity for stakeholders and to modernize it in order to take account of new developments in the field of food information"[5].

A fundamental question which must be raised in the context of the subject Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011

[3]A verdict of the Supreme Court dated 28 June 1972, OSNC 12 (1972), 228, II CR 218/72; see also a verdict of the Court of Appeals in Białystok dated 30 November 2000, OSA 6 (2001) 33; I ACa 340/00; See also a verdict of the Supreme Court of 27 May 1983, OSP 4 (1984) 84; I CR 134/83.
[4]Previously applicable legal regulation, Amends Regulation (EC) No 1924/2006 and Regulation (EC) No 1925/2006 (on the addition of vitamins and minerals and of certain other substances to foods) of the European Parliament and of the Council, Repeals Directives 87/250/EEC (on alcoholic strength in the labelling of alcoholic beverages), 90/496/EEC (on nutrition labelling), 1999/10/EC (on food labelling), 2000/13/EC (on food labelling), 2002/67/EC (on foodstuffs containing quinine and caffeine) and 2008/5/EC (on food labelling) and Regulation (EC) No 608/2004.
[5]Recital 9 from Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers.

on the provision of food information to consumers is the scope and form of this disclosure/communication.

Businesses are not interested in providing all information about their goods and activities. One should distinguish between information whose provision is convenient for the business, especially if it constitutes marketing of its products, and this information which is required, sometimes even ordered, by the law. In the context of the subject regulation, one may consider "required and expected level of information provided as a public law obligation, an obligation on the part of a sovereign to enact appropriate regulations, which would fully guarantee consumers access to sufficient knowledge to enable them to make the right market decisions [Łętowska 2004]. For this reason consumer protection cannot function properly without consumers having assured right to information at the level of public law. The obligation to protect consumers is assumed by the State in the constitution[6] (basic law) and by the European Union in its Treaties (consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union, 2010/C 83/01). A broadly understood right to information is fundamental to proper consumer protection. It is strengthening and consolidation of this right that was the main objective of the European Parliament and the Council in enacting Regulation (EU) No 1169/2011.

The right to information should be based on two basic premises:

1. The right to full information about a product,
2. The right to knowledge about consumer rights, including the right to consumer education.

The Regulation undoubtedly fully realizes the former premise. The right to full information about a product means that information provided to the consumer should be reliable, accurate, complete and clearly communicated. Irrespective of whether the subject transaction concerns a good or a service, this information should be individualized. The type of good and service may require provision of certain information and has particular importance in the case of food products. The addressee or addressees influence the form, language and the means in which the information is to be provided. E. Łętowska is of the opinion that it is not just access to information itself that matters, but also legibility of the print, completeness of the material printed, ability to read it given where it is placed or how long it is displayed on the TV screen etc. [Łętowska 2004]. The subject Regulation meets these expectations as set forth in the legal doctrine and jurisdiction. These expectations are not controversial, and the authors naturally agree with them.

In contrast, many doubts are raised by the latter premise, understood in a broader sense and referring not just to the information about consumer rights, but also the means in which the acquired information may be used, understood, and correctly verified. The European Parliament (in the recital 10) stresses that in order to properly make use of the information, one must possess knowledge about foods indicated in the Regulation and be familiar with at least basic principles of nutrition. The latter would contribute significantly to allowing consumers to make better informed choices in respect of their health needs, habits, and preferences. Mechanisms improving understanding of food informa-

[6]Article 76 of the Constitution of the Republic of Poland.

tion, especially educational and information programs addressed to consumers may have considerable impact (recital 10 from Regulation (EU) No 1169/2011).

The Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers in article 2 paragraph 2 introduces several legal definitions of fundamental importance to proper understanding and interpretation of information. The Regulation distinguishes three types of information: a) food information, b) food information law, and c) mandatory food information. According to definitions adopted by the Regulation, "food information" means information concerning a food and made available to the final consumer by means of a label, other accompanying material, or any other means including modern technology tools or verbal communication. In turn, "food information law" means the European Union regulations governing disclosure of food information, and in particular labeling, including rules of general nature applicable to all foods in specific circumstances or to certain categories of foods, as well as rules which apply only to specific types of foods. "Mandatory food information" means the particulars that are required to be provided to the final consumer by European Union regulations" (art. 2.2 from Regulation (EU) No 1169/2011).

The subject Regulation concerns all three types of information. Its purpose is to set forth requirement for provision of food information by companies which will speak to the average consumer, serve information purposes, and be placed in the principal field of vision. In accordance with the recital 41, food information "should be simple and easily understood", and "reflect current level of knowledge on the subject of nutrition" in accordance with the new regulation (recital 41 from Regulation (EU) No 1169/2011).

NUTRITIONAL VALUE OF FOOD

Eating for human beings is fundamental to life, proper development, general health, mental and physical fitness. Food is also a source of satisfaction and fulfillment of social and hedonistic needs. Food gathering, production and consumption have always been the most important human activity, and any failures in this respect have inexorably led to severe social and biological consequences. In ancient Greece, food was a subject dealt with by many philosophers such as Asclepiades, Aristotle, Empedocles and Pythagoras, and above all the "father of medicine"– Hippocrates. At that time it was thought that all nourishments satisfying hunger contained the same nutritional element indispensible to the human body [Berger 1998]. We have now known for many years that food consists of many different food ingredients. A food ingredient is a chemical compound naturally occurring in food that may have some or no nutritional value. Harmful ingredients dangerous to human health usually arise from inappropriate storage and/or food processing, or from contamination [Gawęcki 1998]. Because of their number and sheer diversity, food products cannot be unambiguously divided into categories, and so their classification is frequently made by convention. The usually criteria take into account: food's origin, chemical composition, level of processing, and readiness for immediate consumption [Pijanowski et al. 1997]. A combination of quality attributes of a given food product determines its overall quality. These attributes may be categorized as follows: organoleptic (reception to human sensors), nutritional and health value, and availability,

that is – durability, packaging, ease of preparation, and high concentration of nutrients [Pijanowski et al. 1997].

NUTRITIONAL VALUE OF FOOD PRODUCTS IN THE LIGHT OF THE NEW REGULATION

Article 21 of the Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 deals with food ingredients and substances which may cause allergies or intolerance in some people, and therefore be harmful to health. In accordance with article 20 the producers are mandated to disclose information regarding food additives, substances which are used as processing aids, and other carriers and substances. The consumers are more and more mindful of their health, and strive to eat food which is least processed and without additives. The Regulation imposes the information requirement regarding additives and substances on the producers in order for the consumer to be able to make informed and safe choices (recital 24 from Regulation (EU) No 1169/2011). The most important provisions of the Regulation concern mandatory nutrition declaration on packaged food. The rules for such disclosure are provided in detail in articles 30 to 36 in section 3 of the Regulation. This information should include the energy value, the amount of fat, saturates, carbohydrate, sugars, protein and salt. It should be presented in the same field of vision and in the form of expression per 100 g or 100 ml uniformly for all producers and where applicable may also be expressed on the basis of per portion (recital 43 from Regulation (EU) No 1169/2011).

LABELING

Much treatment in the subject Regulation is devoted to food product labeling. The guiding principles are clarity and comprehensibility of disclosure. Information placed on labels is there to help consumers make well-informed food and dietary choices. Studies indicated that from the consumer's point of view elements such as legibility of information placed on labels, especially the size of the font and color used, are paramount (recital 26 from Regulation (EU) No 1169/2011). Consequently article 34 of the Regulation sets forth rules on presentation of data detailed in article 30. In order to achieve the goals imposed by the EU Council and Parliament, the lawmakers enacted a minimum height of the font, which must be used to convey the mandatory information on the label, i.e. specified the so-called x-height of the font equal to at least 1,2 mm. In the case of packaging whose biggest surface area is less than 80 cm^2, the minimum x-height of the fond may be equal to or greater than 0,9 mm. It should be underlined that mandatory information placed on a food product must be irremovable, may not be hidden or obscured from view, made little or interrupted by any other written or graphic material.

In contemporary world, more and more people are allergic to various substances (including food ingredients). Meeting this civilization problem, the EU Parliament and Council mandated that producers place on food labels all substances (contained in a given food), which may cause allergies. Any such information must be "emphasized through

a typeset that clearly distinguishes it from the rest of the list of ingredients, for instance by means of the font, style or background color" (art. 22.1.b. from Regulation (EU) No 1169/2011). Further, information about allergens must also be disclosed in the case of food offered without prepackaging, packed at the request of a buyer or sold to mass caterers. In all such cases, the Regulation leaves it to the discretion of the national regulators to determine how and in what form this information will be passed on to consumers. A new solution is to place information about allergens on packaging or containers whose largest surface area is less than 10 cm^2 next to the name of the food, net quantity, minimum durability date or use-by date (art. 21.1. from Regulation (EU) No 1169/2011).

The Regulation also lays out detailed guidelines on disclosing information about the country of origin of food products. The provision of such information is deemed very important in part because of ways in which animal husbandry is conducted in some countries. Consumer interest in such matters is already partly reflected in existing regulations, which mandate disclosure of country of origin in the case of (among others) beef and beef products, fish, olive oil, honey, fruits and vegetables. The Regulation (See: art. 16.2) is broader, bringing under the scope of disclosure also the meat of swine, sheep, goat and poultry. The requirement to disclose the country of origin was place on the producer in situation where lack thereof may be misleading. It applies to situations, where information associated with a product or the label itself might suggest that the product comes from a country or place different from the true country of origin or place of provenance, e.g. in the case of products whose name contains name of a country or place, but whose origin is different, or in the case of products whose name is displayed in a foreign language, which might mislead the consumer to associate the product with the country whose language appears on the label. The solution adopted by the Regulation is to disclose the country of origin or place of provenance of the primary ingredient is the situation in which a country and place is given, but it is not the same as the country of origin or place of provenance of the primary ingredient (art. 26.3). Further, the new law mandates a very detailed disclosure for meat products: producer must provide where the animal was born, where it was farmed, and where it was slaughtered.

The new regulations are meant to communicate to consumers true, reliable, accurate and needed information, which may significantly contribute to better quality of their lives. Nevertheless, one should stress that "new mandatory food information requirements should however be established if and where necessary, in accordance with the principles of solidarity, proportionality and sustainability" (recital 19 from Regulation (EU) No 1169/2011).

CONCLUSIONS

The analysis of provisions of the Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers allows us to conclude that it is a legal act addressing a large measure of consumer rights to information and their needs from the perspective of requirements placed upon producers and sellers. In light of our analysis, the substantive legal framework as set forth in the Regulation should be judged positively. In enacting the subject Regulation,

the EU Parliament and the Council laid foundations for realization of the fundamental principle of consumer law of full and reliable information in the area of broadly understood food products. It should be underlined that legal acts dating back 20 or 30 years, which were superseded by the Regulation (EU) No 1169/2011 did not meet the needs of modern-day consumers, who have very concrete expectations both of food products and of information disclosed on the packaging (the latter allows them to make a well-informed purchase decision). Nevertheless, it may still be worthwhile to expand this information by facts about genetically modified organisms as set forth in Regulation (EC) No 1830/2003 of the European Parliament and of the Council of 22 September 2003 concerning the traceability and labeling of genetically modified organisms and the traceability of food and feed products produced from genetically modified organisms and amending Directive 2001/18/EC. In our opinion, the lack of any such particulars hinders to some extent the consumer's right to full food information under the subject the Regulation.

REFERENCES

Berger S., 1998. Historia nauki o żywieniu, (in) J. Gawęcki, L. Hryniewiecki (eds.), Żywienie człowieka. Podstawy nauki o żywieniu. Wydawnictwo Naukowe PWN, Warszawa, 18–25.

CBOS, 2005. Upodobania kulinarne, nawyki żywieniowe i zachowania konsumenckie Polaków. Komunikat z badań BS/173/2005, Warszawa.

Czapiński J., Panek T. (eds), 2011. Diagnoza społeczna 2011. Warunki i jakość życia Polaków. Rada Monitoringu Społecznego, Warszawa, 45.

Frąckowiak J., 2003. Instytucje prawa handlowego w kodeksie cywilnym. Rejent 6, 15.

Gawęcki J., 1998. Człowiek i jego pokarm, (in) J. Gawęcki, L. Hryniewiecki (eds), Żywienie człowieka. Podstawy nauki o żywieniu. Wydawnictwo Naukowe PWN, Warszawa, 17.

Gertig H., Duda G., 2004. Żywność a zdrowie i prawo. Wydawnictwo Lekarskie PZWL, Warszawa, 35–36.

Haberko J., 2007. Umowa sprzedaży konsumenckiej zawarta poza lokalem przedsiębiorstw. Przegląd Sądowy 3, 98.

Kowalska A., 2011. Food quality and its conditionings. Acta Scientiarium Polonorum – Oeconomia 10 (4), 43–54.

Kieżel E., 2010. Konsument i gospodarstwo domowe w gospodarce europejskiej, (in) E. Kieżel (ed.), Konsument i jego zachowania na rynku europejskim. PWE, Warszawa, 28–31.

Koroluk S., 2003. Zmiana definicji konsumenta w Kodeksie cywilnym – propozycja interpretacji. Monitor Prawniczy 10, 439.

Lewaszkiewicz-Petrykowska B., 1999. Prawo konsumenta do informacji, (in) G. Rokicka (ed.), Model prawnej ochrony konsumenta. Warszawa, 85.

Łętowska E., 2004. Europejskie prawo umów konsumenckich. C.H. Beck, Warszawa.

Mostowik P., 2003. Uwagi dotyczące rozwoju prawa konsumenckiego na tle nowelizacji Kodeksu cywilnego z 2003 r. Radca Prawny 4, 37.

