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Wyższej Szkoły Bankowej w Poznaniu
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Sławomir Jankiewicz

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Introduction

In 1989 (for the second time since the 1920s) Poland faced the necessary task of rebuilding its statehood. Neither the political system nor social or economic life were suited to the conditions of market economy. Some companies (e.g. those associated with heavy industry) had to be restructured and divided into smaller entities, the sector of services was in serious need of development and the level of innovation had to be increased. The system transformation was accompanied by an economic crisis, which the reformers had not anticipated and were unable to control. It had a negative impact on the country's development and the wealth of the Polish society.

The biggest mistake, at the start of the reforms, was the failure to adjust the law to the requirements of a market economy, which is the basis of the efficient functioning of developed countries. For this reason, many economists (among others J.M. Buchanan, Nobel Prize winner for 1986) believe that the most important task of public policy consists in establishing and enforcing rules and regulations, for in the broadest, definitional sense, common action involves establishing and enforcing the law. One can even go as far as to say that the more liberal and global a given country's economy is, the more it depends on regulatory activity for its economic success. The quality of the law also affects the efficiency of a country's economic policy, which implies a relationship between economic policy and legal theory.

In Poland, in the period of transformation, the introduction of the "free" market was regarded as the main priority. It was assumed that market liberalization would automatically eliminate companies that conducted their business inappropriately (e.g. by deceiving customers, selling poor quality products). As a result, in the mid 1990s, the existing law was largely ill suited to the principles of modern market economy. W. Wilczyński, an eminent economist, even observed that our law tolerated "crime, offenses and many phenomena which a normal market

economy does not tolerate."[1] The following economic crisis would probably have been less severe, and consequently, the social and economic costs of the transformation would have been lower, if it had not been for bad law or its ineffective enforcement.

The second significant error was associated with the fact that economic growth became the main objective of economic policy, which focused on the quantitative dimension of the economy to the detriment of the qualitative dimension. The most popular strategy of achieving competitive advantage was by means of cheap labour and intermediate goods and services, which are only effective for a short term. As a result, we now have a large percentage of people who remain outside the labour market, about 3 million economic emigrants, and have to cope with considerable social inequalities and a high percentage of people living in poverty.

In our attempts to catch up with the so called "old" EU member states and ensure a long-term growth in the quality of life, we must view economic development as the basic goal. This implies the need for more innovativeness and the development of knowledge-based economy. It is necessary to move away from the present strategies of achieving competitive advantage towards technological advantage, which will improve the competitiveness of Polish products, increase cost efficiency and the economic potential of Polish companies.

In order to achieve a high rate of economic growth in Poland, it is necessary to overcome numerous obstacles and problems, both internal and external. This is why, the present issue contains articles addressing selected problems associated with challenges for Poland's development policy in the context of the European Union.

Economic growth will require a sufficient supply of electric power with appropriate parameters, at a relatively low price. One of the main problems confronting the energy sector, which needs to be solved, involves energy management (both the network and production) in the presence of a large number of renewable energy sources. Given the much faster development of such power stations in Germany, we can draw on experiences of our western neighbor. This is the issue raised by P. Grądzik in his articles entitled *Problem bilansowania popytu i podaży energii elektrycznej w Niemczech*. A. Hnydiuk-Stefan (*Analysis of factors affecting the price of CO_2 emission allowances*) analyses factors affecting emission allowances, which account for a significant part of the cost of electric energy. P. Wachowski (*Formal and legal aspects of environmental factors in energy production in Poland*) discusses the most important regulations which determine the conditions of energy production in Poland.

[1] W. Wilczyński, Wyzwania jako niespełnione nadzieje w sferze polityki, in: *Wyzwania wobec polityki gospodarczej*, ed. J. Tarajkowski, PTPN, Poznań 2006, p. 159.

The second group of articles deals with the human factor in the context of economic growth. These are:

– M. Gawrycka and M. Maier (*Wpływ zmian demograficznych na rozwój gospodarki narodowej*) analyse the problem of population aging and its relevance for the national economy;

– S. Jankiewicz and P. Trząsalski (*Płaca minimalna a rozwój gospodarczy – ujęcie syntetyczne*) presents results of studies by selected economists researching the relationship between changes in the minimum wage, the labour market and economic development;

– M. Majewska (*Oddziaływanie kapitału ludzkiego na zmiany w strukturze eksportu w procesie zmniejszania luki technologicznej*) presents results of a study on ways in which human capital accumulation through higher education affects changes in the structure of Polish exports, which result from a greater learning productivity of the economy and technological progress;

– J. Polcyn i M. Gawrysiak (*Indicators of investments in education as a background of learning outcomes in post-primary education*) analyse the impact of the level of investments in education on the quality of human capital created by society, which is crucial in the process of building a knowledge-based economy. The authors report results based on primary survey data.

Another thematic block concentrates on the broadly conceived topic of national security. J. Rymarczyk (*Opodatkowanie dochodów i optymalizacja podatkowa w korporacjach transnarodowych*), Janusz Sawicki (*Podstawowe czynniki zmian międzynarodowej pozycji inwestycyjnej netto – przypadek Polski*), M. Uramová, B. Mazúrová and J. Kollár (*Czynniki PKB jako źródła wzrostu gospodarczego w krajach V4*) and R. Sobków (*"Efekt Fishera" jako przykład esencjalizmu metodologicznego w świetle rozwoju myśli ekonomicznej*) address economic issues of national security.

In recent years security (at the national and EU level) has been mainly affected by immigration (mainly from war-torn countries) and terrorism. The first issue is discussed in the article by B. Grenda entitled *The impact of migration-related threats on the national security of European countries*, while P. Majdan, in his article entitled *Cyberterrorism as a modern security threat* analyses terrorist activities in the Internet.

The last section of the present issue is devoted to the problem of local development and the impact of companies on the local economy. The first article in this group, written by K. Kołodziejczyk (*Współczesna przestrzeń publiczna – poglądy i dyskusje)* explores aspects of public space. V. Maráková and M. Medveďová in their article entitled *Znaczenie ośrodków zarządzania organizacjami na Słowacji oraz w Polsce dla rozwoju regionalnego (analiza porównawcza)* investigate the role of the regional development of management centres of tourist organisations in Slovakia and Poland. In another article (*Koncepcja zrównoważonego rozwo-*

ju jako narzędzie rozwoju przedsiębiorstwa) V. Marková and P. Lesníková discuss the relevance of sustainable development for companies and the economy as a whole. In the last article of the current issue, K. Stańczyk (*Wykorzystanie rachunkowości w zarządzaniu podmiotem gospodarki wojskowej*) discusses the importance of management accounting in military establishments.

I recommend the articles included in the present issue in the hope they will inspire interest in further research on the long-term development of Poland.

Prof. nadzw. dr hab. Sławomir Jankiewicz

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The Problem of Electricity Demand and Supply Balancing in Germany as a Side Effect of the Renewable Energy Sources Development

Abstract. *The major goal of German energy policy is becoming independent of external fuel supplies and preventing climate changes. Therefore, German government has been consistently replacing fossil fuel energy sources with renewables. As the power generation from renewable sources is highly dependent upon the weather conditions, and due to the fact that dispatchable sources have been pushed out of the market maintaining balance between the energy supply and demand is becoming more and more difficult. The state intervention such as system support by conventional reserve power plants has become inevitable.*

Keywords: *available power, renewable energy sources, reserve power plants*

Introduction

For several years, Germany has been trying to become independent of importing energy resources. The process of power sector transformation has been named *Energiewende* and it means implementing renewable energy sources and moving away from those based on fossil fuels. However, a number of problems have been encountered in the process.

From the technological point of view, operating any power system is connected with the challenge of maintaining the balance between the supply and demand of electrical energy in any given moment. For years, these systems have been

operated on the assumption that it is the demand that changes and the supply is supposed to comply with that change. This has changed together with the integration of the renewable energy sources, as their supply is strongly dependent upon the weather conditions. Nowadays, both supply and demand are changeable and the balance between the two is much more difficult to accomplish. Facing the lack of energy storage technology on a large scale, the only solution to the problem of maintaining the mentioned above balance seems to be using dispatchable energy sources, such as the sources based on fossil fuels. These, unfortunately, are being pushed out of the market by subsidized non-dispatchable (renewable) energy sources. This phenomenon can be observed in a number of countries due to the fact that the most common form of energy market in Europe is Energy Only Market which comprises only electrical energy turnover.

However, the power system cannot function without another crucial product which is available capacity. In the past, energy was generated almost solely in conventional power plants. In case of this type of energy sources available power is a natural product obtained together with electrical energy. Therefore, Energy Only Market was efficient and no attention was devoted to available power as a product. However, one must bear in mind that there has been a huge change in the structure of energy production in recent years. A gradual decrease in conventional power plants capacity has been observed together with a huge rise in the capacity of renewable installations. The loss of service of available power has become a side effect of renewable energy sources development. Due to the fact that Germany is a leader in renewable energy sources integration, it is this country that suffered first from pushing out available power and encountered difficulties in balancing energy supply and demand. This situation has led to the regulator's and state's reaction and the implementation of a number of new solutions.

The purpose of the following paper is to present the most significant problems connected with the ongoing transformation of German energy industry which is based on systematically increasing share of renewable energy sources and the solutions undertaken by the German government.

1. Dispatchable power capacity deficiency in German power system

The goal of German energy policy is to cover 80% demand for electricity with renewable energy sources and to reduce the greenhouse gas emissions by 80% by the end of 2050. Both the progress in development of renewable energy sources and the amount of financial resources allocated for that purpose in Germany are unprecedented in Europe. The subsidies have been systematically increasing in the past years, reaching 23.7 billion euro in 2015, and the predicted amount in

2016 is to be 25.5 billion euro [BDEW 2016b: 70]. The total amount that has been paid to the producers since 2000 is estimated at 190 billion euro.

German energy policy besides positive effects, including the renewable energy sources share of 32.6%, has brought about some negative consequences as well. One should realize that the energy production with the use of wind power and photovoltaic energy sources is dependent on the weather conditions, which is why these energy sources are called non-dispatchable. Due to the fact that conventional energy sources can be activated on demand and the production volume can be regulated they are called dispatchable energy sources. The share of dispatchable sources in German power system has been systematically declining in the past few years, which makes maintaining the safety of its operation and balancing the supply and demand more and more difficult.