Ozimek I., 2010. Rola instytucji państwowych i organizacji konsumenckich w poprawie ochrony konsumentów na rynku usług turystycznych. Acta Scientiarum Polonorum – Oeconomia 9 (4), 369–377.

Pachuca B., 2009. The right to information as the basis for protection of consumer rights, (in) B. Sitek, J.J. Szczerbowski, A.W. Bauknecht, A. Kaczyńska (eds), Proceeding of the 8th International Conference on Human Rights "The Rights to Knowledge and Information in a Heterogenic Society", 2009. Cambridge Scholars Publishing, 173–177.

Pijanowski E., Dłużewski M., Dłużewska A., Jarczyk A., 1997. Ogólna technologia żywności. Wydawnictwa Naukowo-Techniczne, Warszawa, 81–132.
Rejdak M., 2006. Definicja konsumenta w rozumieniu Kodeksu cywilnego (art. 221 k.c.). Rejent 1, 118.
Sztucki T., 1999. Promocja. Sztuka pozyskiwania nabywców. Agencja Wydawnicza Placet, Warszawa, 25.
Woś J., Racocka J., Kasperek-Hoppe M., 2004. Zachowania konsumentów – teoria i praktyka, Wydawnictwo Akademii Ekonomicznej w Poznaniu, Poznań, 121–122.
Żuławska C., 2007. Zasady prawa gospodarczego prywatnego. C.H. Beck, Warszawa, 91–93.

DOSTĘP DO INFORMACJI JAKO DETERMINANTA ZACHOWAŃ KONSUMENTA NA RYNKU ŻYWNOŚCI

Streszczenie. W artykule omówiona została problematyka prawa do informacji jako jednej z najważniejszych podstaw ochrony praw konsumenta, w świetle rozporządzenia Parlamentu Europejskiego i Rady (UE) nr 1169/2011. Przedstawiona została definicja konsumenta występująca w prawie polskim i podstawowe regulacje w prawie unijnym. Nakreślono zmiany w potrzebach konsumentów, które wystąpiły w ostatnich trzydziestu latach i w ich oczekiwaniach, które oni mają w stosunku do nabywanych produktów żywnościowych. Został poddany ocenie zakres zrealizowania prawa do informacji, które powinno być przekazywane konsumentom w świetle rozporządzenia z dnia 25 października 2011 r. Parlamentu Europejskiego i Rady (UE) nr 1169/2011 w sprawie przekazywania konsumentom informacji na temat żywności.

Słowa kluczowe: konsument, ochrona konsumenta, produkty żywnościowe, informacja, prawo do informacji, Polska

Accepted for print – Zaakceptowano do druku: 22.11.2012

ACTA SCIENTIARUM POLONORUM *Oeconomia 11 (4) 2012, 47–57*

THE ESSENCE OF FAIR TRADE AND ITS IMPORTANCE IN THE WORLD ECONOMY

Michał Wielechowski, Michał Roman
Warsaw University of Life Sciences – SGGW

Abstract. The article presents the main issues of Fair Trade. According to the authors Fair Trade is a very important idea, while a programme designed to change the location and raising the standard of living of a large population of poor regions of the world. Empirical data derived from two sources, the world's largest organizations of Fair Trade: the World Fair Trade Organization (WFTO) and Fairtrade Labelling Organizations International (FLO), are presented in tabular and graphical form. It should be noted that the volume of production and sales of Fair Trade products over the years have been increasing steadily (double-digit levels of an annual growth rate). The main Fair Trade products are: coffee, cocoa, bananas and cane sugar. The largest importers of Fair Trade production in the years 2004–2011 were the United Kingdom and the United States of America. Majority of all farmers and workers within the Fairtrade[1] system live in Africa. Harmful intervention, unethical money allocation, corruption and overproduction argument are the most negative aspects of Fair Trade considered by the economists.

Key words: Fair Trade, Fairtrade products, Fairtrade Labelling Organizations International, World Fair Trade Organization, Fair Trade criticism

INTRODUCTION

Fair Trade today is a systematically growing global movement. Fair Trade is a complement to conventional trade, allowing for more equal distribution between undeveloped and developed countries. Over a million small-scale producers and workers are organized in

[1]Fairtrade (written as an one word with a capital letter) indicates FLO certification and is distinct from Fair Trade (two words written with capital letters) which denotes a general meaning of the movement.

Corresponding authors – Adres do korespondencji: Michał Wielechowski, Warsaw University of Life Sciences – SGGW, Department of Economics and Economic Policy, 166 Nowoursynowska Str., 02-787 Warszawa, Poland, e-mail: michal_wielechowski@sggw.pl; Michał Roman, Warsaw University of Life Sciences – SGGW, Department of Education Economics, Communication and Counselling, 166 Nowoursynowska Str., 02-787 Warszawa, Poland, e-mail: michal_roman@sggw.pl.

many organizations in more than 70 countries of the poorest regions of the world. Most Fair Trade organizations are members of, or certified by one of several national or international federations. These federations coordinate, promote, and facilitate the work of Fair Trade organizations. Some economists detect the presence of many negative aspects of Fair Trade.

The purpose of the article is to present the essence of Fair Trade and its importance in the world economy on the example of the two largest organizations of manufacturers, suppliers and sellers of Fair Trade.

METHODOLOGY

Empirical data derived from two sources, the world's largest organizations of Fair Trade: the World Fair Trade Organization (WFTO) and Fairtrade Labelling Organizations International (FLO), were presented in tabular and graphical form. To analyse the data chosen fundamental statistical methods were used. The authors used the most current data dealing with a particular issue. To present Fair Trade criticism international literature (mostly english) was studied.

ESSENCE OF FAIR TRADE

Fair Trade concept has been developed in response to a growing recognition that benefits accruing from trading and trade growth are not necessarily shared by all countries and their citizens in a comparable manner. Fair Trade is a complement to conventional trade, allowing for more equal distribution between undeveloped and developed countries [Fair Trade... 2005]. Fair Trade has emerged over recent years as a powerful critique of conventional global inequalities and a promising initiative supporting alternative globalization ideas, practices, and institutions grounded in social justice and ecological sustainability. This concept has become a key rallying cry around the world for efforts challenging the negative impacts of conventional international trade. It has simultaneously become a market generating almost 5 billion US dollars per year incorporating numerous commodities and millions of producers, consumers, and distributors globally [Reynolds and Murray 2007].

Not many definitions of Fair Trade in the economic literature can be found. FINE (an acronym) is an informal association of the four main Fair Trade networks: Fairtrade Labelling Organizations International (FLO), International Fair Trade Association, now the World Fair Trade Organization (WFTO), Network of European Worldshops (NEWS!) and European Fair Trade Association (EFTA) describes Fair Trade as a "trading partnership, based on dialogue, transparency and respect, which seeks greater equity in international trade. It contributes to sustainable development by offering better trading conditions to, and securing the rights of, marginalized producers and workers – especially in Africa and South America. Fair Trade organizations (backed by consumers) are engaged actively in supporting producers, awareness raising and in campaigning for changes in the rules and practice of conventional international trade" [Becchetti and Huybrechts 2007]. The primary goal of Fair Trade is to work for the development of the poorest countries of

the Third World communities and building sustainable, direct relationships between the people in poor countries and consumers in wealthy parts of the world. Fair Trade is also a consumer movement, which includes the activities of non-governmental organizations to promote Fair Trade [Żukrowska 2010].

Fair Trade is both an idea and a programme aimed at changing the position and raise the standard of living of a large part of the population from the poorest regions of the world. In its assumption it goes back to the micro-, small- and medium-sized enterprises, private persons and citizens [Jagiełło 2010]. The goals of Fair Trade that flow from this definition are [Moore 2004]:

- to improve the livelihoods and well-being of producers by improving market access, strengthening producer organizations, paying a better price an providing continuity in the trading relationship;
- to promote development opportunities for disadvantaged producers, especially women and indigenous people, and to protect children from exploitation in the production process;
- to raise awareness among consumers of the negative effects on producers of international trade so that they exercise their purchasing power positively;
- to set an example of partnership in trade through dialogue, transparency and respect;
- to campaign for changes in the rules and practice of conventional international trade;
- to protect human rights by promoting social justice, sound environmental practices and economic security.

FAIR TRADE STRUCTURE

Most Fair Trade organizations are members of, or certified by one of several national or international federations. These federations coordinate, promote, and facilitate the work of Fair Trade organizations. The following are the largest and the most important:

- the Fairtrade Labelling Organizations International (FLO) – the best known association of producer networks and many national labelling initiatives that develop Fairtrade standards. The Fairtrade international labelling system is the largest and most widely recognized standard setting and certification body for labelled Fair Trade [FLO... 2012];
- the World Fair Trade Organization (WFTO) – a global association established in 1989 of Fair Trade producer cooperatives and associations, export marketing companies, importers, retailers, national, and regional Fair Trade networks and Fair Trade support organizations [WFTO... 2012];
- the Network of European Worldshops (NEWS!) – created in 1994 a network of national worldshop associations in different countries all over Europe [Fairtrade Foundation... 2012];
- the European Fair Trade Association (EFTA) – established in 1990 a network of European alternative trading organizations which import products from disadvantaged producer groups in Africa, Asia, and Latin America. Its mission is to promote Fair Trade and to make Fair Trade importing more efficient and effective [Sixty Years... 2006].

In 1998, the four listed above federations joined together as FINE. The aim of FINE is to enable these networks and their members to cooperate on [What is... 2003]:
- the development of harmonised core standards and guidelines for Fair Trade;
- harmonisation, and increase in the quality and efficiency of, the monitoring system for Fair Trade;
- advocacy and campaigning work;
- harmonisation of their information and communication systems.

Figure 1 presents current FINE structure. FLO International Association has almost 1000 thousand members located in 66 countries and organized in 3 regional producer networks. By the end of 2010, WFTO had 472 member organizations (registered and provisional) and individuals in 74 countries. NEWS! represents about 2500 shops in 13 European countries. EFTA consociates 11 Fair Trade importers in 9 European countries

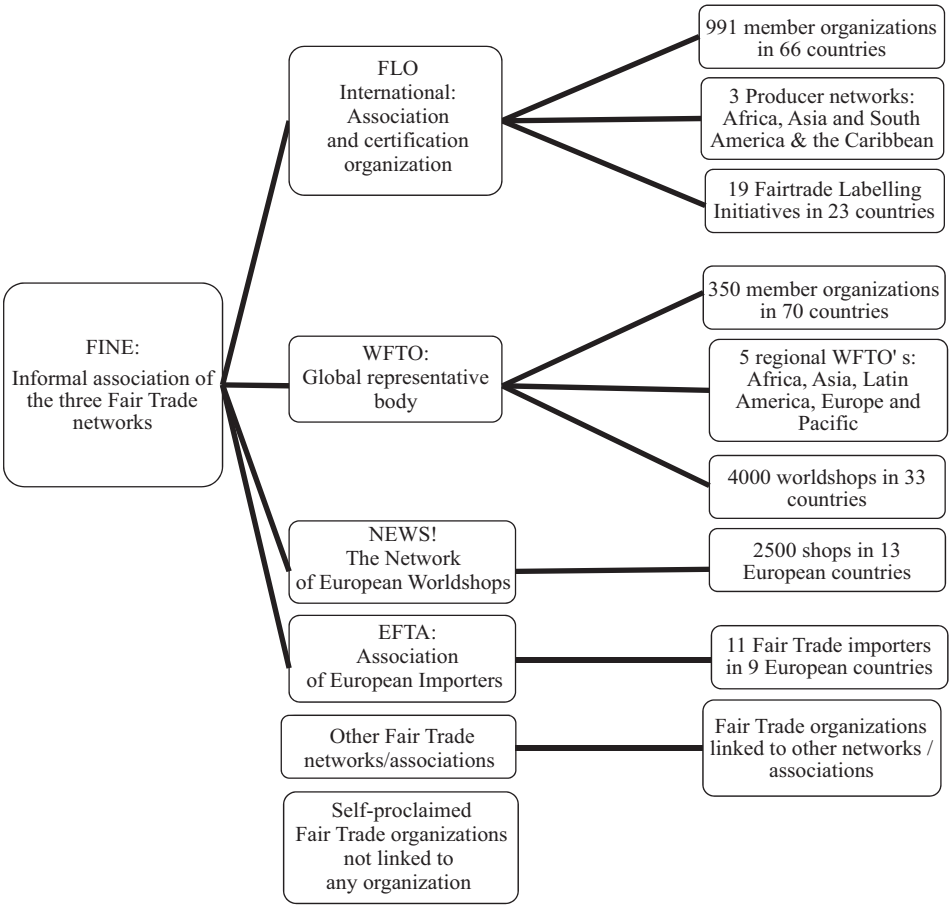

Fig. 1. Schematic overview of the biggest organisations in the Fair Trade movement
Rys. 1. Przegląd największych organizacji Fair Trade

Source: Own elaboration based on A Success… [2011].
Źródło: Opracowanie własne na podstawie A Success… [2011].

(Austria, Belgium, France, Germany, Italy, The Netherlands, Spain, Switzerland and the United Kingdom [EFTA 2006].

An important issue is the Fair Trade supply chain between producer and customer. Figure 2 shows supply chain of the Gifts and Living products from South to the North. People sometimes wonder why the price they pay for Fair Trade product is much more higher than the price that the producer receives.

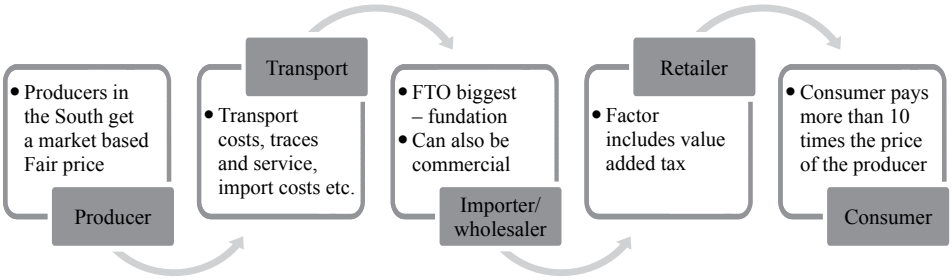

Fig. 2. Fair Trade products supply chain
Rys. 2. Łańcuch dostaw produktów Fair Trade

Source: A Success... [2011].
Źródło: A Success… [2011].

From Figure 2, it becomes clear that whatever price is paid to the producer, the consumer will always have to pay a several times higher price [A Success… 2011]. As in the case of traditional trade in every supply chain some middlemen exist. The difference in Fair Trade is that the producer receives a price that is higher than he would normally receive. Producer gets an extra premium.

FAIR TRADE IN NUMBERS

Fair Trade producer organizations reported Fair Trade sales values totaling 550 million EUR for the 12-month period preceding their 2010 audit. The four largest products by value, coffee, bananas, cocoa and flowers, generated more than 80% of the reported Fair Trade sales income. Whilst Fair Trade sales values mostly track the changes in sales volumes, there are some exceptions to this. Data for rice, nuts and oilseeds, and wine grapes show a decrease in reported Fair Trade sales income despite increases in reported volumes sold (Table 1).

This is partly due to under-reporting of sales income (for example one major wine grapes producer did not report their Fair Trade sales income), and probably reflects changes in the capturing of volume data. In the analyzed period (2004–2011) the estimated Fair Trade retail sales grew in a dynamic way. The growth rates in subsequent years were 39, 43, 33, 37, 15, 27 and 13% in a row. In 2011, the retail value of Fair Trade production amounted to almost 5 billion EUR and was 5 times higher in comparison to 2004 (Table 2).

The largest importers of Fair Trade production in the analysed period were the United Kingdom and the United States. The share of these two countries in value retail sales was

Table 1. Changes in reported Fair Trade sales income by product in 2008–2010
Tabela 1. Zmiany przychodów ze sprzedaży Fair Trade w zależności od produktu w latach 2008–2010

Product	Sales income 2008 (mln EUR)	Sales income 2009–2010 (mln EUR)	Percentage change reported sales income (%)	Product	Sales income 2008 (mln EUR)	Sales income 2009–2010 (mln EUR)	Percentage change reported sales income (%)
Coffee	209.0	242.8	16	Honey	10.6	5.9	–40
Bananas	83.4	103.8	24	Rice	4.6	5.6	27
Cocoa	23.0	60.5	163	Quinoa	1.3	2.8	122
Flowers and Plants	35.1	41.2	17	Nuts and Oilseeds	4.4	2.7	–40
Cane Sugar	7.3	23.7	222	Fruit Juices	3.5	2.3	–36
Tea	15.3	17.2	13	Dried Fruits	1.1	1.8	75
Cotton	16.5	16.6	1	Herbs and Spices	0.7	0.9	42
Fresh Fruits/ /Vegetables	13.8	14.9	8	Sports Balls	0.5	0.7	35
Wine Grapes	12.4	6.4	–55				

Source: Own elaboration based on Monitoring… [2011].
Źródło: Opracowanie własne na podstawie Monitoring… [2011].

Table 2. Total value retail sales by FLO members in years 2004–2011 (mln euro)
Tabela 2. Całkowita wartość sprzedaży detalicznej przez członków FLO w latach 2004–2011 FLO (mln euro)

	Total value retail sales by FLO members (mln EUR)							
Country	2004	2005	2006	2007	2008	2009	2010	2011
AUS/NZ	–	2.50	6.80	0.01	18.57	28.73	125.94	150.28
Austria	–	25.60	41.70	52.79	65.20	72.00	87.00	100.00
Belgium	13.61	15.00	28.00	35.00	45.78	56.43	72.00	77.00
Canada	17.54	34.80	53.80	79.63	123.80	201.98	194.94	199.77
Czech Republic	–	–	–	–	–	0.56	2.70	2.86
Denmark	13.00	14.00	23.20	39.56	51.22	54.44	62.54	74.91
Estonia	–	–	–	–	–	0.30	0.61	0.50
Finland	7.55	13.00	22.50	34.64	54.45	86.87	93.00	102.67
France	69.67	109.10	166.00	0.21	255.57	287.74	303.31	315.42
Germany	57.50	70.90	110.00	141.69	212.80	267.47	340.00	400.54
Ireland	5.05	6.60	11.60	23.34	94.43	118.57	138.00	158.86
Italy	25.00	28.00	34.50	39.00	41.28	43.38	49.40	57.54
Japan	2.50	3.40	4.10	6.20	9.57	11.28	14.43	19.39
Latvia	–	–	–	–	–	0.15	0.43	0.49
Lithuania	–	–	–	–	–	0.32	0.75	0.62
Luxemburg	2.00	2.30	2.80	3.20	4.25	5.33	6.20	7.49
Netherlands	35.00	36.50	41.00	47.50	60.91	85.82	119.00	147.30

Norway	4.79	6.70	8.60	18.07	30.96	34.69	43.76	53.62
RSA	–	–	–	–	–	0.46	1.90	7.27
Spain	–	0.30	1.90	3.93	5.48	8.03	14.36	20.03
Sweden	5.49	9.30	16.00	42.55	72.83	82.66	108.48	134.34
Switzerland	136.00	133.80	142.30	158.10	168.77	180.16	219.92	264.75
UK	205.56	276.80	409.50	704.31	880.62	897.32	1343.96	1498.21
USA	214.60	344.10	499.00	730.82	757.75	851.40	936.97	1030.67
Rest of the World	–	–	–	–	0.13	18.10	39.44	74.74
Total (World)	814.86	1132.70	1623.30	2160.55	2954.37	3394.19	4319.04	4899.27

Source: Own elaboration based on A Success… [2011] and For Producers… [2012].
Źródło: Opracowanie własne na podstawie A Success… [2011] oraz For Producers… [2012].

over 50%. Most important European partners were (except the UK): Germany, France, Switzerland, Ireland and the Netherlands (share of approximately 30%). Fair Trade products are sold in more than 120 countries worldwide.

Most notably Fair Trade products are: coffee, cocoa, sugar, bananas (Table 3). In 2011, estimated sales volume of these products increased more than 10% (growth rate for: coffee – 12%, cocoa – 14%, bananas – 9%, cane sugar – 9%).

Table 3. Estimated sales in volume per Fair Trade product in 2010–2011
Tabela 3. Szacowana wielkość produkcji Fair Trade w latach 2010–2011 (z podziałem na produkty)

Estimated sales volume									
Product	Unit	2010	2011	Growth rate (%)	Product	Unit	2010	2011	Growth rate (%)
Bananas	MT[a]	294,447	320,923	9	Honey	MT	2,072	2,070	0
Cocoa (cocoa beans)	MT	35,285	40,198	14	Oilseeds and Oleaginous Fruits	MT	854	1,219	43
Coffee (roasted, instant)	MT	87,780	98,073	12	Quinoa	MT	1,288	691	–46
Cotton (lint)	MT	–	8,223	–	Rice	MT	5,048	5,718	13
Dried Fruits	MT	673	955	42	Sports balls	1000 items	286	160	–44
Flowers and Plants	1000 stems	327,053	362,067	11	Cane sugar	MT	127,149	138,308	9
Fresh Fruits	MT	18,398	16,165	–12	Tea	MT	12,370	13,398	8
Fresh Vegetables	MT	–	474	–	Timber	Cubic metres	–	324	–
Fruit juices	1000 litres	25,468	38,775	52	Wine	1000 litres	13,155	11,786	–10
Herbs and Spices	MT	408	255	–38					

[a] MT – metric tonne (equal to 1,000 kg in International System of Units).

Source: Own elaboration based on For Producers… [2012].
Źródło: Opracowanie własne na podstawie For Producers… [2012].

Changes in sales were not positive for every Fair Trade product. The sales volume of products, such as fresh fruits, herbs and spices and wine, decreased in 2011.

Table 4 gives a breakdown of the numbers of farmers and workers within Fairtrade certified producer organizations, according to product, for 2010. More than 1.1 million people were involved in production of Fair Trade products. Coffee, tea and cocoa were the most significant products in terms of farmer and worker numbers.

Table 4. Breakdown of farmers' and workers' numbers by Fair Trade product in 2010
Tabela 4. Rozkład liczby rolników i pracowników zaangażowanych przy produkcji Fair Trade w 2010 roku (w zależności od produktu)

Product	Farmers by product	Workers by products	Farmers and workers by products	Percentage of total (%)	Product	Farmers by product	Workers by products	Farmers and workers by products	Percentage of total (%)
Coffee	532,000	0	532,000	48.31	Bananas	9,900	5,500	15,400	1.40
Tea	14,200	81,500	95,700	8.69	Herbs and Spices	10,000	0	10,000	0.91
Cocoa	125,900	0	125,900	11.43	Dried Fruits	6,700	0	6,700	0.61
Cotton	58,500	0	58,500	5.31	Rice	5,400	0	5,400	0.49
Flowers and Plants	0	34,000	34,000	3.09	Wine Grapes	400	3,800	4,200	0.38
Fresh Fruits/ /Vegetables	3400	21,500	24,900	2.26	Honey	3,600	0	3,600	0.33
Cane Sugar	17,600	0	17,600	1.60	Quinoa	2,900	0	2,900	0.26
Nuts and Oilseeds	16,900	0	16,900	1.53	Fruit Juices	2,300	0	2,300	0.21
Sports Balls	0	16,400	16,400	1.49	Grand Total	**938,400**	**162,800**	**1,101,200**	100.00

Source: Own elaboration based on Monitoring… [2011].
Źródło: Opracowanie własne na podstawie Monitoring… [2011].

In 2010, 58% of all farmers and workers within the Fairtrade system lived in Africa. Latin America and the Caribbean accounted for 25% of all famers and workers within the Fairtrade system, and Asia and Oceania for 17%. Of the 63 countries where Fairtrade International is present, Tanzania had the most farmer members of Fairtrade organizations, while India was the largest country in terms of workers in Fairtrade hired labour organisations. The size of Fairtrade producer organizations varies widely. The smallest producer organization has only 9 members, and the largest more than 70 000 [Monitoring... 2011].

FAIR TRADE CRITICISM

According to Henderson Fair Trade means "paying a price premium for commodities based not on quality but on employment and other conditions which is counter-productive and unfair". As a result consumers get lower-quality products. Secondly, much of extra money from the price premium goes to the fair-trade bureaucracy rather than to the producers. A better solution for Third World producers is to abolish all remaining trade barriers instead of building new ones [Henderson 2008]. The same standpoint present Maseland and de Vaal who claim that the practice of Fair Trade organizations might lead to market distortions that cause adverse effects [Maseland and de Vaal 2002].

Some economists say trade cannot be fair anytime [Żukrowska 2010]. They perceive many negative aspects of Fair Trade. Among the raised objections are:

- excessive, harmful intervention (According to liberal economists the free market development is a better guarantee of the expansion of poor countries than subsidizing their production. (The authors claim that free market is not a ideal market structure and has some downsides, that is why subsidizing can be a good solution to encourage farmers from the Third World.);
- unethical money allocation and selling techniques (Consumers have been shown to be content paying higher prices for Fairtrade products, in the belief that this helps the very poor [Arnot et al. 2006]. There is no evidence how much of the extra money paid to the exporting cooperatives reaches the Fair Trade producers from the Third World. Nobody monitors how much extra retailers charge for Fair Trade goods. The authors totally agree with this statement.);
- overproduction argument (Some critics argue that Fair Trade harms non-Fair Trade producers. Fair trade organizations explain that their farmers are paid higher prices and are given special advice on increasing yields and quality. Such a situation encourage them to increase the production. In the authors' opinion joining the Fair Trade association is a full free option and every farmer or producer can do it.);
- corruption (According to authors, subsidising of certain manufacturers can lead to a lot of abuse.).

CONCLUSIONS

Based on the data presented, the following conclusions can be drawn:

- the crucial Fair Trade products include coffee, cocoa, bananas and cane sugar;
- the value of retail sales of Fair Trade production has increased five times over the past eight years (2004–2011);
- the main two importers of Fair Trade production in the years 2004–2011 were the United Kingdom and the United States. The share of these countries in the sold production exceeded 50% in the analysed period;
- majority of all farmers and workers within the Fairtrade system lived in Africa;
- some economists perceive many negative aspects of Fair Trade: harmful intervention, unethical money allocation, corruption and overproduction argument are the

most negative aspects of Fair Trade considered by them. The authors agree with the majority of noted negative aspects of Fair Trade but cannot share opinion about harmful intervention caused by Fair Trade rules;
- according to the authors the idea of Fair Trade movement is a valuable one and is worth popularising.

REFERENCES

Arnot C., Boxall P., Cash S., 2006. Do ethical consumers care about price? A revealed preference analysis of Fair Trade coffee purchases. Canadian Journal of Agricultural Economics, Vol. 54, 4, 555–565.

Becchetti L., Huybrechts B., 2007. The Dynamics of Fair Trade as a Mixed-form Market. Journal of Business Ethics, 81, 733–750.

Henderson D., 2008. Fair Trade is counterproductive – and unfair. Economic Affairs, 28 (3), 62–64. http://dx.doi.org/10.1111/j.1468-0270.2008.00847.x (Accessed: September 2012).

EFTA, 2006. Joining Fair Trade Forces. http://www.european-fair-trade-association.org/efta/Doc/What.pdf (Accessed: September 2012).

Fair trade = fair deal, 2005. Canadian Journal of Dietetic Practice and Research 66 (1). http://www.highbeam.com/doc/1P3-823614131.html (Accessed: September 2012).