The renewable energy sources act [Erneuerbare-Energien-Gesetz – EEG 2014] guarantees that they are granted the priority in the power grid access. This means that the energy from these sources needs to be collected from the producer regardless of the current market price. In the periods of favourable weather conditions, renewable sources supply large volumes of electricity, what results in a fall in the wholesale price. Nowadays, energy prices are on the lowest level in history. The wholesale prices are more and more often negative, which means that the seller needs to pay for collecting his or her product (for example, on 8.05.2016 between 14.00 and 15.00 o'clock it was possible to receive energy together with the payment 130.09 euro/MWh) [EPEX SPOT 2016]. The volume of energy produced from wind and photovoltaic sources had doubled in the years 2011-2015, reaching the level of 126.4 TWh in 2015. At the same time, the average energy price had fallen by almost 50% to 30.97 euro/MWh. Details are presented in Table 1.

Table 1. Supply of non-dispatchable energy sources and average energy price

Year	2011	2012	2013	2014	2015
Amount of energy produced from wind and solar radiation (TWh)	68.5	77.1	82.7	93.4	126.4
Average energy price (product baseload) (euro/MWh)	56.07	49.30	39.08	35.09	30.97

Source: own on the basis of BDEW 2016a: 40; 2016b: 13.

However, the low wholesale energy price is not a problem for the owners of renewable energy sources as they receive compensation calculated as the difference between the selling price and the contract price. This compensation is financed by households and added to their electricity bills as a special charge for renewable sources (German EEG-Umlage), which, for the year 2016, was established at the level of 6.354 cent/kWh.

That is different for conventional energy sources whose income has been constantly decreasing due to falling wholesale prices. Low energy prices have led to the situation in which conventional power plants exploitation has ceased to be profitable. Two units of Irsching gas power plant, built in 2010 and 2011, can be referred to as an example. Their efficiency factor of 59.7% and 60.4% makes them the most modern units in the world, yet, according to the owner – E.ON – the power plant has not worked for a single hour supplying the energy to the market since 2014 [E.ON 2015]. This resulted in the owner's decision to put forward a motion to the regulatory authority for the facilities to be closed down. The situation of Irsching power plant reflects the phenomenon, which is now being observed throughout Germany, of moving conventional energy sources to the right on the merit order list and replacing them by subsidized renewable energy sources. The biggest energy producers have already restructured their companies by isolating unprofitable sectors of conventional energy production (as a risk optimization). Energy market does not stimulate investors to build new conventional facilities. On the contrary, producers put forward motions to the regulatory authority to close down many conventional units. According to the German regulator, 69 power plants with the joint capacity of 14367 MW, which is more than half of Poland's energy demand, had requested permission to turn off their facilities between the end of 2012 and November 2015 [Bundesnetzagentur 2015: 67]. The mentioned above report does not specify the reasons why the producers want to close down their facilities (rate of decapitalization or loss of profitability).

Another reason for decrease in available capacity has been the German government's decision to decommission nuclear power plants. This was mostly due to the accident at the Fukushima nuclear power plant in 2011. At that time the German government decided to phase out nuclear power. Prior to that, nuclear power plants were considered as transitional energy sources until they could be entirely replaced by renewable energy sources as soon as the electricity grid is properly strengthened. After the accident in Fukushima, 9 nuclear power units were closed down in Germany, the joint capacity of which was of over 10 GW. The 8 remaining nuclear power units with the capacity of over 11 GW will have been closed down by the end of 2022. The overall costs of dismantling all the German nuclear power plants were estimated at 47.5 billion euro in 2015. One needs to bear in mind that although nuclear power plants are expensive in terms of investment costs, which have already been incurred, they are relative cheap in terms of variable costs. Therefore, they are much less susceptible to low prices on the wholesale market when compared to other conventional power plants. As the result of that, there was no risk of ceasing production due to low profitability as it happens in the case of gas and coal based power plants. The German government's decision resulted in the loss of 17 units with the power capacity of over 20 GW from the

power grid. Moreover, most of the closed down plants were situated in the south of the country which is the region characterized by the highest power demand.

The German government has pledged reductions of greenhouse gas emissions by 40% until 2020 (with reference to 1990) as part of the European Union climate policy. As achieving this goal might be at risk the Germany has decided to close down several brown coal plants with a total capacity of 2.7 GW, which is 13% of the overall capacity of all lignite-based power plants, which is another reason for the decrease in the share of dispatchable power in the system. The units ought to be decommissioned gradually starting from 2016. They will be, however, maintained ready for use to secure the grid's safety for the period of 4 years. Then, they will be closed down permanently. Their owners will be compensated for the decommissioning with 230 million euro a year for the period of 7 years. These costs will result in the price rise of 0.05 cent/kWh that will be borne by the customers.

Another problem that German electrical system needs to face is the geographical distribution of energy sources. The regulatory authority states in the annual report [Bundesnetzagentur 2015] that there is energy oversupply in the north of the country, while the demand in the south cannot be satisfied by the existing power plants. Moreover, the electrical grid is not developed enough for the excess energy to be transported to the south, which very often results in the power grid overload. This phenomenon intensifies annually between October and April. Some of the energy produced in the north is transported south with the use of neighbouring countries systems, mainly those of Poland and the Czech Republic.

The Main River is considered to be the border line between the north (energy oversupply) and the south (energy deficit) in the public debate. Although the energy balance of the plants under construction and those which are planned to be decommissioned by 2019 is positive, it is still considered as unfavourable due to the investments location. To the north of the Main River the capacity of the units under construction is expected to exceed the capacity of those which are going to be decommissioned (those based on gas and coal), while to the south of the Main River the capacity balance is short (missing 2323 MW). Therefore, the problems with energy transmission from the north to the south are expected to increase. One should take into consideration the fact that the decisions on new investments were taken several years ago. There has been a significant fall in the wholesale prices since then, and that is why the units under construction are not expected to be profitable.

2. Actions undertaken to maintain energy balance and security of the system operation

In a time of Energiewende, maintaining the energy supply and demand balance together with the operational system security is getting more and more dif-

ficult and it requires that the German government and the regulatory authority should introduce supporting mechanisms and take proper actions.

According to the Regulation on Network Reserve issued in 2013 [Netzreserveverordnung 2013], so-called network reserve was introduced. The objective of this service is to maintain the energy supply in the south of the country at those times when transmission of energy (generated in wind power plants) from the north is not possible. This service is provided by those power plants whose operation within the energy market is no longer profitable, but whose motion to the regulator for decommissioning was rejected on the basis of their significance in maintaining the system safety. These units are at the grid operator's disposal who can activate them especially between October and April (that is why this reserve is commonly referred to as "winter reserve") when problems with satisfying the energy demand in the south are expected. German system is also supported by reserve power plants located abroad, i.e. in Austria, Italy, France and Switzerland. Indispensable reserve for the period between October 2014 and April 2015 was established at 3636 MW. At that time German grid operators had to use the reserve for seven days and sometimes this potential was almost fully exploited. The analysis conducted by the grid operators and confirmed by the regulatory authority exhibited the necessity of increasing the reserve to 7515 MW for the period between October 2015 and April 2016. It needs to be stated that less than the half of the reserve (2995 MW) comes from German power plants and the rest (4520 MW) is provided from power plants located abroad. During this period of time the reserve had been activated for 93 days in total. The reserve for the winter of 2016/2017 was established at 5400 MW. The costs of the mentioned above service tend to rise systematically and amounted to 56.3 million euro in 2013, 66.8 million euro in 2014 and 168 million euro in 2015 [Bundesnetzagentur 2016: 18]. Whether the service in question will be needed in the future and to what extent is dependent upon the advancement in the power grid development and its capacity in terms of transferring energy from the north to the south.

The Act on Energy Market introduces another mechanism [Strommarktgesetz 2016]. It states that a new type of power reserve will be established starting from the winter 2018/2019. The service will be provided by those power plants which will win the tender and will sign a contract with the grid operator. The obligation of tendering these contracts will be incumbent upon the transmission network operators. Producers are forbidden to trade produced energy freely – their facilities are going to be at the sole disposal of the grid operator (they must not be market participants). After the contract expires the units are obliged to cease their operations. The main goal of this service is to create a safety buffer in case the volume of energy available on the market is not sufficient to satisfy the existing demand. This might happen when the energy production based on renewable energy sources is not sufficient. First tender procedures will be initiated in 2017 and their aim is to

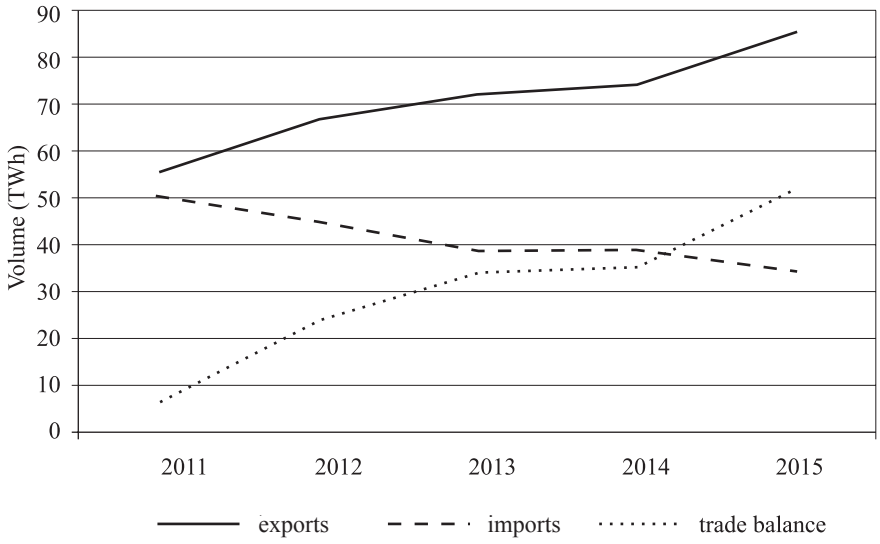
contract the capacity of 2 GW of reserve power for the winter of 2018/2019. Then, starting from 2020/2021 the reserve should constitute 5% of maximum annual demand. After that, the ministry (Bundesministerium für Wirtschaft und Energie) is supposed to verify the volume of the reserve every two years. Power plants will be granted an annual payment to cover fixed costs and variable costs. The latter are costs of producing energy when the facilities are activated on the operator's demand. The exact costs of this new service will be known after the tenders are closed, however, according to the ministry's estimation, they will be in the range of 130 and 260 million euro a year. The costs of maintaining the facilities ready to use are to be transferred to the end users (between 0.028 and 0.055 cent/kWh). The activation costs, however, will be incurred by balancing groups which are responsible for causing imbalance in the system (these users who did not desist from consumption despite there was not enough energy for them on the market).

According to the same act, it will be possible to build new power plants if it is necessary for maintaining the safety of the system operation. These units will be used as both the network reserve and the capacity reserve, depending on the need. The total capacity of such facilities throughout the country cannot exceed 2 GW. The operators of transmission networks are supposed to carry out the analysis by the end of January 2017 and decide whether the construction of the new facilities is really necessary. Taking into consideration the energy deficit in the south of Germany, it might be assumed that the decision will be positive. The volume of demand for new capacities will be verified in the following years. The proposal of the Regulation on Capacity Reserve [Kapazitätsreserveverordnung 2015] imposes the requirement on the new reserve power plants according to which they need to supply their full power within 45 minutes after receiving the signal from the network operator. Such short start-up period can only be provided by gas power plants. Therefore, it is essential for the tenderer to make sure whether the gas infrastructure is sufficiently developed and to provide gas fuel by signing proper contract with the gas network operator. There are also other arguments in favour of gas technology, such as lower fixed costs and capital expenditures when compared to coal based power plants. High variable costs (fuel price) do not influence the profitability of the investment as the reserve power plants are supposed to operate for a limited number of hours a year and the product they offer is, above all, availability.

Apart from the actions undertaken within the country, Germany is highly interested in the development of the common energy market in Europe. Removing barriers in the free international energy trading would result in finding more clients interested in buying German energy during the periods of oversupply and in satisfying German electricity demand thanks to import during the periods of deficit (e.g. days without wind). The markets of Germany and Austria are already put together, which is profitable for both countries. Austrian pumped-storage power plants buy cheap German energy in order to store and resell it when prices rise.

This exchange is also profitable for Germany because makes it possible to sell the energy for which customers are hard to find. Austria is the biggest trading partner for Germany in terms of electricity exchange. The total volume of exports and imports and the balance of exchange for Germany are presented in Figure 1. It can be noticed that the exports have been rising systematically for a few years and in 2015 the balance of exchange (exports less imports) reached the record value of 51.8 TWh (this is as much as one third of Polish demand for electricity) and it is connected with the increasing production from renewable energy sources.

Figure 1. Balance of international exchange of German system



Source: own on the basis of BDEW 2016b: 13.

Interesting conclusions can be drawn from the comparison of the average prices Germany used in international exchange. The data from the regulator indicate [Bundesnetzagentur 2015: 145] that electricity was sold abroad at the average price of 36.98 euro/MWh in 2013, and bought for 39.7 euro/MWh. The following year the average exports price was 32.12 euro/MWh, and imports price – 34.05 euro/MWh. The difference of about 2 euro/MWh is an apparent loss for German economy. In reality the trade with other countries is for the German power system the cheapest form of energy storage. That is why the construction of additional connections with Denmark, Sweden and Norway is being planned in order to take advantage of favourable hydrological conditions of Scandinavian countries (energy storage possibilities) in order to export oversupply and support the system during the supply deficit.

Conclusion

The example of Germany shows that the transition to renewable energy sources is a complex process. Rapid development of subsidized renewable sources has resulted in the decrease in the wholesale price of energy. This, in turn, has led to the loss of profitability of numerous conventional power plants which either have already withdrawn from the market or are going to withdraw in the nearest future. This is how conventional units have been pushed out of the market by the renewable energy sources.

The loss of dispatchable energy sources is also directly connected with political decisions, the first of which was the one made in 2011 on closing down all the existing nuclear power plants. The second one concerned decommissioning some of the lignite power plants. The development of renewable energy sources together with the decommissioning of conventional power plants results in the constantly diminishing share of dispatchable units in the system. The fact that the supply of energy from renewable sources is highly dependent on the weather conditions and is obtained in the periods in which it does not suit to the demand makes it even more complicated. Thus, ensuring the power balance and safe network operation is becoming more and more difficult.

Energy Only Market, on which the service of availability of energy sources for work is not provided, cannot solve the arising problem. Therefore, the intervention of the government and the regulatory authority, which is to ensure enough power that can be generated on the operator's demand, has become indispensable. The service of network reserve has been introduced recently in order to provide supply in the south of the country. Another service, that is the capacity reserve is supposed to satisfy the demand when the supply available on the market is not sufficient. Also the measures that have been undertaken in Europe in order to remove the barriers in the free energy trade will result in stabilizing the German system. As a result of the energy exchange the periodic surplus is exported from the German system. When the demand is high and supply low, Germany can reduce the deficit with imports. The cheapest form of energy storage is using the systems of other countries. Therefore, Germany is planning to build more transmission lines with Scandinavian countries in order to use their, favourable for energy storage, hydrological conditions.

The introduction of the new reserve system together with the actions undertaken in order to enhance international energy trade will make it possible to increase the share of renewable sources in the energy mix. This will also provide the time necessary to develop the network and the technology necessary for energy storage.

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Problem bilansowania popytu i podaży energii elektrycznej w Niemczech jako skutek uboczny wprowadzenia odnawialnych źródeł energii

Streszczenie. *Celem polityki energetycznej Niemiec jest uniezależnienie od zewnętrznych dostaw paliw oraz zapobieganie zmianom klimatu. Dlatego niemiecki rząd konsekwentnie przeprowadza proces zastępowania źródeł energii opartych o paliwa kopalne, źródłami odnawialnymi. Ponieważ produkcja źródeł odnawialnych zależna jest od warunków pogodowych a źródła sterowalne zostały wyparte z rynku, zapewnienie równowagi popytu i podaży w niemieckim systemie elektroenergetycznym staje się coraz trudniejsze. Koniecznym okazało się podjęcie działań rządu takich jak np. wsparcie pracy systemu przez konwencjonalne elektrownie rezerwowe.*

Słowa kluczowe: *moc dyspozycyjna, odnawialne źródła energii, elektrownie rezerwowe*

Zeszyty Naukowe
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Formal and Legal Considerations of Environmental Aspects in Energy Production in Poland

Abstract. *The aim of the article is to present selected Polish regulations which affect the shaping of the environment, especially its selected elements called environmental aspects. The article discusses the concept of the environmental aspect as well as basic legal instruments governing the protection of the environment and alleviating the harmful impact of energy production on the surrounding environment.*

Keywords: *environmental aspect, environmental protection, PN-EN ISO 14001:2005*

Introduction

Energy production is a complex process, where many crucial quality and environmental conditions have to be met. The process is strongly conditioned not only by Polish regulations but also by EU regulations, in particular concerning environmental protection. They were largely transferred into the Polish legal system after accession to the European Union.

One of the key problems and challenges facing the energy sector in Poland is the necessity to gradually reduce its impact on the environment. The evolving EU legislation and the main directions of economic development in the world and in Europe require a gradual reduction of emissions of primary pollutants to the environment and a policy aimed at alleviating the environmental hazards associated with the occurrence of other ecological aspects.

1. The concept of environmental aspect

Various definitions of the concept of "environmental aspect" generally provide quite a consistent idea about the underlying notion. In practice, there are two standardization systems which define interpretations of this concept.

The PN-EN ISO 14001:2005 standard makes reference to the term "environmental aspect", which is defined as "an environmental aspect is an element of an organization's activities, products, or services that can interact with the environment."[1] The environmental aspect is closely connected with the concept of environmental impact, which is defined as "any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects." The classification of environmental impacts specified in the PN-EN ISO 14001:2005 standard focuses on identifying environmental aspects understood in the light of the above definition associated with an organisation's activities and determining which of them are "significant environmental aspects," i.e. those that have or can have a significant environmental impact. According to clause 4.3.1 of the standard, "The organization shall establish, implement and maintain a procedure(s) to identify the environmental aspects of its activities, products and services that have or can have significant impact(s) on the environment. The organization shall ensure that the significant environmental aspects are taken into account in establishing, implementing and maintaining its environmental management system."

The second systematic approach to the definition of environmental aspects is represented by the Eco-Management and Audit Scheme (EMAS). Like the ISO standard, the EMAS system defines both the concept of environmental aspect and significant aspect. According to EMAS, an environmental aspect is defined as "an element of an organisation's activities, products or services that has or can have an impact on the environment," while a significant environmental aspect is defined as "an environmental aspect that has or can have a significant environmental impact." Moreover, according to the EMAs requirements, it is necessary to identify direct environmental aspects, which are defined as "environmental aspects associated with activities, products or services of the organisation itself over which it has direct management control." Indirect environmental aspects, in turn, are environmental aspects associated with activities, products or services which can result from the interaction of an organisation with third parties and which can to a reasonable degree be influenced by an organisation."[2]

[1] PN-EN ISO 14001:2005 System zarządzania środowiskowego. Wymagania i wytyczne stosowania [Environmental management systems. Requirements and with guidelines for use].

[2] Regulation (EC) No 1221/2009 of The European Parliament and of The Council of 25 November 2009 on the voluntary participation by organisations in a Community eco-management

The key consideration in determining significant levels for an organisation's environmental aspects is to establish a set of criteria (determinants) for assessing the significance of an environmental aspect. These criteria can include: the scale of the impact, the seriousness of the impact, the likelihood of occurrence, the duration of the impact, factors associated with the organisation's activity, e.g. costs or impact on the public image, legal requirements (including planned changes) or concerns of the parties involved.

2. Selected Polish regulations

General references to environmental issues can be found in the Constitution of the Republic of Poland of 2 April, 1997.[3] Article 5 of the Constitution contains a provision stating that the Republic of Poland – in addition to safeguarding the independence and integrity of its territory, ensuring the freedoms and rights of persons and citizens, the security of the citizens, and safeguarding the national heritage – shall ensure the protection of the natural environment pursuant to the principles of sustainable development. This provision directly implies the implementation of a state policy based on principles ensuring that the needs of the present generation are met without compromising the ability of future generations to meet their own needs. One of the main laws governing issues connected with the organisation of the national energy system is the Energy Law Act.[4] The act contains provisions indicating its compatibility with the principle of sustainable development.

Its purpose is to create conditions for the country's sustainable development, to ensure energy security, to provide incentives for the economical and rational use of fuels and energy, to foster healthy competition, to counteract negative effects of natural monopolies, to comply with obligations resulting from international treaties and strike a balance between the interests of energy producers and energy consumers, and – which is particularly important for the purpose of this article – to meet the requirements of environmental protection.

The Environmental Protection Law Act[5] is one of the most important Polish laws about the environment, its management and protection. It implements

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and audit scheme (EMAS), repealing Regulation (EC) No 761/2001 and Commission Decisions 2001/681/EC and 2006/193/EC, Official Journal L 342, 22.12.2009.

[3] Konstytucja RP z dnia 2 kwietnia 1997 r., Dz.U. nr 78, poz. 483 z poźn. zm. [The Constitution of the Republic of Poland of 2 April 1997, Journal of Laws, no. 78, item 483 as amended].

[4] Ustawa z dnia 10 kwietnia 1997 r. Prawo energetyczne, Dz.U. 2012, poz. 1059 z późn. zm. [The Act of 10 April 1997 – Energy Law, Journal of Laws 2012, item 1059 as amended].