Fairtrade Foundation – History, 2012. http://www.fairtrade.org.uk/what_is_fairtrade/history.aspx (Accessed: September 2012).

FLO (Fairtrade Labelling Organizations International), 2012. http://www.fairtrade.net/about_us.html (Accessed: September 2012).

For Producers with Producers – Highlights from Fair Trade International's 2011–12 Annual Report, 2012. http://www.slideshare.net/fairtrade/fairtrade-international-annual-report-201112-for-producers-with-producers (Accessed: September 2012).

Jagiełło B., 2010. Droga do Fair Trade: ewolucja relacji północ – południe w perspektywie porównawczej, (in) Fair Trade w globalizującej się gospodarce. Warsaw School of Economics, Warsaw, 31–34.

Maseland R., Vaal A. de, 2002. How fair is Fair Trade? De Economist, 150 (3), 251–251. http://www.hec.unil.ch/ocadot/SECODEVdocs/Articles/Maseland-DeVaal.pdf (Accessed: September 2012).

Monitoring the scope and benefits of fair trade, Report 3rd Edition, 2011. http://www.fairtrade.org.uk/includes/documents/cm_docs/2012/M/Monitoring%20the%20scope%20and%20benefits%20of%20Fairtrade%202011%20PUBLIC%20FLO%20Dec11.pdf (Accessed: September 2012).

Moore G., 2004. The Fair Trade Movement: Parameters, Issues and Future Research. Journal of Business Ethics 53, 73–86.

Reynolds L.T., Murray D.L., 2007. Contemporary challenges and future prospects, (in) Fair Trade. The challenges of transforming globalization. Routledge Taylor & Francis Group, London & New York, 223–224.

Sixty Years of Fair Trade, 2006. http://www.eftafairtrade.org/ (Accessed: September 2012).

A Success Story for Producers and Consumers. Fair Trade Facts and Figure, 2011. http://www.european-fair-trade-association.org/efta/Doc/FT-E-2010.pdf(Accessed: September 2012).

WFTO (World Fair Trade Organization), 2012. http://www.wfto.com/index.php?option=com_content&task=view&id=889&Itemid=290 (Accessed: September 2012).

WFTO, Annual Report 2010, 2010. http://www.wfto.com/index.php?option=com_ content&task=view&id=26&Itemid=109 (Accessed: September 2012).

What is FINE?, 2003. [Available at:] http://www.rafiusa.org/programs/Bangkok%20proceedings/12What%20is%20FINE.pdf (Accessed: September 2012).

Żukrowska K., 2010. Terms of trade i Fair Trade – teoria R. Prebischa dzisiaj, (in) Fair Trade w globalizującej się gospodarce, Warsaw School of Economics, Warsaw, 12–13.

ISTOTA SPRAWIEDLIWEGO HANDLU (FAIR TRADE) I JEGO ZNACZENIE W GOSPODARCE ŚWIATOWEJ

Streszczenie. W artykule przedstawiono najważniejsze zagadnienia dotyczące sprawiedliwego handlu (Fair Trade). Według autorów artykułu ruch Fair Trade jest bardzo ważną ideą, której celem jest zmiana lokalizacji i podniesienie poziomu życia dużej części populacji z biednych regionów świata. Dane empiryczne pochodzące z dwóch największych organizacji Fair Trade na świecie, tj. Światowej Organizacji Sprawiedliwego Handlu (WFTO) oraz Fairtrade Labelling Organizations International (FLO), zaprezentowane zostały w formie tabelarycznej i graficznej. Należy zauważyć, że wielkość produkcji i sprzedaży produktów Fair Trade rośnie na przestrzeni lat (dwucyfrowy poziom rocznej stopy wzrostu). Do głównych produktów Fair Trade należy zaliczyć: kawę, kakao, banany oraz cukier trzcinowy. Największymi importerami produktów Fair Trade w latach 2004–2011 były Wielka Brytania oraz Stany Zjednoczone Ameryki Północnej. Większość rolników i pracowników w ramach systemu produkcji Fair Trade zamieszkuje obszar Afryki. Do najbardziej negatywnych aspektów sprawiedliwego handlu (Fair Trade) uwzględnianych przez ekonomistów należy zaliczyć: szkodliwy interwencjonizm, nieetyczny (niesprawiedliwy) przydział pieniędzy, korupcję oraz nadprodukcję.

Słowa kluczowe: sprawiedliwy handel (Fair Trade), produkty Fair Trade, Światowa Organizacja Sprawiedliwego Handlu (WFTO), Fairtrade Labelling Organizations International (FLO), krytyka sprawiedliwego handlu

Accepted for print – Zaakceptowano do druku: 22.11.2012

ACTA SCIENTIARUM POLONORUM *Oeconomia 11 (4) 2012, 59–70*

THE ROLE OF INTERNATIONAL ECONOMIC ACTIVITY OF NON-FARM ENTERPRISES IN RURAL AREAS

Joanna Wiśniewska
Poznań University of Life Sciences

Abstract. The article analyzes the share of international trade and foreign capital in non-farm companies in rural areas in 2005 and 2010. It enabled verification of the hypothesis on changes, forms and levels of international business. It argues that the internationalisation of the researched companies depends on the size of the company as well as its location. The important determinants influence the process: potential and agglomeration effect. They are responsible for the differentiation of international business activities of companies in agricultural and urbanised areas. The argued phenomena exert negative influence on sustainable development of national economy.

Key words: internationalisation, non-farm enterprises, rural areas

INTRODUCTION

The purpose of this study is to address a specific problem, the extent to which the location determines the forms of international involvement of the enterprises, in particular – how SMEs' international activity is linked to their location. The main assumption is that company international commitment is to some range determined by the location decisions. The study aims to expand the empirical evidence on under-researched area within internationalisation – the location patterns of international operations and pace of the process. There are proposed: a method to materialize different forms of internationalisation with functional types of areas, and the joint approach for spatial and size factors. It poses and verifies the following hypotheses concerning SMEs' international activities:

1. Even thought small and medium-sized enterprises have diversified share of international operations, on average it is lower in agricultural areas than in urbanised areas and they are likely to lag behind.
2. The share of different forms of small and medium-sized enterprises' international activities depend on their size and territorial location.

Corresponding author – Adres do korespondencji: Poznań University of Life Sciences, Department of Economics, 28 Wojska Polskiego Str., 60-637 Poznań, Poznań, e-mail: wisniew@up.poznan.pl.

3. The share of foreign capital in domestic small and medium-sized enterprises depends on the functional type of their location.

LITERATURE REVIEW

There is branch and territorial diversification of enterprise competitiveness, which results from different capacity of branches and regions to create the conditions for starting and functioning of business. It is a complex feature, whose evaluation requires that numerous aspects of functioning of a business entity should be taken into consideration, e.g. the potential, competitive advantage, market position, competitiveness instruments and competitors [Gorynia, Stępień and Sulimowska 2000]. Since the origin of the competitiveness theory it has been accompanied by the enterprise location theory. The competitive advantage of the enterprise depends on its location. In the international aspect differences in the costs of production factors lead to the location of production in the countries which have the advantage. Then their products are exported. However, the traditional approach does not take the problem of global competition into account [Gorynia 2007b].

At present the problem is approached as the business network theory [Porter 2000]. In the entity aspect it concerns three entities: an individual enterprise, several competing enterprises, the territorial system of business activity [Budner 1999]. Owing to the location of enterprises which are direct competitors near each other there are positive external effects. They become the factor of attractiveness of a particular location and they attract new entities and create agglomerations, which are the source of so-called agglomeration advantages: scale advantages, location advantages, urbanisation advantages, branch interrelation advantages [Gorynia and Jankowska 2008].

Scale advantages result from specialisation and bulk purchase and sales market. Location advantages result from the concentration of many enterprises in a particular area, their cooperation and innovativeness resulting from the competition and specialisation of business surrounding institutions in providing services for a specific group of recipients. On the other hand, urbanisation advantages result from the location of various branches in the neighbourhood and their relations with different fields [Budner 1999]. The agglomeration effect still plays a considerable role in the location of enterprises in urban centers in spite of the fact that in many of them serious problems appear, such as: limited access to building and recreational areas, depletion of the capacity of infrastructure equipment, immigrant population integration problems, overpopulation and concentrations of urban poverty, deterioration of the quality of the natural environment [Budner 1999].

The growing limitations of urban centres favour deconcentration of the population, deglomeration and dispersion of settlement to suburban areas, where business is also moved. In consequence, the structure of economy and dynamics of development of rural areas are improved. Three essential factors influence this: the likelihood of formation of new enterprises, the degree of survival of new enterprises, the rate of increase in competitiveness of enterprises. The index of formation of new business entities is higher in the areas which already have some economic concentration. Therefore, the development

of enterprise in areas with low concentration of new businesses is particularly difficult [Jackson, Klich and Rzymska 2000].

The location and competitiveness of enterprises play a significant role in the regional development. There are two approaches to competitiveness in the territorial aspect: as the sums of competitiveness of enterprises operating in a particular area and as secondary competitiveness of the region in the macroeconomic aspect [Gorynia and Łaźniewska 2009]. The contemporary concepts of balanced economic development implicate the need of completeness and simultaneousness of the processes of globalisation and local development. Hence, creation of the best conditions of business location from the point of view of local area usability becomes the basic parameter of competitiveness of the region in globalised economy [Jewtuchowicz 2005]. The appearance of a foreign investor influences the local economy and companies operating on the local market by increased competitiveness, danger of substitutes and the bargaining power of suppliers or purchasers [Gorynia 2005].

The problem of business location is one of the most important issues both to the businessperson, employee and the state and local communities. It is one of the most difficult and complicated economic problems [Stawasz 2000]. In practice, the location of an enterprise influences the costs of production, the employee's choice of the place of residence, the access to the market and production resources [Domański 1993]. Socio-economic or technical aspects often limit the possibilities of choice of the business location. Specific branches cannot find suitable conditions for development in all places and vice versa – not all types of businesses can develop in a particular place. The values and location requirements of an enterprise are compared in the development process. The rule of coherence means the right business in the right place [Budner 1999].

So far the results of research have enabled the formulation of two generalisations concerning the factors of enterprise location determined by W. Budner (1999) on the basis of studies by T. Bergin and W. Egan (1964) and K. Brenke (1996): the evaluation of location factors made by the people making decisions about the location depends on the specific character of the enterprise and the traits of the person making decision about the location, and the location factors are not permanent and they are not a closed set; especially over the last several decades the role of new factors has been increasing [Budner 1999].

In the globalisation era location does not find a significant place in the development of competitiveness of large business entities, because the decreasing costs of trade and communication have significantly increased access to supply markets, sales and know-how regardless of the location of the enterprise [Ketels 2006]. Competitiveness between enterprises stresses quality more than gaining factors of production at the lowest prices. The weakened dependence between the selection of location and the sales market is also influenced by increased concentration and specialisation of production and by progress in communication technologies and transport [Stawasz 2000]. On the other hand, economic processes also point to delocalisation and relocation of parts of the business activity by the application of outsourcing and offshoring in large enterprises. In consequence, there may be geographical concentration and diversification of the activity of the enterprise allowing for the sources of competitive advantage, i.e. cost differences, scale advantages and range advantages [Witek-Hajduk 2010].

The contemporary theories of international location of production stress the importance of institutional and political factors in the choice of location of foreign investments. They point to the significant role of cost factors, markets factors and the factors related with the trade policy. Their importance for the enterprise varies depending on the investment motives. The international location theory provides an explanation to the question how an exporting enterprise uses the location-conditioned competitive advantage on a foreign market. The competitive advantage or loss determines the spatial distribution of investments, production and directions of international trade. Along with the theory of property and internalisation the location theory makes an element of J.H. Dunning's eclectic theory (1980), which assumes the competitive advantage of foreign capital over local business entities [Rymarczyk 2004, Gorynia 2005, Gorynia 2007a, Witek-Hajduk 2010]

The specific qualities of enterprise location, which may turn into such competitive advantages as the access to the source of raw materials, sales market, natural resources, labour, transport and energy, still remain extremely important to small enterprises, especially to those whose products occupy an important position on local markets [Jackson, Klich and Rzymska 2000, Markowski 2004]. Pursuing cost minimisation is a chief criterion of optimisation of the location choice of those enterprises, especially the resource values associated with access to all the factors of production in one place.

In highly developed economies enterprises in rural areas make up to 40% of the total enterprise population. They operate in branches directly or indirectly related with agriculture. The factors of enterprise development in rural and urbanised areas exhibit both similarities and differences. However, studies point to additional difficulties encountered by enterprises in rural areas. For example, they may result from the distance between them and the sales markets or business services. In comparison with the enterprises located in cities they use different forms of financial aid more frequently [Smallbone et al. 2002, Carrington and Zantoko 2008, Strzyżewska 2011].

Enterprises in rural areas are the subject of numerous scientific studies, which most often bring up the problem of their insufficient development in developing economies or economies under transformation. The issue of the influence of this phenomenon on the increasing differences between the income of the population in rural and urbanised areas is discussed [Liu and Yu 2008]. The authors point to the benefits resulting from the development of enterprises for the economic boom in typically agricultural areas. They are a carrier of knowledge and innovativeness for farms, the source of developing farmers' skills and the factor of improvement in the quality of agricultural products [Bekele and Muchie 2009].

In rural areas in Poland the number of new enterprises is falling and farmers show hardly any interest in enterprise development programmes [Jackson, Klich and Rzymska 2000, Kłodziński 2003]. This tendency is in stark opposition to the trend in highly developed countries, where the ratio between the new enterprises and the population in rural areas is rising [Smallbone et al. 2002, The agricultural... 2010 and The path... 2010]. In the economic structure of Polish cities the enterprise sector has an established position. However, in rural areas the development of enterprises has only begun [Ratajczak 2010, Zawisza and Dończyk 2010]. It encounters a number of barriers, which are more intensified than in urban areas [Ratajczak 2010, Strzyżewska 2011].