[5] Ustawa z dnia 27 kwietnia 2001 r. Prawo ochrony środowiska, Dz.U. 2008, nr 25, poz. 150 z późn. zm. [The Act of 27 April 2001 – Environmental Protection Law, Journal of Laws 2008, no. 25, item 150 as amended]; ustawa z dnia 27 lipca 2001 r. o wprowadzeniu ustawy Prawo ochrony środowiska, ustawy o odpadach oraz o zmianie niektórych ustaw, Dz.U. nr 100, poz. 1085, z późn.

a number of European regulations, among others the habitats directive [37], the end-of-life vehicles directive,[6] the directive on ambient air quality and cleaner air[7] and others.

The act provides detailed definitions and regulates issues associated with the environmental policy and environmental protection programmes, including the implementation of investments, environmental protection research, and the protection of different environmental resources (air, water, land surface, fossil fuels, organosphere) and protection against noise and electromagnetic fields. The act also defines restrictions related to the protection of environmental resources, limited use areas and industrial zones. A separate section of the act is devoted to measures aimed at counteracting pollution (among others, using devices and installations) and substance emission. It also sets out general principles that need to be implemented when manufacturing products to comply with environmental requirements. Another section regulates issues associated with the protection of environmental resources and the harmful effects of various forms of transport.

The following sections deal with aspects involved in applying for, granting and obtaining permissions to emit substances or energy to the environment, along with regulations concerning the expiration, revocation and limitations of emission allowances (including integrated permissions associated with conducting various forms of activity).

The act sets up and lays down the principles of maintaining a National Pollutant Release and Transfer Register and the manner of conducting environmental audits by entities using the environment at the request if environmental protection agencies in the event of indications suggesting that an installation may have a negative impact on the environment. The act defines the concept of a "major accident" and provides legal instruments to counteract major industrial accidents, lists obligations of the operator of an establishment which poses a hazard of a major accident as well as obligations of administrative authorities. The Act specifies available financial and legal measures, including fees for the use of the environment along with specific rates, the application of increased fees, special provisions and fines (civil, criminal, and administrative responsibility).

The last section of the act sets out the principles to be followed by institutions responsible for environmental protection, including the State Environmental Protection Council, the National Fund for Environmental Protection and Water Management.

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zm. [The Act of 27 July 2001 on the introduction of Environmental Protection Law, The Wastes Act and amendments to some acts, Journal of Laws no. 100, item 1085 as amended].

[6] Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of life vehicles, Official Journal L 269, 21.10.2000.

[7] Directive 2008/50/EC of the European Parliament and of The Council of 21 May 2008 on ambient air quality and cleaner air for Europe, Official Journal L 152, 11.06.2008.

The Nature Conservation Act of 16 April 2004[8] sets outs objectives, principles and forms of conserving wildlife, the natural environment and landscape. According to the act, Nature conservation is defined as a system of activities aimed at the preservation, sustainable use and restoration of resources, creations and elements of nature. The act specifies the objectives of nature conservation and ways of accomplishing them. It establishes possible forms of nature conservation and agencies and services responsible for enforcing it. It also outlines the principles and forms of managing natural resource and elements of nature and legal consequences of nature conservation as well as criminal provisions.

One of the essential normative acts that makes a direct reference to environmental aspects, e.g. associated with heat production, is the act on greenhouse gas emissions trading.[9] It lays down the principles of the emissions allowances trading system, which is designed to stimulate an economically efficient way of reducing emission levels. The act defines the notion and organisation of the emissions allowances trading system and the National Emissions Trading Registry. It also outlines the principles of the national plan of distributing emissions allowances and the manner of granting and surrendering emissions allowances as well as ways of applying for allowances by installations obliged to participate in the system. The act lists obligations of installations and establishments concerning the monitoring of emission levels, the surrendering of allowance, and regulations governing the imposition of fines.

The Act of 13 April 2007 sets out the principles concerning the prevention and remedying of environmental damage.[10] It defines preventive and remedying measures in the event of a direct hazard to the environment and the occurrence of environmental damage. The act classifies costs of conducting preventive and remedying measures and specifies ways of reporting direct threats of environmental damage and actual cases of environmental damage and the completion of preventive and remedying measures.

The act on the release of information about the environment and its protection, participation of the public in environmental conservation and assessments of environmental impact[11] regulates, among other things, procedures of assessing en-

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[8] Ustawa z dnia 16 kwietnia 2004 r. o ochronie przyrody, Dz.U. nr 92, poz. 880, z późn. zm. [The Nature Conservation Act of 16 April 2004, Journal of Laws no. 92, item 880 as amended].

[9] Ustawa z dnia 22 grudnia 2004 r. o handlu uprawnieniami do emisji do powietrza gazów cieplarnianych i innych substancji, Dz.U. nr 281, poz. 2784, z późn. zm. [The Act of 22 December 2004 on the Trade of Emissions Allowances of Greenhouse Gases and Other Substances to the Atmosphere, Journal of Laws no. 281, item 2784 as amended].

[10] Ustawa z dnia 13 kwietnia 2007 r. o zapobieganiu szkodom w środowisku i ich naprawie, Dz.U. nr 75, poz. 493, z późn. zm. [The Act of 13 April 2007 on the Prevention and Remedying of Environmental Damage, Journal of Laws no. 75, item 493 as amended].

[11] Ustawa z dnia 3 października 2008 r. o udostępnianiu informacji o środowisku i jego ochronie, udziale społeczeństwa w ochronie środowiska oraz o ocenach oddziaływania na środowisko,

vironmental impact and outlines the principles of public participation in environmental conservation. Article 49 addresses the issue of performing environmental impact assessment (including strategic environmental impact assessment) and the usefulness of considering environmental aspects, particularly in order to support balanced development and implement the EC law on environmental protection.

The Act of 17 July 2009 sets out the principles of managing greenhouse gas emissions and other substances.[12] It also defines the tasks of the National Centre for Emission Balancing and Management and the National System for Emission Balancing and Forecasting. It provides a list of greenhouse gases and other substances released into the air and covered by the system for the management of emissions of greenhouse gases and other substances. The act establishes the National Green Investment Scheme whose proceeds are used to finance environmental programmes or projects, measures of adaptation to climate change and other measures in the field of air protection. It also sets out the principles of the operation of the National Registry of the Kyoto Units.

3. Administrative decisions

Administrative responsibility is the third kind of responsibility (in in addition to civil, criminal responsibility) that should be taken into account by organisations that use the environment and have a harmful impact on it. It is understood as responsibility enforced by administrative organs by means of administrative decisions. The basic instruments of administrative responsibility, listed on the Act on the Environmental Protection Law,[13] include decisions:

– ordering an organisation to reduce its harmful impact on the environment and restore it to the previous state;

– ordering an organisation or a natural person using the environment to stop its activity or the operation of an installation.

The act in question defines cases in which a particular agency responsible for environmental protection should issue a decision ordering an installation operator to stop its activity. The provisions generally refer to activities that cause a con-

Dz.U. nr 199, poz. 1227, z późn. zm. [The Act of 3 October 2008 on the Release of Information about the Environment and its Protection, Participation of the Public in Environmental Conservation and Assessments of Environmental Impact, Journal of Laws no. 199, item 1227 as amended].

[12] Ustawa z dnia 17 lipca 2009 r. o systemie zarządzania emisjami gazów cieplarnianych i innych substancji, Dz.U. nr 130, poz. 1070, z późn. zm. [The Act of 17 July 2009 on the System to Manage the Emissions of Greenhouse Gases and Other Substances, Journal of Laws no. 130, item 1070 as amended].

[13] Ustawa z dnia 27 kwietnia 2001 r. Prawo ochrony środowiska, Dz.U. 2008, nr 25, poz. 150 z późn. zm. [The Act of 27 April 2001 on the Environmental Protection Law, Journal of Laws 2008, no. 25, item 150 as amended].

siderable deterioration of the environment, and in particular, when its continuation poses a threat to health or life. The use of an active installation needs to be stopped immediately if it is operated with the required integrated permit or is operated in violation of the conditions of the integrated permit for a period exceeding 6 months. The act also specifies situations when it is obligatory to postpone the bringing into use of a building, a complex of structures or installations related to a project which has been classified as one of those that may have significant impact on the environment. An activity that has been stopped can only be resumed if a consent has been granted by the authority that ordered it to be stopped. Such a consent can be granted if the grounds for stopping an activity have ceased to exist.

3.1. Integrated permits

Integrated permits are a special form of administrative decisions. Their use is regulated by the Council Directive 96/61/EC, called „the IPPC directive," issued in 1996. The provisions of the directive have been transposed into the Polish law in the form of the Environmental Protection Law.

An integrated permit is an administrative decision which regulates the principles of releasing into the air, water or land substances or energy causing pollution and produced by some kinds of installations. The list of installations is provided in the ordinance of the Minister of the Environment of 27 August 2014 concerning the kinds of installations that may cause considerable pollution in different elements or the environment as a whole[14], issued by virtue of Article 201, Section 2 of the Environmental Protection Law Act. An integrated permit holder is, in fact, able to operate an installation. An integrated permit, which is a kind of licence to operate an industrial installation (or other kinds of activity, such as breeding farms, sewage treatment) is intended as a replacement for sectoral environmental permits that have been in use so far, and includes all kinds of environmental impacts specified in sectoral environmental permits and interactions between them.

In principle, an application for an integrated permit is supposed to demonstrate the company's approach to environmental protection, manifested by, for example, the use of best available practices, i.e. the most effective techniques to ensure the highest level of protection of the environment as a whole, developed on a scale which allows implementation under economically and technically viable conditions, taking into consideration the costs and environmental benefits, as long as they are reasonably accessible to the operator.

[14] Rozporządzenie Ministra Środowiska z dnia 27 sierpnia 2014 r. w sprawie rodzajów instalacji mogących powodować znaczne zanieczyszczenie poszczególnych elementów przyrodniczych albo środowiska jako całości, Dz.U. poz. 1169 [The ordinance of the Minister of the Environment of 27 August 2014 concerning the kinds of installations that may cause considerable pollution in different elements or the environment as a whole, Journal of Laws item 1169].

3.2. Licences

Energy generation, processing, storage, transmission, distribution and trade require a licence which enables an enterprise to conduct economic activity in this area. Licences for the generation, distribution and trading in heat are granted by the President of the Energy Regulatory Office (ERO) in response to an application from an entrepreneur. According to Article 33, Section 1 of the Energy Law Act,[15] the licence applicant must meet the following requirements:

– their principal place of business or place of residence is located within a member state of the European Union or a member state of the European Free Trade Agreement (EFTA) – a party to the European Economic Area Agreement;

– has financial resources sufficient for the proper performance of their activity or can document their ability acquire such resources;

– has the technical potential ensuring the proper performance of their activity;

– can ensure the employment of persons with appropriate professional competences referred to in Article 54;

– has obtained a land development conditions decision (a planning permission) for the area.