Simultaneously, in rural areas there are factors which favor the development of the enterprise sector. They include such aspects as: lower prices of land, low and more stable salaries, a limited role of trade unions [Kulawczuk 1995]. Local markets are not very competitive yet. Thus, the intensification of competition does not determine the strength of enterprises in rural areas [Zawisza and Dończyk 2010]. Additionally, there are no business support institutions in Polish rural areas and the policy supporting rural enterprises is characterised by strong dispersion of potential and means [Kłodziński 2003]. By contrast, in highly developed economies there is considerable effort made to support business development in rural areas [Smallbone et al. 2002, Bakele and Muchie 2009, Zawisza and Dończyk 2010].

The economic growth is a new combination of material factors and technological processes, whose aim is to obtain new products or create new organisations [Schumpeter 1934]. New processes appear in new enterprises, which have been developed from scratch. Usually they are not formed from old enterprises, but they appear and start production along with old businesses [Jackson, Klich and Rzymska 2000]. Thus, the development of enterprises in rural areas is an economic process created by entities which are not related with agriculture, i.e. businessmen operating in rural areas in non-agricultural branches, who function in combination with or in separation from agriculture. This contributes to balanced economic development of rural areas, regions and countries.

MATERIAL AND METHOD

The international economic activity of non-farm enterprises in rural areas has been considered according to their location, employment size and the forms and dynamics of the internationalisation process. The aim of the research was to compare the forms and level of international involvement of enterprises. The enterprise internationalisation was evaluated by means of the available indexes of trade exchange and share of foreign investments.

The research population is made from the enterprises, which according to the definition specifying the number of employees, are small (10–49 employees) and medium-sized (50–249 employees). The population of the enterprises under investigation corresponds to the number of enterprises which submitted statistical reports in selected rural communes and rural areas of urban and rural communes in Poland in 2005 and 2010[1]. The researched population comprised 1,183 enterprises in 2005 and 1,542 in 2010, including 773 and 988 small and 410 and 554 medium-sized enterprises which reported on incomes, costs, financial results and costs of fixed assets of enterprises[2].

The entities were located in 185 communes, including 18 urbanised communes, 53 multifunctional communes, 82 communes with prevailing agricultural functions and

[1]The research does not include the entities working in the following branches: agriculture, forestry, hunting and fishing, public administration and national defence, compulsory social insurance, households employing workers, households making products and providing services for their own needs, exterritorial organisations and teams (according to the Polish Classification of Activity 2007).
[2]Main Statistical Office database.

32 strictly agricultural communes. The location pattern shows the highest number of enterprises in urbanized area, and the smallest in agricultural ones in all size categories (Table 1). The communes selected for the research were classified according to standardised functional types as the following areas: urbanised, multifunctional, with prevailing agricultural functions, strictly agricultural. The basis of standardisation of functional types was the degree of concentration of socio-economic structures. Thus, urbanised areas are characterised by considerable concentration of intensive structures, especially: housing, services, production and recreation and they meet the following criteria: location beyond the administrative boundaries of urban communes, population density of more than 100 residents per 1 km^2, more than 140 registered business entities per 1000 inhabitants at the working age and positive migration balance [Bański 2009].

Table 1. The distribution of the researched population of enterprises according to the employment and rural area type in 2005 and 2010

Tabela 1. Rozkład badanej populacji przedsiębiorstw według wielkości zatrudnienia i typu obszaru w latach 2005 i 2010

Area Type	Number of								
	Communes	Small Enterprises		Medium		SMEs in total		Share (%)	
		2005	2010	2005	2010	2005	2010	2005	2010
Urbanised	18	213	334	141	209	354	543	29.9	35.2
Multifunctional	53	242	308	117	159	359	467	30.3	30.3
Prevailing Agricultural Functions	82	215	225	108	132	323	357	27.3	23.2
Strictly Agricultural	32	103	121	44	54	147	175	12.4	11.3
Total	185	773	988	410	554	1183	1542	100.0	100.0

Source: The author's compilation based on the Main Statistical Office unpublished data from statistical reports on incomes, costs, financial results and costs of fixed assets of enterprises.

Źródło: Badania własne na podstawie niepublikowanych danych GUS ze sprawozdań statystycznych o przychodach, kosztach, wyniku finansowym i nakładach na środki trwałe przedsiębiorstw.

Next, the multifunctional areas are a transitional form between urbanised areas and traditional rural areas. They meet the following criteria: location beyond the boundaries of urban areas, more than 100 registered business entities per 1000 inhabitants at the working age and positive migration balance. The areas with prevailing agricultural functions are those where agriculture has a definite advantage over other economic functions. They are characterised by high diversification, ranging from strict commercial farming to extensive farming. The areas meet the following criteria: they are located outside urbanised and multifunctional areas, the share of farmland is more than 70% of the total area and the number of farms running only an agricultural activity exceeds 70% of the total number of farms. In strictly agricultural areas, which are characterised by the dominance of the agricultural function, concentration of farmland, natural conditions favourable to agricultural production and a high share of commercial farms, other economic functions are of small importance. Those areas are located outside the aforementioned types of

areas; the share of farmland exceeds 80% of the total area or the share of farms with chiefly market-oriented production amounts to more than 70% [Bański 2009].

In the research a simple quantitative analysis of percentage changes of mean shares of exports in total sales and imports in total costs has been used. The share of enterprises with foreign capital in the total number of enterprises in the researched groups and locations has been analysed. The analysis enabled to indicate changes amid years 2005 and 2010 of internationalisation of enterprises measured by share of export sales and import purchases. It indicates also the changes in number of enterprises with foreign capital share.

RESEARCH OUTCOMES AND DISCUSSION

The basic form of foreign involvement of an enterprise is export and import. Export is an active form of international involvement related with supplying the products of the enterprise to foreign markets [Rymarczyk 2004]. Entrepreneurs execute direct and indirect export [Gorynia 2007a].

The share of exports in total sales of SMEs was varied in different locations. In 2010 the highest share of exports was in medium-sized enterprises – 25.4% in total. In the researched group of enterprises it was the smallest in highly agricultural areas – 10.8%. In the group of small enterprises the highest was in multifunctional areas – 21.7%, and the smallest in urbanised – 8.3%. In medium sized, the smallest in highly agricultural – 7.4%, and the highest in prevailing agricultural – 31.7% (Table 2).

In 2010 it increased by 12 percentage points in total, by 19 in multifunctional areas and only by 2 in highly agricultural areas, as compared with 2005. The highest grow was in small enterprises in multifunctional areas – by 37 percentage points, whereas it decreased in medium-sized enterprises in highly agricultural area by 33 percentage points. The export grew more rapidly in medium-sized then in small enterprises, respectively by 15 and 10 percentage points.

To sum up, in the researched group of enterprises in the given years, there was the least important role of the export in highly agricultural, and less in urbanised areas than in multifunctional and prevailing agricultural areas where it was most important.

Import is a form of passive involvement abroad, related with purchasing commodities or services on foreign markets [Rymarczyk 2004]. Import satisfies current productive needs – supply import, development needs – investment import and consumption needs – consumption import. Enterprises execute supply import directly or indirectly, which satisfies their current productive and investment needs. It is the import of raw materials, materials and blanks for production purposes and the import of machines, appliances and know-how. Another form of trade exchange is the import of trade commodities, i.e. the import of commodities to be resold, which replace domestic production, substitutive import or competitive to domestic products. Total import purchase is the net value of purchased imported commodities and services, i.e. without the VAT and handling costs, including the purchase of imported fixed assets and services.

The researched enterprises based their activity on imported products to a different extent. In 2010 in researched SMEs the average share of imports in total costs

Table 2. The involvement of imports, exports and foreign capital in non-farm enterprises according to the employment and rural area type in 2005 and 2010 (%)

Tabela 2. Udział importu, eksportu i kapitału zagranicznego w nierolniczych przedsiębiorstwach według wielkości zatrudnienia i typu obszaru rolniczego w latach 2005 i 2010 (%)

Area Type	The average share of (%)						Change		
	Exports in total sales		Imports in total costs		Enterprises with foreign capital				
	1		2		3		1	2	3
	2005	2010	2005	2010	2005	2010	2010/2005		
Small and Medium (S&M)									
Urbanised	18.0	21.1	26.2	29.8	19.5	23.9	117	114	123
Multifunctional	21.6	25.8	12.3	13.2	11.1	12.6	119	107	114
Prevailing Agricultural Functions	23.9	25.1	10.6	9.9	10.8	9.8	105	93	91
Strictly Agricultural	10.6	10.8	5.6	5.8	6.1	6.3	102	104	103
Total S&M	19.9	22.3	17.1	19.3	12.9	15.2	112	113	118
Small enterprises (S)									
Urbanised	7.4	8.3	32.9	39.1	14.6	18.6	112	119	127
Multifunctional	15.8	21.7	8.3	10.7	9.9	10.4	137	129	105
Prevailing Agricultural Functions	15.0	16.7	4.2	2.8	7.9	8.4	111	67	106
Strictly Agricultural	9.3	9.8	3.8	6.4	2.9	6.6	105	168	228
Total S	12.3	13.5	17.1	21.5	9.7	12.2	110	126	126
Medium-sized enterprises (M)									
Urbanised	20.4	24.7	23.4	24.8	27.0	32.5	121	106	120
Multifunctional	23.7	27.3	14.4	14.5	13.7	17.0	115	101	124
Prevailing Agricultural Functions	26.8	31.7	13.1	14.0	16.7	12.1	118	107	72
Strictly Agricultural	11.1	7.4	6.4	5.4	13.6	5.6	67	84	41
Total M	22.1	25.4	17.1	18.1	19.0	20.6	115	106	108

Source: The author's compilation based on the Main Statistical Office unpublished data from statistical reports on incomes, costs, financial results and costs of fixed assets of enterprises.

Źródło: Badania własne na podstawie niepublikowanych danych GUS ze sprawozdań statystycznych o przychodach, kosztach, wyniku finansowym i nakładach na środki trwałe przedsiębiorstw.

was 19.3%, and was the highest in urbanised areas –29.8%, and the smallest in highly agricultural – 5.8%. It was the highest in small enterprises located in urbanised areas – 39.1% of share in total costs, and the smallest in the same group in prevailing agricultural – only 2.8%.

In 2010 in the researched group the average share of imports increased by 13 percentage points, as compared with 2005. In the enterprises located in urbanised and multifunctional areas it increased more rapidly, respectively by 14 and 7 percentage points, whereas

in prevailing agricultural areas a decrease was observed by 7 percentage points. The same pattern of change was observed for small enterprises, but changes were generally more rapid, respectively increase by 19, 29 percentage points and decrease by 33 percentage points. In medium-sized enterprises changes were slighter than in small ones. In those located in urbanised and multifunctional areas import shares grow was 6 percentage points and 1 percentage point, and decreased in those located in highly agricultural areas was by 6 percentage points.

To recapitulate, in the researched group of enterprises in the given years, the SME in urbanised areas are more importing, and those in multifunctional and prevailing agricultural are more exporting, whereas those in highly agricultural areas are the least exporters and importers as well.

At present apart from traditional trade relations cooperation is an essential form of international involvement of enterprises. The sake of the shares of an enterprise on the domestic market to a foreign entity is a passive, non-cooperative and capital form of internationalisation [Witek-Hajduk 2010]. On one hand, the investment involvement of Polish enterprises abroad is not high, but it has been increasing in recent years. On the other hand, the location of foreign investments in domestic enterprises is a significant economic process and so far it has been the dominant form of internationalisation of Polish enterprises [Rymarczyk 2004].

In the researched group the number of enterprises with foreign capital changed depending on the size of the enterprise and the functional type of the area. On average the share of entities with foreign capital was 12.9% in 2005 and it increased to 15.2% in 2010. Their share was the highest in urbanised areas, i.e. 23.9% in 2010, and it was the lowest in highly agricultural areas, i.e. 6.3%. There were similar changes between 2005 and 2010 – their share rose by 23 percentage points in urbanised areas and only by 3 percentage points in highly agricultural areas, whereas in the areas with prevailing agricultural functions it dropped to 9 percentage points.

Among small enterprises the share of foreign capital was nearly 9.7% in 2005 and it increased to 12.2% in 2010. The share of small enterprises with foreign capital was diversified according to the area type. The largest number of enterprises was located in urbanised areas – 18.6% in 2010, whereas the smallest number was in highly agricultural areas, i.e. 6.6%. The dynamics of enterprises with foreign capital was similar; in 2010 in urbanised and highly agricultural areas their share increased by 27 and 128 percentage points as compared with 2005. In the areas with prevailing agricultural functions and in multifunctional areas the increase reached barely by 6 and 5 percentage points.

In medium-sized enterprises the share of foreign capital was higher than in small enterprises. It was 19% in 2005, but it rose to 20.6% in 2010. The number of enterprises with foreign capital differed depending on the area type. In 2010 the largest number of medium-sized enterprises was located in urbanised areas – nearly 32.5%, whereas the smallest number was in highly agricultural areas – 5.6%. There was different dynamics of the number of enterprises between 2005 and 2010. Their number increased by 20 and 24 percentage points respectively in urbanised and multifunctional areas, whereas in the areas with prevailing agricultural functions and in highly agricultural areas it decreased 28 and 59 percentage points respectively.

CONCLUSIONS

The research took into consideration the diversification of the structure of size and location of enterprises. This enabled the author to draw a conclusion about the heterogeneity of the processes of enterprise internationalisation and their concentration in urbanised areas. The analysis confirmed the presence of two important effects in the process of enterprise internationalisation: potential effect and agglomeration effect.

The presence of those effects is proved by the international involvement of larger enterprises located in the areas near urban agglomerations. Enterprises in urbanised areas gain agglomeration advantages resulting from the advantages of scale, location and urbanisation. In the researched group of enterprises the agglomeration effect clearly determines the forms of their internationalisation, more passive in enterprises located in urbanised areas in the mean of import's supply for the nearby agglomerate markets and more active in enterprises located out of urbanised areas in the mean of export's supply for the international markets. The enterprises located in highly agricultural markets are less internationalized than those in the other areas. The presence of these effect in the process of enterprise internationalisation means that the aim of enterprises is to gain and maintain permanent advantage on the local market rather than realise global strategies.

The internationalisation potential of enterprises depends on the possibility to gain foreign capital and thus, to gain advantage over domestic competitors. The share of enterprises with foreign capital changed along with the size of enterprises and the type of the area where they were located. There was a higher number of enterprises with foreign capital among medium-sized rather than small companies. The highest number of these was located in urbanised areas and the lowest in highly agricultural areas. The share of enterprises with foreign capital among small and medium-sized enterprises in urbanised areas was about 20 and 30% respectively, whereas in highly agricultural areas it was about 7 and 6% respectively. However, as far as medium-sized enterprises are concerned, in 2010 there was a slightly slower rate of growth of enterprises with foreign capital, as compared with 2005. There was a similar increase in the number of small enterprises with foreign capital in urbanised and highly agricultural areas.

The location of direct investments in the largest enterprises located within the agglomeration confirms the assumptions of J.H. Dunning's [1980] eclectic theory of direct investments. It assumes that the internationalisation of production takes place where there are specific advantages resulting from the property, internalisation and location. In consequence, there are even bigger differences in the development of outskirts, including highly agricultural areas and the areas with prevailing agricultural functions and their competitiveness decreases. To recapitulate, there is considerable diversification in the process of internationalisation of Polish enterprises, which may influence the balanced development of economy.

REFERENCES

The agricultural sector and rural businesses in Kent – Kent Rural Evidence Base 2009, 2010. Kent County Council, Kent.

Bański J., 2009. Typy obszarów funkcjonalnych w Polsce. PAN Instytut Geografii i Przestrzennego Zagospodarowania im. S. Leszczyckiego. http://www.igipz.pan.pl.

Bekele E., M. Muchie, 2009. Promoting Micro, Small and Medium Enterprises (MSMEs) for Sustainable Rural Livelihood. Aalborg University Research Series. Working Paper 11, http://www.diiper.ihis.aau.dk/research/3397011 (Accessed: 05.10.2011).

Budner W., 1999. Lokalizacja przedsiębiorstw. Materiały Dydaktyczne 55, Wydawnictwo Akademii Ekonomicznej, Poznań.

Carrington C., Zantoko L., 2008. Rural-Based Entrepreneurs. SME Financing Data Initiative. Industry Canada, Ottawa, http://www.sme-fdi.gc.ca/eic/site/sme_fdi-prf_pme.nsf/eng/h_02133.html (Accessed: 05.03.2012).

Domański R., 1993. Gospodarka przestrzenna. PWN, Warszawa.

Dunning J.H., 1980. Toward an Eclectic Theory of International Production. Journal of International Business Studies Vol. 11, 1.

Gorynia M. (ed.), 2005. Strategie firm polskich wobec ekspansji inwestorów zagranicznych. PWE, Warszawa.

Gorynia M., 2007a. Strategie zagranicznej ekspansji przedsiębiorstw. PWE, Warszawa.

Gorynia M., 2007b. Studia nad transformacją i internacjonalizacją gospodarki polskiej. Centrum Doradztwa i Informacji. Difin, Warszawa.

Gorynia M., Jankowska B., 2008. Klastry a międzynarodowa konkurencyjność i internacjonalizacja przedsiębiorstwa. Difin, Warszawa.

Gorynia M., Stępień B., Sulimowska M., 2000. Konkurencyjność przedsiębiorstwa – koncepcje, pomiar, ocena i standaryzacja, (in) M. Gorynia, J. Schroeder (eds), Przedsiębiorstwo a internacjonalizacja działalności gospodarczej. Zeszyty Naukowe Seria. Zeszyt 278. Wydawnictwo Akademii Ekonomicznej w Poznaniu, Poznań).

Gorynia M., Łaźniewska E., 2009. Kompendium wiedzy o konkurencyjności. PWN, Warszawa.

Henry M., Drabenstott M., 1996. A New Micro View of the US Rural Economy. Economic Review. Kansas City: Federal Reserve Bank of Kansas City.

Jackson J.E., Klich J., Rzymska K., 2000. Nowe przedsiębiorstwa w transformacji polskiej gospodarki. Gospodarka Narodowa 5–6, 42–77.

Jewtuchowicz A., 2005. Terytorium i współczesne dylematy jego rozwoju. Wydawnictwo Uniwersytetu Łódzkiego, Łódź.

Ketels C., 2006. Michael Porter's Competitiveness Framework – Recent Learning and New Research Priorities. Journal of Industry, Competition and Trade 6, 115–136.

Kłodziński M., 2003. Rozwój przedsiębiorczości na obszarach wiejskich. Ubezpieczenia w rolnictwie. Materiały i Studia 1, 13–25.

Kulawczuk P., 1995. Rozwój przedsiębiorczości wiejskiej, (in) M. Bąk (ed.), Rozwój gospodarki wiejskiej. Przedsiębiorczość jako droga restrukturyzacji wsi w Polsce. Oficyna Naukowa, Warszawa.

Liu M., Yu J., 2008. Financial Structure, Development of Small and Medium Enterprises, and Income Distribution in the People's Republic of China. Asian Development Review 25, 137–155.

Markowski T., 2004. Przestrzeń w zarządzaniu rozwojem regionalnym i lokalnym. KPZK PAN, Warszawa.

The path to strong, sustainable and balanced growth, 2010. HM Treasury. Department for Business Innovation and Skills, London.

Porter M.E., 2000. Location, competition, and economic development: local clusters in global economy. Economic Development Quarterly 14, 15–34.

Ratajczak M., 2010. Kondycja ekonomiczna małych i średnich przedsiębiorstw z obszarów wiejskich Warmii i Mazur. Acta Scientiarum Polonorum – Oeconomia 9, 163–172.

Rymarczyk J., 2004. Internacjonalizacja i globalizacja przedsiębiorstwa. PWE, Warszawa.

Schumpeter J., 1934. The Theory of Economic Development. Harvard University Press, Harvard.

Smallbone D., North D., Baldock R., Ekkanem I., 2002. Encouraging and Supporting Enterprise in Rural Areas. Centre for Enterprise and Economic Development Research, London.
Stawasz D., 2000. Współczesne uwarunkowania rozwoju polskich regionów. Wydawnictwo Uniwersytetu Łódzkiego, Łódź.
Strzyżewska M., 2011. Wpływ internacjonalizacji polskich przedsiębiorstw na ich wyniki ekonomiczne, (in) A. Adamik (ed.), Kształtowanie konkurencyjności i przewagi konkurencyjnej małych i średnich przedsiębiorstw. C.H. Beck, Warszawa, 263–280.
Witek-Hajduk M.K., 2010. Strategie internacjonalizacji polskich przedsiębiorstw w warunkach akcesji polski do unii europejskiej. Oficyna Wydawnicza Szkoły Głównej Handlowej. Monografie i Opracowania 568, Warszawa.
Zawisza S., Dończyk M., 2010. Uwarunkowania rozwoju przedsiębiorczości na przykładzie gminy Gostyń. Acta Scientiarum Polonorum – Oeconomia 9, 251–260.

ZNACZENIE MIĘDZYNARODOWEJ DZIAŁALNOŚCI GOSPODARCZEJ PRZEDSIĘBIORSTW NIEROLNICZYCH NA OBSZARACH WIEJSKICH

Streszczenie. W artykule poddano analizie udział handlu i kapitału zagranicznego w nierolniczych przedsiębiorstwach na obszarach wiejskich w latach 2005 i 2010. Analiza pozwoliła na zweryfikowanie hipotez dotyczących zmian, form i poziomu międzynarodowej działalności gospodarczej. Dowiedziono, iż internacjonalizacja badanych przedsiębiorstw zależy od wielkości przedsiębiorstwa, jak również od jego lokalizacji. Dwa ważne czynniki wpływają na ten proces: efekt potencjału i aglomeracji. Są one odpowiedzialne za zróżnicowanie międzynarodowej działalności gospodarczej przedsiębiorstw na terenach rolniczych i urbanizowanych. Dyskutowane zjawisko wywiera negatywny wpływ na zrównoważony rozwój gospodarki narodowej.

Słowa kluczowe: internacjonalizacja, przedsiębiorstwa nierolnicze, obszary wiejskie

Accepted for print – Zaakceptowano do druku: 22.11.2012

ACTA SCIENTIARUM POLONORUM *Oeconomia 11 (4) 2012, 71–81*

APPLICATION OF DYNAMIC MODELS WITH STOCHASTIC PARAMETERS OF THE OBJECTIVE FUNCTION TO THE OPTIMIZATION OF PRODUCTION IN FARMS OF THE WEST POMERANIAN VOIVODSHIP

Jadwiga Zaród
West Pomeranian University of Technology in Szczecin

Abstract. Two dynamic models of stochastic programming were constructed for the West Pomeranian Voivodship. They comprised four successive years of varied agriclimatic conditions, with and without EU subsidies. Model I referred to farms growing crops, whereas Model II referred to those growing crops and livestock. Both models accounted for random parameters of the objective function, which constituted the matrix of farm income achieved in 10 regions of the West Pomeranian Voivodship. Those models were solved by means of three methods using the MATLAB software. The results comprise a precise area of the particular cultures and the fallows, the joint farm income achieved in the four analyzed years and the risk accompanying the accomplishment of it.

Key words: dynamic model, stochastic programming, farm income, risk

INTRODUCTION

Agricultural production, the crops in particular, is closely related to the natural environment of a random character. This, aside of the agrotechnical treatments, determines the size and fluctuations of yields. The optimization of agricultural production in uncertainty conditions is enabled by stochastic programming models. One of the forerunners that classified the problems of stochastic programming was Schneeweiss [1962]. In his distribution he distinguished models with a random objective function. In his paper [1991] Krawiec attempted to solve such models. They concerned the optimization of farm production in a particular year. The operation of farms over a period of a few years was studied by Jeleniewska [1993]. All parameters in those models were deterministic.

Corresponding author – Adres do korespondencji: West Pomeranian University of Technology in Szczecin, Faculty of Economics, 31 Janickiego Str., 71-270 Szczecin, Poland, email: jzarod@zut.edu.pl.

In the global literature one can find many authors discussing the effect of random factors on selected agricultural problems. For instance, Vercammen [2003] investigated the direct subsidies and payments on farm investments. Pihamaa and Pietola [2002] developed a plan of optimum cattle breeding in uncertainty conditions.

This paper discussed the optimization of the total production of farms in the West Pomeranian Voivodship. Its purpose is to determine the production structure yielding the highest farm income in given conditions while minimizing the risk of its achievement. The risk is related to the achievement of farm income in 10 regions of the voivodship of varied agricultural usability in the 2003–2006 period.

RESEARCH METHOD

The research method comprises dynamic stochastic programming models. The dynamic models consist of blocks created by classical linear programming models. The blocks were connected using balance constraints, hereinafter referred to binding constraints. The conditions were build in accordance with the Bellmann's [Bellman and Dreyfus 1967] recurrence equations principle.

The internal constraints for each block can be written as a matrix form [Grabowski 1980]:

$$Ax \leq b \quad \text{restrictive (balance) constraints} \tag{1}$$

$$x \geq 0 \quad \text{boundary constraint} \tag{2}$$

where: A – technical-economic parameters;
b – free term;
x – decisive variables.

The objective function of this model has the following form:

$$Z = \boldsymbol{C}^T\boldsymbol{x} \rightarrow max \tag{3}$$

where: $\boldsymbol{C}$ – the vector of random variables with expected value $E(\boldsymbol{C}_i) = c_i$, variance $D^2(\boldsymbol{C}_i) = s^2$ for $i = 1, 2, \ldots, n$ and covariance $cov\,(\boldsymbol{C}_i\boldsymbol{C}_j) = s_{ij}$ for $j = 1, 2, \ldots, m$.

As the objective function provides random variables, we deal with a stochastic programming model. There is a number of ways to solve such a model. This paper uses three methods referred to as the E, V and VE stochastic programming models [Madansky 1963, Krawiec 1991].

If the expected value of the $\boldsymbol{C}$ vector is presented as $E(\boldsymbol{C}) = c = (c_1, c_2, \ldots, c_n)$, then the objective function (3) can be expressed as:

$$E(Z) = E(\boldsymbol{c}^T\boldsymbol{x}) = \boldsymbol{c}^T\boldsymbol{x} \rightarrow max \tag{4}$$

The model established by the formulas (1)–(2) and (4) constitutes a deterministic linear programming problem. Its solution is a vector of the decision variables x_E and the maximum quality z_E which can be achieved in given conditions. This model is referred to as the E stochastic programming model, and the variance δ^2 of its objective function is determined by the formula:

$$x_E^T S x_E = \delta_E^2 \tag{5}$$

where: S – the matrix of variance and covariance of the objective function parameters.

This variance is a measure of the risk, which might appear too high for the decision-maker.