The process of granting a licence can start upon the submission of an application containing decisions and permissions concerning land development conditions, environmental protection and ecological safety, including:

– an integrated permit, or in the case of its absence, a permission to release pollutants into the atmosphere, a permit required by the Water Law act and a waste generation permit,

– a document notifying the environmental protection agency about the existence of an active installation releasing gases or particulates into the air (if such notification is required).

A licence is granted for a specified period of time, not shorter than 10 years and not longer than 50 years.

4. ISO and EMAS standards

In 2004 the International Organization for Standardization published the second edition of the ISO 14001 standard for an Environmental Management System. The requirements and guidelines for use were introduced in Poland a year later. The standard sets out requirement concerning an environmental management system in organisations, regardless of their kind or geographical, cultural or

[15] Ustawa z dnia 10 kwietnia 1997 r. Prawo energetyczne, Dz.U. 2012, poz. 1059 z późn. zm. [The Act of 10 April 1997 on the Energy Law, Journal of Laws 2012, item 1059 as amended].

social conditions. The main objective of the standard is to foster activities related to environmental protection and to reduce and prevent pollution through a system model geared towards continuous improvement.

The ISO 14001 standard helps to develop and implement an environmental policy and ecological objectives that take into account legal requirements and other norms, for examples those specified in directives and regulations issued by institutions the European Union. The standard places a lot of emphasis on identifying environmental aspects and informing all interested parties about significant aspects. The success of an environmental management system depends on the involvement and awareness of departments in a given organisation, especially the management. The development of an environmental policy and the establishment of objectives and processes requires the whole organisation to take actions in order to improve its performance, facilitates environmental protection and prevents pollution in a way which meets the social and political needs.

The standard does not set out any absolute requirements concerning the assessment of outcomes of environmental performance. It only requires an organisation to implement the obligations specified in the environmental policy and operate in accordance with the existing legal requirements and the norms that the organisation has committed itself to observe, which should motivate the company to continue the process of self-improvement and prevent environmental-pollution.

One important element of the standard is the requirement to establish and implement a procedure of identifying emergency situations and malfunctions or failures which can have an impact on the environment, and to establish an emergency response plan in order to prevent and limit the negative environmental impact. According to the provisions of the standard, an organisation commits itself to regularly monitor and measure key characteristics of its operations which can have a significant impact on the environment. The procedure involves keeping a record of such information in order to monitor effects, methods of operational control and compliance with the organisation's environmental objectives and tasks.

The requirements of ISO 14001 are complimented by the National Community Eco-management and Audit Scheme (EMAS).[16] EMAS is one of EU instruments for organisations (enterprises and institutions) which decide to make a voluntary commitment to monitor its own environmental impact and continuously improve its environmental performance. The act lists competent bodies designated to perform tasks specified in the EU law, which register the voluntary participation of an organisation in EMAS; it provides information about where to find a sample application form and the rate of the registration fee for an applicant organisation. One of the requirements of EMAS is the need for a periodical renewal of the

[16] Ustawa z dnia 15 lipca 2011 r. o krajowym systemie ekozarządzania i audytu (EMAS), Dz.U. nr 178, poz. 1060 [The Act of 15 July 2011 on the National Community Eco-management and Audit Scheme (EMAS), Journal of Laws no. 178, item 1060].

registration and the use of external and independent validation by an accredited environmental verifier. Thanks to its principles, EMAS is currently one of the most reliable systems of environmental management. EMAS requirements are generally modelled after the PN-EN ISO 14001:2005 standard, but includes four additional elements:

– evidence of continuous improvement of the organisation's environmental performance,

– evidence of full compliance with EU and national environmental regulations that apply to the organisation,

– informing (by means of environmental declarations) the public and all interested parties (customers and the local community) about the environmental impact of the organisation, its products and services and its environmental performance aimed at minimising the negative environmental impact,

– involvement of the organisation's employees in the process of improving its environmental performance.

Compared to the PN-EN ISO 14001:2005 standard, EMAS places a lot more emphasis on the question of identification and classification of direct and indirect environmental (ecological) aspects associated with the company's operation.

Summary

Polish formal and legal considerations of environmental aspects are closely connected with the EU legislation, which is aimed at reducing the negative impact of economic activity on the environment, relying strongly on the directives and sectoral programmes. The Polish legislation has transposed the environmental requirement of the EU law into the Constitution and relevant acts, which are the basis for individual administrative decisions, such as integrated permits and licences, which have a considerable effect on improving the quality of environmental aspects used to generate energy.

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Polskie uwarunkowania formalnoprawne aspektów środowiskowych w produkcji energii

Streszczenie. *Celem publikacji jest przedstawienie wybranych polskich przepisów prawnych, które mają wpływ na kształtowanie środowiska naturalnego, a szczególnie jego wybranych elementów zwanych aspektami środowiskowymi. W opracowaniu omówiono pojęcie aspektu środowiskowego, a także podstawowe instrumenty prawne szczegółowo regulujące kwestie ochrony środowiska i zmniejszające uciążliwość produkcji energii na otaczające środowisko naturalne.*

Słowa kluczowe: *aspekt środowiskowy, ochrona środowiska, PN- EN ISO 14001:2005*

Zeszyty Naukowe
Wyższej Szkoły Bankowej w Poznaniu
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Analysis of Factors Affecting the Price of CO_2 Emission Allowances

Abstract. *The article presents results of a study analyzing what key factors affect the price of European Emission Allowances (EUA) and the strength of their impact. The article explains the underlying mechanism behind the correlation between these factors and EUA prices. Using such indicators as the price of Brent crude oil, coal and gas, and government auction monitor and political decisions, it is possible to make short-term, medium-term and long-term predictions of EUA prices, and consequently to plan production and profitability in companies that are obliged to participate in the emissions trading system. Owing to the complexity of principles that regulate the market and a high level of variation in the associated indicators, predictions are often very inaccurate. The probability of high EUA prices is a threat to the profitability of primary production.*

Keywords: *CO_2 emissions, EU ETS, EUA, the Kyoto Protocol*

Introduction

The CO_2 emissions trading system is one of the three mechanisms set out in the Kyoto Protocol, in addition to Joint Implementation projects (JI) and Clean Development Mechanism (CDM). All these mechanisms have been developed to counteract climate change by reducing the level of greenhouse gas emissions to the atmosphere. The most widespread of these mechanisms and one that extends beyond the timeframe of the Kyoto Protocol is the European emissions trading system (EU ETS), which is effective in EU member states. The aim of emissions

trading is to incentivise innovation and thus reduce the amount of CO_2 emissions. Initially, under the rules of the system, companies whose emission levels exceeded a set limit had to purchase EUA units, while those that operated efficiently could sell their surplus EUAs.

Since the emissions trading market was established in 2005, its scale has been growing rapidly and the value of transactions in 2007 reached 30 billion dollars. Some brokers predicted the market would become the largest commodity market in the world, whose value after merely one decade can reach the level of 1 trillion dollars [Kanter 2007]. Such a large market growth was unexpected for most companies obliged to participate in the system. As a result, they were unprepared to conduct a rational emissions trade and lacked the necessary knowledge about ways of effectively managing free allowances and predicting EUA prices (the so called EUA units) relative to units that had to be purchased. In addition, some companies (cement plants, sugar mills, CHP plants, steel mill, etc.) were confronted with a completely new field of activity, namely stock exchange trading.

Effective emissions management in the above mentioned sectors of the economy can be achieved by monitoring factors affecting EUA prices. The present article describes the most important factors which should be monitored to provide the basis for more accurate predictions of EUA prices, since after several years of emissions trading it is possible to identify certain market factors that can be used to predict the behavior of EUA units, which are the basic units of exchange in this relatively young market.

The article reports results of a study based on the analysis of EUA price fluctuations and how they are correlated with other commodity markets and the most important factors responsible for rises and declines in EUA prices. The results are useful above all for manufacturing companies to predict EUA price trends based on factors that most commonly affect this market.

1. Factors affecting the price of CO_2 emission allowances

The EU emissions trading system (EU ETS) is a is one EU's policy element to combat climate change, and most of all is a key tool for reducing greenhouse gas emissions in cost effectively way. It is the first and by far the largest international carbon market.

EU ETS comprises more than 11,000 power stations and industrial plants in 31 countries, as well as airlines. The EU ETS works on the "cap and trade" principle. A "cap," or limit, is set on the total amount of certain greenhouse gases that can be emitted by installations covered by industrial plants, power stations and other energy-intensive installations in the system. For 2020 the target for emis-

sions from installations operating in the sectors included in the EU ETS is a 21% reduction compared to 2005. Under the European Commission's proposal, emissions are to be reduced by 43% by 2030. The second principle, i.e. "trade" means that companies after receiving free emission allowances from their governments can either buy extra emission allowances to cover their actual annual emissions or they can sell surplus allowance to other companies. The market also includes carbon offsets, which are allowances resulting from emissions reductions achieved in international emissions reduction projects implemented in developing countries (CDM projects) and developed countries (JI projects). By the end of April of the compliance cycle, companies obliged to participate in the emissions market have to surrender a certain number of allowances to cover the real emissions; otherwise they have to pay a penalty of 100 euro per each Mg of unsurrendered carbon permit. When a company uses efficient means of production or reduces its actual carbon emissions trough modernisation, it can keep its spare carbon credits and use them to cover future emissions or sell them to another company which is short of EUAs to cover its own emissions.

The imposition of a limit on the total number of allowances available ensures that they have a market value. The European Commission believes that a sufficiently high price of carbon permits in the emissions market motivates companies to invest in clean, low-emission technologies. Another outcome is that the international trade in carbon offsets in the EU ETS market is the main driving force behind investments in clean technologies and low-emission solutions, especially in developing countries.

When EUA prices and the impact of other commodity markets are analysed, it is possible to notice a particularly high correlation between prices of Brent crude oil, gas, coal and German electricity. However, given the complexity of the emission market, any changes in the system resulting from political decisions cause considerable fluctuations and market immaturity manifests itself in frequent, large fluctuations triggered by news of possible cuts in the number of allowances available for free allocation or changes in regulations. In the light of basic economic principles, EUA prices should fall to zero once there is a large surplus of allowances of about of 2 billion tonnes even before the start of the third trading period of the Emissions Trading Scheme (Phase III), i.e. before 2012. Surprisingly, this prediction did not come true for a number of reasons explained in the remaining part of the article. A similar situation to what happened at the end of the second trading period could be observed at the end of the first trading period, when a surplus of allowances in the market drove EUA prices nearly to zero. The situation before Phase III meant that there was a surplus of 2 billion tonnes' worth of EUAs in circulation relative to the needs of all installations in the system. Prices levels in Phase I and II did not behave in the same way because of the risk associated with further developments in trading regulations, which appeared in the second period

and the fact that a large part of surplus allowances were kept in trading accounts maintained by energy-consuming installations, brokers and banks.