The V stochastic programming model assumes the variance of Z random variable as the objective function which should be minimized. It has the following form:

$$D^2(Z) = \boldsymbol{x}^T\boldsymbol{S}\boldsymbol{x} \rightarrow min \tag{6}$$

This function is a quadratic form, therefore the solution of the model created by the constraints (1)–(2) and the function (6) is possible solely by the application of the quadratic programming algorithm. The solution of the V model is a vector of the decisive variables x_V and the lowest variance δ_V^2 that can be achieved at the given constraints. The expected value is obtained from the formula:

$$z_V = \boldsymbol{c}^T\boldsymbol{x}_V \tag{7}$$

This value is subject to an insignificant risk, however it might be too low for the decision-maker.

If an additional constraint on the expected value of the objective function in the following form is imposed:

$$\boldsymbol{c}^T\boldsymbol{x} \geq d_i \tag{8}$$

where: d_i – any value the interval $[z_V, z_E]$, or from the interval of the ends determined by the expected value in the V and E models, on the V model. Then such a model, created by the balance constraints (1)–(2), (8) and the objective function (6), will be called the VE stochastic programming model. This model will be solved by means of the quadratic programming and allow the choice of the expected quality z_{VE} (calculated by means of the formula 7), which is profitable for the decision-maker, encumbered by an acceptable risk δ_{VE}^2.

CONSTRUCTION OF A FARM MODEL WITH A RANDOM OBJECTIVE FUNCTION

Information upon farm area (the area of arable grounds and green cultures), the crops structure, the livestock capita, the purchase of means of production and services, the sale of crops and livestock products in the 2003–2006 period were collected from databases of the Central Statistical Office, the Agency for Restructuring and Modernization of Agriculture and the Western Pomeranian Branch of Agricultural Advisory Center. The data from particular years constituted technical-economic parameters and free terms of the respective blocks of a dynamic model of an average farm in the West Pomeranian Voivodship. Those blocks were linked to each other by means of balance constraints (mutual), referring to crop rotation and stock turnover. The objective function was created by the matrix of variance and covariance of farm incomes achieved from each activity in the analyzed years in 10 regions of the West Pomeranian Voivodship. The division of the voivodship into regions of similar agricultural usefulness was conducted by means of a discrimination analysis [Zaród 2009]. The unit income for the particular variables of the crop and stock production was calculated as a result between the production value and direct costs (sowing material, fertilizers, pesticides) and other costs (costs of growing and harvesting, others – e.g. twine, foil, taxes, insurance) without the price of the farmer's own work. The assumptions concerning the unit production values and the costs of particular agricultural activities were based on the Western Pomeranian Branch of Agricultural Advisory Center studies [Kalkulacje rolnicze 2003, 2004, 2005, 2006]. Additionally, farm income in the years 2004 and 2005 were increased by direct and supplementary subsidies, whereas in 2006 also by sugar subsidies. The design of such a model is presented in Table 1 [Zaród 2008].

In the analyzed years approximately 84% of farms in the West Pomeranian Voivodship dealt solely with the crop production; every sixth farm kept livestock. Due to the production character two optimization models were developed. Model I, dealing with crop production, consisted of 44 decision variables and 47 constraints. Model II, developed for an average farm dealing with crop and livestock production, comprised 104 variables and 122 balance constraints. Decision variables for each block of Model I describe the crop area of all cereals, bulb and root plants, papilionaceous plants, rape, the purchase of means of production and the rent of labour. Constraints apply to the area of arable land, the crop structure and labour balance. Additionally, binding constraints apply to the area of crops following each other on a particular field (crop rotation), i.e. crop i in year t will be followed by crop j in year t+1. In models with livestock production the decision variables, apart from the abovementioned ones, pertain to the population of animals of relevant classes and species as well as to the purchase of fodder. The balancing conditions were supplemented with livestock site, organic fertilization and fodder demand balances. Furthermore, subsequent years were linked by livestock population changes, for class i animal in year t will move to class j in year t+1. The optimization criterion, depending on the solution method, is the maximization of farm income or the minimization of the objective function value. Square root of

Table 1. Design of linear-dynamic model
Tabela 1. Schemat modelu liniowo-dynamicznego

Constraints	Decisive variables					
	Year I variables	Year II variables	Year III variables	Year IV variables	Sign	Limit
Constraints of years 0–1					≤	
Internal constraints of year 1					≥ ≤	
Constraints of years 1–2					≥	
Internal constraints of year 2					≥ ≤	
Constraints of years 2–3					≥	
Internal constraints of year 3					≥ ≤	
Constraints of years 3–4					≥	
Internal constraints of year 4					≥ ≤	
Multiyear constraints					≥ ≤	
Objective function					→	max (min)

Source: Own elaboration.
Źródło: Opracowanie własne.

variance (formula (6)) is the risk measure. The unit farm income from particular crops and green cultures in all models in the 2004–2006 period is the sum of income from production and subsidies.

RESULTS OF STOCHASTIC PROGRAMMING MODELS SOLUTIONS

The paper used three methods for solving optimization models with random objective function. For Models I and II the E, V and six VE stochastic models were solved (the interval within the ends determined by the qualities of the farm incomes in the models V and E was divided into five parts). The calculations were conducted using the MATLAB software extended with plugins enabling the solution of linear and quadratic programming stochastic optimization models. The results of each model contain the exact area of particular crops and fallows, the total farm income achieved in the four analyzed years and the risk accompanying its achievement. The assumed crop rotation (identical for both models), which ensured maintenance of high culture of soils, had a substantial effect on the results. The area of particular crops and the succession of crops in the analyzed years in the optimal solutions of Model I is presented in Table 2.

Due to a high number of results the table does not account for the solutions of the VE models, dealing with the type and the area of crops.

Table 2. Crop rotation in optimal solutions of Model I
Tabela 2. Zmianowanie roślin w rozwiązaniach optymalnych modelu I

	Model E									
	Field I		Field II		Field III		Field I		Fallow
	ha									
2003	Potatoes Beets Oats	0.30 0.26 2.31	Wheat Barley	1.58 –	Rape Triticale	1.15 0.32	Rye Other crops	2.70 1.74	2.43
2004	Wheat Barley	2.87 –	Rape Triticale	1.27 0.31	Rye Other crops	– 1.47	Potatoes Beets Oats	0.68 – 3.76	2.30
2005	Rape Triticale	1.21 1.66	Rye Other crops 1.58	–	Potatoes Beets Oats	0.3 0.27 0.90	Wheat Barley	3.13 1.31	3.07
2006	Rye Other crops	2.05 0.82	Potatoes Beets Oats	0.41 0.27 0.90	Wheat Barley	1.47 –	Rape Triticale	1.50 2.94	3.43
	Model V									
2003	Potatoes Beets Oats	0.56 – 0.65	Wheat Barley	1.27 –	Rape Triticale	1.16 4.99	Rye Other crops	– 1.74	2.43
2004	Wheat Barley	1.21 –	Rape Triticale	1.27 –	Rye Other crops	4.68 1.47	Potatoes Beets Oats	0.43 0.25 1.06	2.30
2005	Rape Triticale	1.21 –	Rye Other crops	– 1.27	Potatoes Beets Oats	0.61 0.27 5.26	Wheat Barley	1.74 –	3.07
2006	Rye Other crops	– 1.21	Potatoes Beets Oats	0.41 0.27 0.58	Wheat Barley	3.38 2.77	Rape Triticale	1.50 0.24	3.43

Source: Author's calculations using the MATLAB software.
Źródło: Obliczenia własne w programie MATLAB.

All the solutions indicate the most profitable production directions, i.e. wheat and beets. However, the soil requirements of those crops are high and their area in the model was limited to 25 and 2% of the total area of arable land, respectively for wheat and beets. High profit was also ensured by potatoes and rape, however their area was conditioned by crop structure. In optimal solutions, particularly of the V and VE models, there is a tendency to decrease more risky crops in a given year (e.g. rye in 2003, 2005 and 2006, and barley in 2003, 2004 and 2005) and to increase the area of the remaining crops.

The profitability of agricultural production is indicated by the amount of achieved farm income. The farm income (expected value) and the risk of achieving it (standard deviation) jointly in four analyzed years in the optimal solutions are shown in Table 3.

VE models numbered $_{1, 2, \ldots 6}$ are the models, whose target criterion minimises the risk of achievement of farm income. The expected value of farm income in these models falls within the range determined by the V and E models (61,301.95–63,464.34). This range has been divided into six parts corresponding to relevant indexes.

Table 3. Expected value and standard deviation of farm income
Tabela 3. Wartość oczekiwana i odchylenie standardowe dochodu rolniczego

Type of model	Farm income (PLN)	Variance (PLN)	Standard deviation (PLN)
E	63,464.34	22,194,368.99	4,711.09
$V = VE_1$	61,301.95	9,018,669.67	3,003.11
VE_2	61,734.43	9,308,173.86	3,050.93
VE_3	62,166.91	9,610,062.00	3,100.01
VE_4	62,599.39	9,926,091.32	3,150.57
VE_5	63,031.86	10,280,744.45	3,206.36
VE_6	63,464.34	11,097,159.94	3,331.24

Source: Author's calculations using the MATLAB software.
Źródło: Obliczenia własne w programie MATLAB.

Standard deviation is a measure of risk of accomplishment of the farm income. It increases proportionally to the increase in the farm income. The risk in farming is related primarily to agriclimatic conditions. Year 2003 was disadvantageous for the crops, as was the comparable year 2006. Favorable conditions for crop cultivation ensured high yields in 2004 and slightly lower in 2005. Moreover, the basic and supplementary subsidies for farmers after the Poland's accession to the European Union considerably increased the farm income. The income in the V and VE_1 models, as well as E and VE_6, are identical due to the assumptions of the model. Different risk in the VE_6 model, as compared to the E model, results from the application of a different research method. Conversion of the income to 1 ha of arable land allows for a more precise analysis (Figure 1).

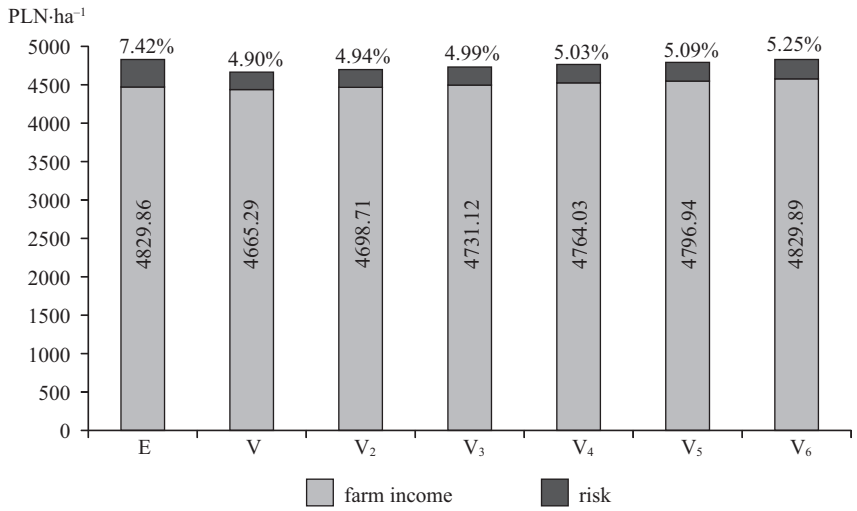

Fig. 1. Unit farm income and the risk of their achievement in Model I
Rys. 1. Jednostkowe dochody rolnicze i ryzyko ich realizacji w modelu I

Source: Own elaboration.
Źródło: Opracowanie własne.

Fluctuation of unit farm income is insignificant, and its highest difference between the E and V models amounts to PLN 164.57. Risk can decrease income by 4.9 to 7.42%. Income reduced by risk is comparable in each solution. The most profitable solution is provided by the VE_6 model, characterized by a high expected value at a considerably low uncertainty of its accomplishment.

The optimal solutions of Model II contain, besides the index of the area of particular crops, the numbers of profitable species of livestock. The analysis of calculations (not all of them can be presented due to technical inconveniences) indicates the profitability of the application of the production structure achieved by means of the VE_6 model. Table 4 contains the area of the crops from this solution.

Table 4. Crop rotation in the optimal solution of Model II
Tabela 4. Zmianowanie roślin w rozwiązaniu optymalnym modelu II

	Model VE_6											
	Field I			Field II			Field III			Field I		Fallow
	ha											
2003	Potatoes Beets Oats	0.38 0.26 0.18		Wheat Barley	1.48 –		Rape Triticale	1.15 4.27		Rye Other crops	0.98 1.66	2.43
2004	Wheat Barley	0.82 –		Rape Triticale	0.99 0.49		Rye Other crops	3.90 1.52		Potatoes Beets Oats	0.38 0.25 2.01	2.30
2005	Rape Triticale	0.15 0.67		Rye Other crops	– 1.48		Potatoes Beets Oats	0.40 0.27 4.75		Wheat Barley	0.84 1.80	3.07
2006	Rye Other crops	– 0.82		Potatoes Beets Oats	0.41 0.27 0.80		Wheat Barley	3.38 2.04		Rape Triticale	1.50 1.14	3.43

Source: Author's calculations using the MATLAB software.
Źródło: Obliczenia własne w programie MATLAB.

The animal production based on a closed turnover of the stock. The optimal solution indicates the profitability of cattle breeding in all analyzed years and the basic livestock consisted of 4 cows, 3.92 calves (calving coefficient equal to 0.98), 3.12 young fatteners, 0.8 replacement heifer and culled cow (5-year-period usability of an adult specimen) each year. The fractions of particular units prove the absence of a given animal on a farm throughout the entire year. Swine breeding was profitable merely in the first two analyzed years. In 2003 the herd consisted of 4 sows, 64 piglets, 62 fatteners, 1 replacement gilt and 1 culled sow. In 2004 the herd decreased to 3 sows, 48 piglets and 62 fatteners while in 2005 merely 46 fatteners remained, reclassified from previous year piglets. The animals were fed with the home fodder and the purchased high-protein mixtures. The commercial production comprised: fatteners, feeder calves, wheat, barley, rape and potatoes (in the case of unprofitability of swine breeding).