In addition, during the first phase there was no possibility of transferring or *banking* EUAs to be used in the second phase, which means that surplus allowances kept in accounts of companies were worthless. In contrast, surplus allowances in the second trading period could be banked and surrendered during the third phase. The most important aspects affecting the price of the market equilibrium of EUA and causing it to change will be discussed in the following part of the article.

2.1. Commodity markets

Prices of CO_2 emissions allowances vary considerably, quite like some commodities that make up the so-called energy mix. The biggest correlation was observed between the price of Brent crude oil, which causes a rise in the price of EUA units. The reason for that are positive signals indicating economic acceleration brought about by a higher demand for oil, which is used in many sectors of the economy. As a result of economic growth, energy production will be higher, which means energy producers will have to buy more EUAs.

Another indicator is the dark spread, which refers to the theoretical gross profit margin of coal-fired power plants from selling energy. Coal is the most emission-intensive fuel and requires the purchase of more EUAs by energy producers in order to cover their actual emission levels.

The dark spread of a coal-fired power plant from producing energy can be expressed by the following formula:

$$DS = P_{el} - P_c \cdot \eta_{el}, \text{ euro/MWh} \quad (1)$$

where:

- DS – Dark Spread, the difference between the market price of electricity and the market price of coal,
- P_{el} – the price of electricity,
- P_c – the price of coal per 1 MWh,
- η_{el} – power plant efficiency.

The profitability of electricity generated in coal-fired power stations, which accounts for the price of EUAs, is given by:

Clean Dark Spread (*CDS*) = Dark Spread – (price of EUA × 0.96) euro/MWh

Another indicator strongly correlated with EUA prices is the price of gas. In the case of drops in gas prices, prices of EUAs will start falling. This is the result of energy producers switching to gas-fired energy generation, which is less emis-

sion-intensive than coal-based generation. Hence, a fall in gas prices will result in a fall in EUA prices.

Energy generation in gas-fired power plants can be measured by means of the *Spark Spread*, which is an option traded on the stock exchange and refers to the profitability of electricity generated in gas-fired power plants. The profitability of electricity generated in gas-fired power plants is given by the formula:

$$SS = P_{el} - P_g \cdot \eta_{el}, \text{ euro/MWh} \quad (2)$$

where:

- SS – Spark Spread, the difference between the market price of electricity and the market price of gas,
- P_{el} – the price of electricity,
- P_g – the price of gas per 1 MWh,
- η_{el} – power plant efficiency.

The profitability of electricity generated in gas-fired power stations which accounts for the price of EUAs is given by:

Clean Spark Spread (*CSS*) = Spark Spread – (price of EUA × 0.411) euro/MWh

An increase in Spark Spread implies higher profits from burning CO_2-emitting fuel per one 1 MWh, namely gas, may bring about a fall in EUA prices, resulting from a lower demand on the part of energy producers.

2.2. Political decisions

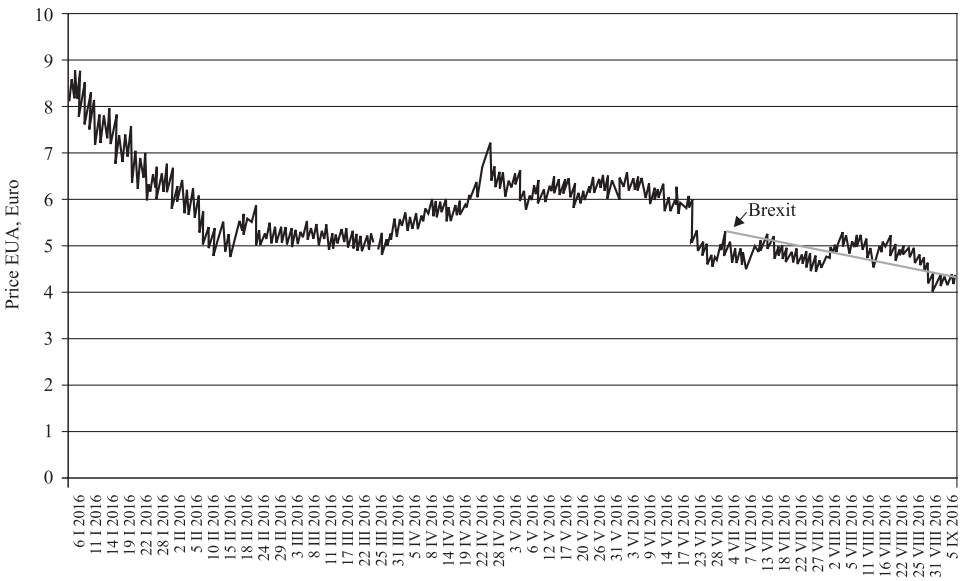
Tracking price fluctuations historically and the factors that affect them, it can be concluded that political decisions have the most significant influence on sudden rises and falls. In the absence of significant political events, the factors described in section 2.1 are the main determinants of EUA prices. However, given the fact that emissions market is still immature, it is highly vulnerable to political decisions and major events in the countries which are part of it.

Decisions of the European Commission which aim to raise the price of EUAs, such as *backloading* – an attempt to rebalance the market – have a significant impact on price fluctuations and disrupting regular price levels determined by the factors described in section 2.1.

One of the tools to limit the supply of EUAs, which will be introduced from January 2019 by the European Commission in order to affect the price of EUAs is the so-called Market Stability Reserve (MSR). It is intended to increase the effectiveness of the EU ETS by reducing the existing surplus of emission allowances. The solution is considered to be long-term and is expected to restore the system equilibrium. The idea behind it is to increase the system's resilience to

major shocks, such as the financial crisis that occurred during the second phase and adjusting the supply of allowances to be auctioned. The legislative proposal for MSR was submitted in January 2014. The date coincided with the adoption by the European Commission of a framework for the climate and energy policies until 2030. The European Parliament officially adopted the MSR on 7 July 2015 and the Council adopted it on 18 September 2015. By adopting the MSR mechanism, 900 million allowances to be auctioned in 2014-2016 are postponed or *backloaded* (i.e. withdrawn from the original auction calendar) and placed in the reserve of free allowances not allocated in the third phase. Under the MSR rules, the supply of EUAs to be auctioned is to be correlated with the demand. The total volume will be calculated annually and the number of EUA units available in the market will be announced by 15 May. The calculation will include phase II, i.e. the period when allowances could be banked. The total pool of allowances in circulation will also include certified emission reductions (CER) and emission reduction units (ERU), cancelled allowances and those transferred to the reserve. The first calculation will be made by 15 May 2017, when the surplus exceeds 833 million EUAs – 12% of surplus allowances in circulation will be transferred to the reserve (in 2021 it will be the excess supply from 2019). If the surplus falls below 400 million EUAs, allowances will be gradually released from the reserve,

Figure 1. EUA prices for 2016 showing decreases in the aftermath of the referendum about the United Kingdom's withdrawal from the European Union



Source: based on data from the ICE Exchange www.theice.com [access: 12.09.2016].

increasing the number of available allowances (by 100 million EUAs annually). The gradual decrease in auction volumes will continue until 2029 and by this time the reserve is expected to grow to 3.89 billion EUAs.

The MSR regulation aims to increase the price of EUA units, since the current level in the region of 4-8 euros is too low to function as an incentive to reduce emissions in factories and trigger investment in low-emission technologies.

However, some political decisions can also cause considerable price decreases, such as the Brexit referendum, which contributed to a fall in EUAs (Figure 1). The reason for the decline was the uncertainty among investors trading in EUA futures, who are mostly based in London, just like the ICE Exchange, which accounts for 95% of EUA trade. The value of EU ETS market is not only determined by the trade in EUAs between companies obliged to participate in the system, which need EUA units to retain allocated emission limits and cover their actual emissions. A large part of allowance trading volume is in the hands of stock speculators and financial institutions trying to profit from allowance trading. This activity often results in massive sales or purchases of EUAs, which are rapid reactions to this type of speculation and cause sudden increases and declines in the value of EUAs.

2.3. Government auctions, the primary supply of EUAs

Government auctions are the primary supply of EUAs in the ETS. The auction calendar is planned one year in advance and the price is determined by individual auctions conducted using three auction platforms: EEX,[1] ICE and TGE.[2] Auctions can be accessed by financial institutions and direct market participants, that is energy-producing installations.

Using the Demand to Supply Ratio (DSR) for auctions it is possible to calculate the demand level for EUAs, and in this way determine the current trend. The lower the ratio, the lower the demand for EUAs, which is a negative market signal and contributes to the fall in EUA prices. When DSR is high, it contributes to price increases. This is a signal that the supply of EUAs in the market is too small to meet the existing demand.

Analyses of Phase III of ETS, which is the period when government auctions were introduced, have revealed that the price of EUAs was strongly affected by changes in volumes and dates set out in the regular auction calendar. When the regular schedule of supply in a given country is disrupted by a holiday break, there is a sudden price increase during the last auction before the break or the first one

[1] www.eex.com [access: 12.09.2016].
[2] www.tge.pl [access: 12.09.2016].

after the break as a result of volume accumulation (market controlled by buyers), causing an increase in DSR.

3. Possibilities of predicting EUA price levels

EUA price levels are a crucial factor in production planning made by installations obliged to participate in the ETS. Given large price increases, production can even prove to be unprofitable. Because of regulations that govern this relatively young market, there are no restrictions on the upper limit of market prices. When a production company fails to cover its actual emission levels, it faces a penalty of 100 euro for each 1 Mg of CO_2 emissions, which can even lead to the company's bankruptcy; for this reason, the need to comply with the requirement by purchasing enough EUAs at the right time and at an optimal price is so crucial for many companies.

It is therefore extremely important to make accurate predictions of EUA price levels, which can be done by tracking indicators described in this article. Each production company should develop its own algorithm to assess the risk associated with EUA prices. The risk depends on the emission intensity.

Forecasts and risk assessment associated with EUA prices should be made in a short-term, medium-term and long-term time frame for a given time interval <0, T> and should include the following factors:

– price of gas, P_g – for short-term forecasting,
– price of coal, P_c – for short-term forecasting,
– price of electricity, P_{el} – for short-term forecasting,
– prices of EUAs in the primary market (government auctions), P_a – for medium-term forecasting,
– the number of EUAs in the primary market (government auctions), I_a – for medium-term forecasting,
– the possible direction of changes resulting from political decisions, Z – for long-term forecasting.

In the short term and given attractive EUA prices, allowances should be purchased on an ongoing basis in the spot market, while long-term production targets should be secured by allowances purchased in the derivatives market.

Summary

The results of the study indicate that the price of EUAs is affected most by political decisions which determine the number of EUAs in circulation, the number of market participants and the involvement of financial firms. Other crucial factors include information from European markets, which directly influence in-

vestment decisions made by entities trading in EUAs and shape the level of energy commodities. Another important factor are prices of the energy mix in associated commodity markets, which can be important for short-term production planning. Less important, momentary changes are brought about by government auctions, which merely reflect the behaviour of commodity markets when they take place according to the regular schedule. Auctions results provide a secondary signal for market participants. Given a constant level of DSR for auctions, the signal for the market is neutral.

As shown earlier, EUA price forecasting is an extremely difficult challenge for companies obliged to participate in the ETS and is often very inaccurate because of changes in commodity markets and political decisions introducing new mechanisms that affect the price level and the number of EUAs in circulation.

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Analiza czynników kształtujących poziom cenowy uprawnień do emisji CO_2

Streszczenie. *W artykule przedstawiono wyniki badań dotyczących wpływu najważniejszych czynników powiązanych z kształtowaniem poziomów cenowych EUA oraz przeanalizowano ich stopień oddziaływania. Wyjaśniono także mechanizm korelacji wymienionych parametrów z cenami EUA. Za sprawą wymienionych wskaźników takich jak ceny ropy Brent, węgla, gazu oraz monitoringu przebiegu aukcji rządowych i decyzji politycznych, możliwe jest prognozowanie ceny EUA w terminie krótko-, średnio- i długookresowym, a tym samym planowanie produkcji i jej opłacalności w zakładach obligatoryjnie objętych systemem handlu emisjami CO_2. Z uwagi na złożoność zasad rynku oraz dużą zmienność wskaźników powiązanych, prognozowanie jest obarczone dużym błędem. Prawdopodobieństwo wystąpienia wysokich poziomów cenowych EUA jest zagrożeniem dla opłacalności podstawowej produkcji.*

Słowa kluczowe: *emisja CO_2, EU ETS, EUA, Protokół z Kioto*

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Impact of Demographic Changes onto National Economy Development

Abstract. *The effects of population decline and their influence onto the national economy need to be analyzed with reference to modern demographic trends regarding society ageing process. The problem of demographic changes does not only concern the birth rate, life span and migration, but it also refers to economic phenomena and thus, the economic and demographic trend interrelation becomes quite obvious. Macroeconomic approach defines the relationship between the demographic and social and economic development of the country. This research gives a broad overview of the influence of demographic changes onto the national economy. The purpose of the following paper is to present the impact of demographic changes onto Polish economy. The research period covers the years 2004-2015. The scope of the study includes the subject literature overview together with the collection of source materials presented in the empirical part of the study.*

Keywords: *demographic structure, national economy, ageing, population*

Introduction

Global demographic changes are nowadays becoming more and more apparent. Demographic processes together with their consequences are now seen as challenges especially in terms of social and economic structure of the country.

Small demographic potential is, with reference to the economy, connected with a number of problems of functioning of the labor market, public finance or medical care. Insufficient number of individuals participating in the economy

leads to problems in economic development, and as a result of that, to the slowing down of economic growth.

The major factor which leads to changes in the demographic structure is the intensification of the ageing process together with the reduction in the number of births. Ageing is mostly manifested by the increase in the number of people who are at the post-working age. This influences the stability of the public finance due to the increase in the expenditure on social and medical care. The number of people at the production age is diminishing and the number of elderly people, who generate more spending, is rising. This expenditure comprises mostly pensions and health care [Pleśniak 2014: 44].

Nowadays Polish society is experiencing demographic transformation. Low number of births does not provide demographic renewal and the number of elderly people is constantly rising.

The fall in the population resulting from the decrease in the fertility rate (value at the level lower than 1.5 leads to difficulties connected with generation replacement), which, in turn, results in the decrease in the number of people of production age – from 25.9 million in 2010 to 21.8 million in 2035 [Central Statistical Office 2015], and is connected with the availability of labor force.

For Poland, this availability of labor force seen as reserve is a decisive factor for economic growth as it decreases the gap in work efficiency. Reduction in the labor force will be reflected in the labor market, which, in turn, will enforce changes in the structure of Polish economy.

Ageing of the society needs to be treated as a natural and inevitable process which is part of mechanisms of functioning of the economy. It is also a challenge which Poland needs to face as people are the most important resource of the economy and can determine its competitiveness.

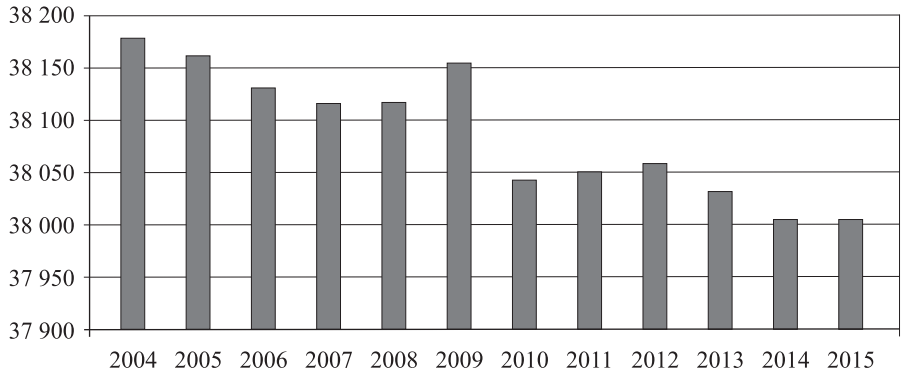
The purpose of the following paper is to pinpoint the most important determinants concerning the role of elderly people in the society and to present the consequences of demographic changes that result from society ageing and their influence onto Polish economy.

1. Demographic changes – ageing of the society

The current demographic image of Polish society is the result of the Second Demographic Transition which has been present since the end of the 20th century. The major factors influencing the changes are the change in fertility pattern together with the transformation of family formation. These changes have been accompanied with prolonging human life. All these factors are reflected in the age structure of the population, in particular the acceleration of ageing of the society, diminishing numbers of people in productive age and labor force ageing.

Population age structure depends on the past and current trends regarding death and birth rates and migration. The ageing of the society can be a consequence of shrinking percentage of young people connected with the decrease in the birth rate. One can observe a significant increase in the number of people at the age of 65 and older. By 2050 the percentage of elderly people will have increased to almost 35% (in 2010 this percentage was 13%). Additionally, the number of people over 80 is also increasing (approximately 1.4 million people), which results in the intensification of double ageing of the society, that is a sudden growth in the number of people aged over 75 [CSO 2015].

Figure 1. Total population in the years 2004-2015
(in thousands)

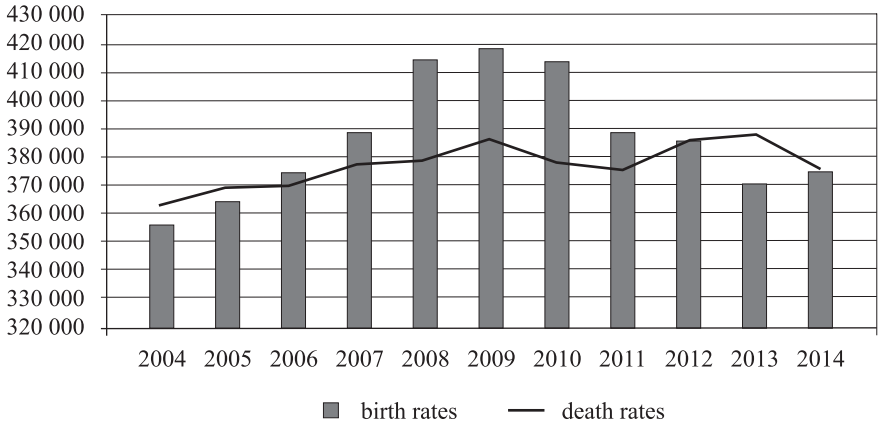


Source: own elaboration.

A significant characteristics of demographic situation in Poland is a continuous decrease in population. In the years 2004-2015 the number of inhabitants dropped from almost 39 million to 38 million (Figure 1). At the end of 2014 the population was 38.5 million, 8.5 million of whom were people over 60 (over 22% of the total population). In 2015 the number of Polish inhabitants was only 38 million [CSO 2015].

The decrease in the population is the result of the unfavorable tendency which is a low population growth rate. The birth rate has decreased, which, together with the simultaneous increase in the number of deaths, has resulted in the decrease in the population growth. Currently this ratio has dropped to the level of 1.25. The biggest loss of the population was observed in 2013, when the decrease in the birth rates was combined with the simultaneous increase in the number of deaths. In 2014 the population growth rate was 0.0% (Figure 2), which means that the population lost its ability of reproduction by means of population growth, that is maintaining the balance between birth and deaths numbers.

Figure 2. Population growth versus death rates in Poland in the years 2004-2014

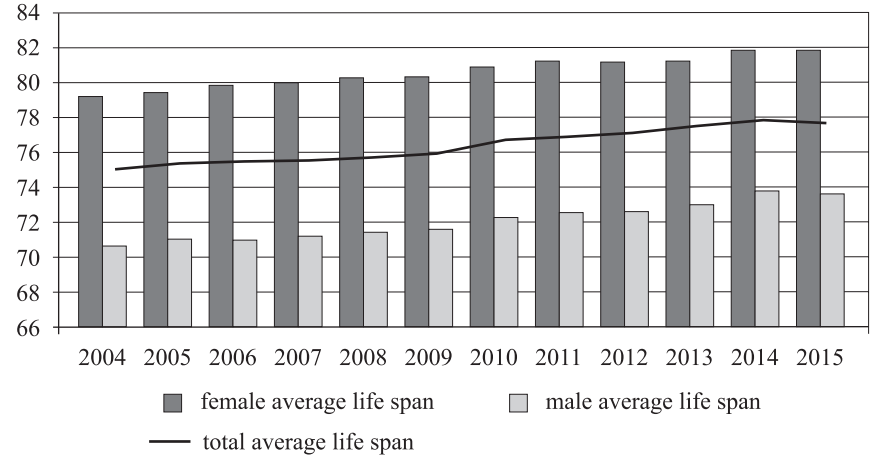


Source: own elaboration.

The process of ageing of the society initiated by so called demographic transition was connected with the shift in the population reproduction regime from the traditional to the modern one which is characterized by the small number of deaths and births. These changes have resulted in the change in the age structure of the population of Poland.

Multigenerational family in which all the members had to work was seen as the necessity without which one could not function. It was dominated by tradition

Figure 3. Average life span in Poland in 2004-2015



Source: own elaboration.

and culture, not by the economic system [Toffler 1985: 272]. The State from the social and economic point of view did not play then a significant role.