The total farm income in the 2003–2006 period in all solutions of Model II was significantly higher than in those of Model I. Its values together with the risk are presented in Table 5.

Table 5. Expected value and standard deviation of farm income
Tabela 5. Wartość oczekiwana i odchylenie standardowe dochodu rolniczego

Type of model	Farm income (PLN)	Variance (PLN)	Standard deviation (PLN)
E	117,832.82	25,135,741.77	5,013.55
$V = VE_1$	105,289.96	10,514,325.06	3,242.58
VE_2	107,798.53	11,616,099.89	3,408.24
VE_3	110,307.10	12,808,453.63	3,578.89
VE_4	112,815.67	14,138,502.41	3,760.12
VE_5	115,324.24	15,809,212.17	3,976.08
VE_6	117,828.48	20,980,980.25	4,580.50

Source: Author's calculations using the MATLAB software.
Źródło: Obliczenia własne w programie MATLAB.

The livestock production increased farm income by 80%. The accomplishment of this income is less risky than in Model I. It may result from a lesser effect of the argiclimatic conditions on livestock breeding. The model assumes a possibility of livestock feeding with the purchased fodder. More precise analysis of income and its risk is presented on Figure 2.

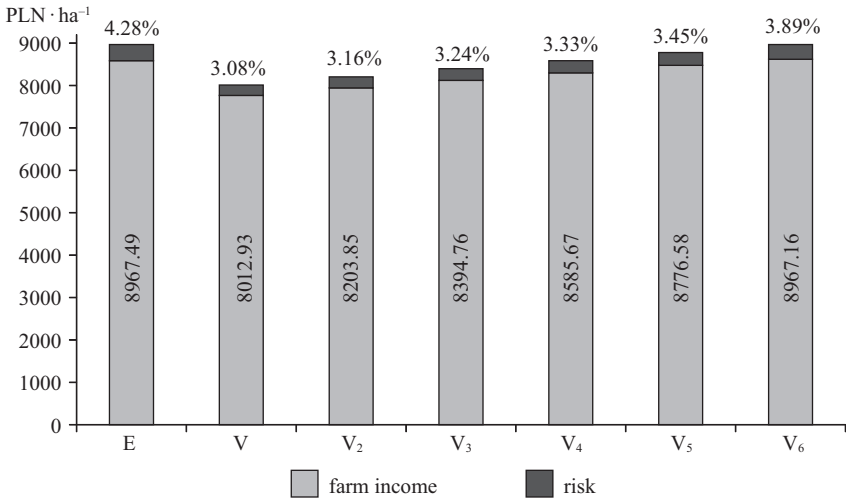

Fig. 2. Unit farm income and the risk of its achievement in Model II
Rys. 2. Jednostkowe dochody rolnicze i ryzyko ich realizacji w modelu II

Source: Own work.
Źródło: Opracowanie własne.

The highest fluctuation of unit farm income for the four analyzed years in Model II amount to 11% (between E and V models). Standard deviation indicates by how much the income might be lower in each solution; the differences fluctuate between 3.08 and 4.28%.

CONCLUSIONS

1. Dynamic models with stochastic parameters of the objective function allow for temporal and spatial alterations. They refer to four successive years (with and without EU subsidies), of varied agriclimatic conditions. Their objective function is constituted by the farm incomes achieved in various regions of the West Pomeranian Voivodship province.
2. Fluctuations of unit farm income, calculated by a few methods, in farms dealing with crop production only are insignificant (amounting to 3.4%). The risk-free income in each solution is comparable.
3. Livestock production increases the income of an average farm in the West Pomeranian Voivodship by 80%, and the risk of its accomplishment does not exceed 4.28% in either solution.
4. The solutions obtained by E models are characterized by high expected value, but also the highest uncertainty of its accomplishment. The V models provide solutions of the lowest quality of the objective function encumbered by an insignificant risk. The application of the VE models (particularly VE_5 and VE_6) determines a structure of production that decreases farm income insignificantly at a relatively low variance.

REFERENCES

Bellman R., Dreyfus S., 1967. Programowanie dynamiczne. PWE, Warszawa.

Grabowski W., 1980. Programowanie Matematyczne. PWE, Warszawa.

Jeleniewska E., 1993. Próba określenia reakcji przedsiębiorstwa rolniczego na zmieniające się warunki gospodarowania przy wykorzystaniu metody programowania liniowo-dynamicznego. Wydawnictwo SGGW, Warszawa.

Kalkulacje rolnicze, 2003. Zachodniopomorski Ośrodek Doradztwa Rolniczego, Barzkowice, 2–22.

Kalkulacje rolnicze, 2004. Zachodniopomorski Ośrodek Doradztwa Rolniczego, Barzkowice, 2–23.

Kalkulacje rolnicze, 2005. Zachodniopomorski Ośrodek Doradztwa Rolniczego, Barzkowice, 2–23.

Kalkulacje rolnicze, 2006. Zachodniopomorski Ośrodek Doradztwa Rolniczego, Barzkowice, 2–23.

Krawiec B., 1991. Metody optymalizacji w rolnictwie. PWN, Łódź.

Madansky A., 1963. Methods of solution of linear programs under uncertainty. Operations Research Vol. 10, 4, 463–471.

Pihamaa P., Pietola K., 2002. Optimal beef cattle management under agricultural policy reforms in Finland. Agricultural and Food Science in Finland Vol. 11, 1, 3–11.

Schneeweiss H., 1962. Ein allgemeines Schema des Stochastischen Programmierens. Statistische Hefte Vol. 3, 1, 131–157.

Vercammen J., 2003. A Stochastic Dynamic Programming Model of Direct Subsidy Payments and Agricultural Investment. Food and Resource Economics Working Papers 5, University of British Columbia, Vancouver.

Zaród J., 2008. Programowanie liniowo-dynamiczne jako narzędzie analizujące zmiany w funkcjonowaniu gospodarstw rolnych. Wydawnictwo Uniwersytetu Łódzkiego, Łódź, 429–435.

Zaród J., 2009. Wykorzystanie analizy dyskryminacyjnej do podziału województwa zachodniopomorskiego na rejony przydatności rolniczej. Journal of Agribusiness and Rural Development 3 (13), 345–354.

ZASTOSOWANIE MODELI DYNAMICZNYCH ZE STOCHASTYCZNYMI PARAMETRAMI FUNKCJI CELU DO OPTYMALIZACJI PRODUKCJI W GOSPODARSTWACH ROLNYCH WOJEWÓDZTWA ZACHODNIOPOMORSKIEGO

Streszczenie. Dla województwa zachodniopomorskiego zbudowano dwa dynamiczne modele programowania stochastycznego. Obejmowały one cztery kolejne lata o różnych warunkach agroklimatycznych, bez i z dotacjami unijnymi. Model I dotyczył gospodarstw zajmujących się produkcją roślinną, a model II uwzględniał uprawę roślin i hodowlę zwierząt. W obu modelach występowały losowe parametry funkcji celu, które stanowiła macierz dochodów rolniczych osiąganych w 10 rejonach województwa zachodniopomorskiego. Modele te rozwiązano trzema metodami za pomocą pakietu MATLAB. Wyniki rozwiązań zawierają dokładną powierzchnię poszczególnych upraw i gruntów ugorowanych, łączny dochód rolniczy osiągany w czterech analizowanych latach oraz ryzyko związane z jego realizacją.

Słowa kluczowe: model dynamiczny, programowanie stochastyczne, dochód rolniczy, ryzyko

Accepted for print – Zaakceptowano do druku: 22.11.2012

CONTENTS
SPIS TREŚCI

General and technical requirements for the elaboration of papers:

1. **Size of the research paper** including tables, figures and photographs should not exceed 12 pages of A-4 format.
2. **Materials to be published** in *Acta Scientiarum Polonorum* should be prepared in accordance with the rules of the publishing process binding at the publishing office of a given series of the Journal.
3. **Style of documents** – the text of the paper should be typed with Times New Roman font 12 points, 11 of space between the lines, setting parts of the text in special typeface is allowed, e.g. italic or bold, but without underlining letters, words and sentences.
4. **Size of tables and figures** cannot exceed B-5 format (12.5 cm × 19.5 cm); descriptions of tables should be typed with Times New Roman 9 points, content of tables 8 points, single space, if possible without vertical lines, table format – doc. or rtf.

The following paper setting is binding:

1. **Title of the article** in Polish (or in English if the whole paper is in English; the same refers to the summary and key words).
2. **First name and surname** of the author (-s).
3. **Paper abstract** (from 600 to 1000 characters).
4. **Key words** – 6 words useful when indexing and searching.
5. **The main text of the research paper** should include: introduction with the aim and research hypothesis, material and methods, results, discussion, conclusions (or summary) and references.
6. **Title, abstract** (600–1000 characters) as a translation of the summary and **key words** in English.
7. **Address** of the author's (authors') place of work – post and e-mail address.
8. **Titles of tables** and their content, and captions of figures and legends must be provided in Polish and in English, while the numbers of tables and figures – with Arabic numerals.

Units and spelling – the international SI system is binding, e.g. $g \times dm^{-3}$ (and not g/dm^3).

References – when referring to the publications of other authors in the text of the paper, a surname and a year should be provided in brackets [Kowalski and Lewandowski 2000, Lewandowski 2001, Zalewski et al. 2001] or … according to Kowalski [2000]...

The list of references should be presented in the alphabetical order in the following way: author's (authors') surname, initials of first names; year of publishing if there is more than one paper of the same author published in a given year, after the year it is necessary to mark particular items a, b, c, etc.; title of the paper, bibliographical abbreviation of the publishing house and place of publishing, No of volume, book and numbers of pages, e.g.:

Chełkowski Z., 1966. Introdukcja troci do rzeki Gowienicy. Gospod. Ryb. 1 (2), 18–19.

Greń J., Kowalski Z., 1972. Statystyka matematyczna. PWN, Warszawa.

Turski W., 1972. Projektowanie oprogramowania systemów liczących. Mat. Konf. Projektowanie maszyn i systemów cyfrowych. Warszawa 2–5 czerwca 1971. PWN, Warszawa, 132–139.

The author sends the text of the paper in 2 copies to the editorial office. After he/she receives a review, the Author sends an editorial copy to the editorial office including the reviewer's comments, a corrected copy of the paper including an electronic carrier (diskette, CD or e-mail) and a response to the reviewer's and editor's comments. The main part of the publication (abstract, the text of the article proper and references) should be saved in one file. The editorial office reserves a right to make cuts and corrections, and to suggest changes and substantive supplementations agreed with the author. The graphic material (figures, diagrams, charts) should be prepared and sent as a separate electronic file (source files) in programs working in Windows environment (e.g. in Excel, Corel Draw, Photoshop etc.).

The author of the paper published is obliged to transfer his/her copyright to the publisher and submit a declaration that the paper has not been published in another journal.

The authors of the papers participate in the costs of their publishing. Information about fees and additional information for authors are available at the website

www.acta.media.pl

Acta Scientiarum Polonorum – ogólnopolskie czasopismo naukowe polskich uczelni rolniczych, publikuje oryginalne prace w następujących seriach tematycznych:

Agricultura – Agronomia
Wydawnictwa Uczelniane Uniwersytetu Technologiczno-Przyrodniczego w Bydgoszczy
ul. Ks. A. Kordeckiego 20, 85-225 Bydgoszcz, tel. 52 374 94 36, fax 52 374 94 27

Biologia – Biologia
Wydawnictwo Uniwersytetu Przyrodniczo-Humanistycznego w Siedlcach
ul. Bema 1, 08-110 Siedlce, tel. 25 643 15 20

Biotechnologia – Biotechnologia
Geodesia et Descriptio Terrarum – Geodezja i Kartografia
Medicina Veterinaria – Weterynaria
Wydawnictwo Uniwersytetu Przyrodniczego we Wrocławiu
ul. Sopocka 23, 50-344 Wrocław, tel./fax 71 328 12 77

Technica Agraria – Inżynieria Rolnicza
Hortorum Cultus – Ogrodnictwo
Wydawnictwo Uniwersytetu Przyrodniczego w Lublinie
ul. Akademicka 13, 20-033 Lublin, tel. 81 445 67 11, fax 81 533 37 52

Piscaria – Rybactwo
Zootechnica – Zootechnika
Wydawnictwo Uczelniane Zachodniopomorskiego Uniwersytetu Technologicznego w Szczecinie
al. Piastów 50, 70-311 Szczecin, tel. 91 449 40 90, 91 449 41 39

Silvarum Colendarum Ratio et Industria Lignaria – Leśnictwo i Drzewnictwo
Technologia Alimentaria – Technologia Żywności i Żywienia
Wydawnictwo Uniwersytetu Przyrodniczego w Poznaniu
ul. Witosa 45, 61-693 Poznań, tel. 61 848 78 07, fax 61 848 78 08

Administratio Locorum – Gospodarka Przestrzenna
Wydawnictwo Uniwersytetu Warmińsko-Mazurskiego w Olsztynie
ul. Heweliusza 14, 10-724 Olsztyn, tel. 89 523 36 61, fax 89 523 34 38

Architectura – Budownictwo
Oeconomia – Ekonomia
Wydawnictwo Szkoły Głównej Gospodarstwa Wiejskiego w Warszawie
ul. Nowoursynowska 166, 02-787 Warszawa, tel. 22 593 55 20, fax 22 593 55 21

Formatio Circumiectus – Kształtowanie Środowiska
Wydawnictwo Uniwersytetu Rolniczego w Krakowie
al. 29 Listopada 46, 31-425 Kraków, tel. 12 662 51 57, 12 662 51 59

1644 0757