The development of the economy was a direct impulse for family transformation. The role of the woman was totally changed as she gained independence. The reconciliation between the woman's role within the family and her professional aspirations led to the change of procreational behavior, which, in turn resulted in the drop in the number of births. A child has started to be seen as "consumer good" and the fertility pattern has changed. In 2015 the fertility rate was at the level of 1.28.

The ageing of the society caused by the decrease in the fertility rate together with the lengthening of the human life (Figure 3) determines the generation structure of the society.

The progress of civilization, including the development of medicine and health prophylaxis results in the growing numbers of people at the post-productive age. [Kijak 2013: 6].

The process of ageing of the society, although often perceived as human success, is very costly for the country's economy, as it requires changes in the structure of health care system and public finance.

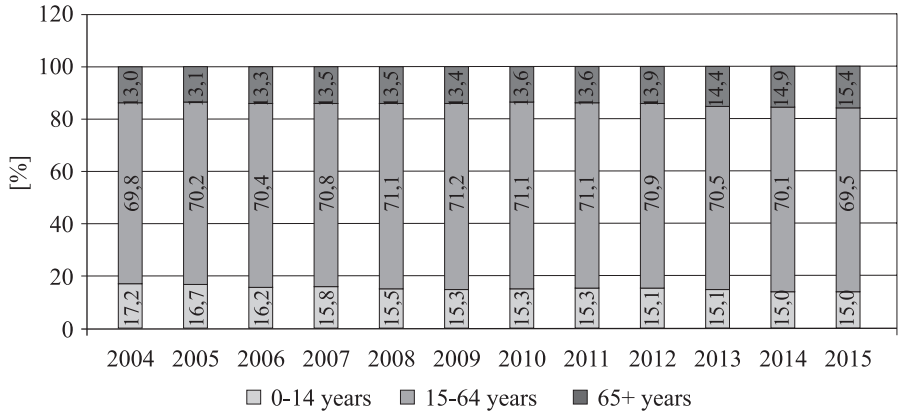
2. Pension scheme and health care and ageing of the society

Demographic issues are becoming the most significant problems that the economy is now facing. The social, cultural and moral changes have resulted in a number of demographic negative changes. The improvement of demographic ratios used to be perceived as the sign of improvement of health and life conditions. However, neglecting the possible consequences of this phenomenon turned out to be a serious mistake as we will have to face them in the near future. Therefore, the problem needs to be considered thoroughly in terms of economy development as it relates directly to strategic developmental issues. The barriers to keeping the proper level of development are related to public finance and public expenditure which determine the economy's ability for further development. [Michalski 2015].

Thus, unfavorable changes in the demographic structure are the obstacle to the country's sustained development, which will definitely lead to cross-generation tension and will also limit the opportunities for the quality of life improvement as the fiscal burdens will be impossible to tolerate by the people at the productive age. Impeding economic development will directly result in hindering economy competitiveness, which will, in turn, lead to smaller generation of work places.

The most significant demographic challenges should make one consider the problems of insufficient numbers of working people whose earnings would need to be redistributed. That would be the major income source for the growing group

Figure 4. Demographic structure in Poland in 2004-2015



Source: own elaboration.

of beneficiaries of public finance due to the phenomenon of ageing of the society. This group benefits from pension schemes, health and social care and nursing insurance. One also needs to bear in mind that the growing fiscal burden influences the young generation's decisions concerning leaving the country in search of better life and work conditions. That is why financing science and R&D cannot be considered an opportunity for the country's economic development as the economy based on modern technology cannot function properly without sufficient labor resources.

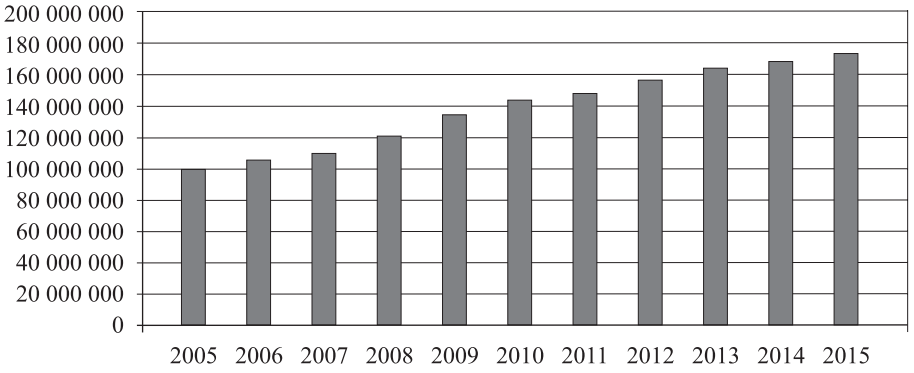
The process of ageing of the society in Poland is clearly related to the increase in the demographic burden with people at the post-productive age.

This will inevitably hinder proper functioning of the pension system which is based on the principle of intergenerational solidarity. The result of the increase in the numbers of elderly people is the intensified demographic burden with the people at the post-productive age.

Demographic prognoses indicate explicitly that the number of working people in Poland will diminish from 7 million to 4.3 million (by 40%) by the year 2060. Inverse relationship will be observed in the group of elderly people as their numbers will grow to 9.5 million by the year 2060 [CSO 2015]. The data indicate that it is the demographic burden with elderly people that is the major obstacle to the economic development of the country. One should especially take into consideration the pension scheme as it is the contributions of the working people that are used to make payments for the retired. This means that public expenditure on elderly people is higher than the expenses on the young. The expenditure on the retired is getting higher and higher every year (Figure 5).

Elderly people use public finance to a large extent as they "consume" social benefits (one needs to bear in mind that the benefits they use are really costly).

Figure 5. Pension expenditure in Poland in 2004-2015 (PLN)



Source: own elaboration.

At the very moment when a person retires he or she stops being active in professional terms. Prior to that they earned money and paid taxes. Now they are dependent on social benefits. All this makes budget income fall and public expenditure rise [Jurek 2012].

Social expenditure constitutes the highest share in the public expenditure and within the social expenditure the biggest share is formed by pensions – 52.6% and health care – 25.3%. It is predicted that in the following years, that is by the year 2020, this expenditure will systematically grow and will be, respectively, 53.8% and 25.4% [CSO 2014], which is connected with the ageing of the society, that is the growing numbers of retired people.

Table 1. Structure of social expenditure in 2014-2020 (%)

Country	2014	2016	2018	2020
Total social expenditure	100.0	100.0	100.0	100.0
Pensions	52.4	52.6	53.1	53.8
Health care	25.1	25.3	25.3	25.4

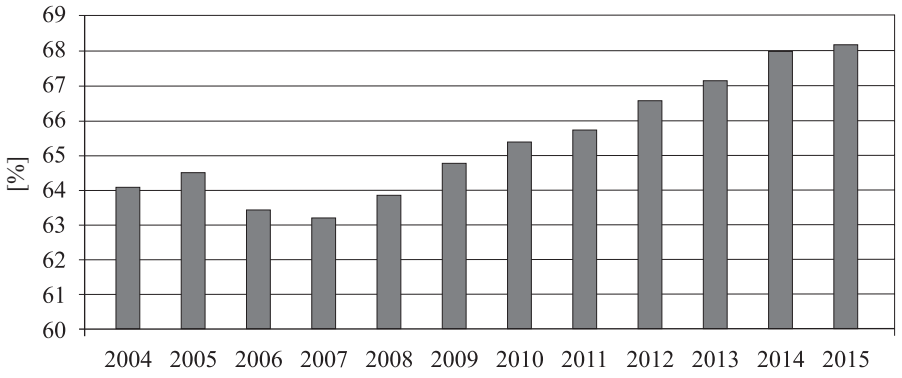
Source: own elaboration on the basis of *Projekcja wydatków socjalnych na lata 2014-2020*.

It is necessary for the proper functioning of the economy that the costs of social care are financed with the current budget revenue. However, in the country in which the population is getting older the expenditure is growing much faster than the income from taxes and contributions. Under these circumstances it is

necessary to use public debt.[1] Demographic part of this debt refers to the fact that pension scheme is burdened with the growing number of elderly people when compared to the diminishing numbers of young people.

Lengthening human life span means that one can live to the very old age, for the country, however, that means increasing expenditure on health and long-term care. All that results from the change in the family model, in which due to the low fertility rate, it is the state that needs to take care of the senior citizens. The data gathered by the Polish Central Statistical Office indicate that the number of nursing homes and hospices is still growing, which results from the growing social demand connected with the process of ageing of the society.

Figure 6. Professional activity rate in Poland in 2004-2015



Source: own elaboration.

Because of the observed and forecasted unfavorable changes in the demographic structure of the population it is high time to pay full attention towards the lengthening of the working life, especially of the people at the mobile age and in this way prepare labor resources and the economy for the future changes. Therefore, one should consider the professional activity rate changes.

Professional activity rates in all the considered periods never exceeded 70%. This confirms the necessity of changes in the attitudes towards increasing professional activity, as the current situation has a very unfavorable effect onto Polish economy. In the near future companies might face the lack of well-prepared and sufficient labor resources.

[1] The term "pension liabilities" is also found in the subject literature. It comprises demographic, political and pension elements.

Conclusion

The dynamics of the changes in the demographic structure of the population are justified by the changes in the family structure and longer life span together with the lack of intergenerational solidarity.

These demographic changes influence to a much bigger extent the public expenditure when compared to the public income. Elderly people generate much higher costs when compared to the young. This implies that the period during which pensions are paid is longer and the health care expenditure is higher. In the near future this will lead to introducing restrictions on other public expenditure and to the increase in the sums paid as pensions.

Changes significant to the economy stemming from the transformation of the demographic structure of the population have been observed in Poland. Demographic changes have a significant influence onto the labor market and require undertaking activities that would lead to the increase in the professional activity. Lengthening the period of professional activity seems to be inevitable and such actions should be taken into consideration in the country's macroeconomic policy. Current demographic changes influence both the labor market and social security system.

Changes in the demographic structure of Polish population began together with the system transformation in the last decade of the 20th century, however, their peak was observed at the beginning of the new century. That was the emergence of a totally new demographic structure of the country characterized by the low birth rate ratio and lengthening of the average life span.

The mentioned above changes influence the country's economic development to a great extent. Information on the population age structure is the basis for determining future potential labor resources. Forecasts prepared by the Polish Central Statistical Office (CSO) indicate explicitly that after 2025 elderly people will constitute more than 30% of the population [CSO 2015] and this number will continue to increase to the level of almost 35% in 2050 [CSO 2015], which might have an unfavorable effect onto functioning of Polish economy.

The growing number of people over 65 is connected to the public finance inefficiency and the growing consumption by senior citizens. On the other hand, however, the process of ageing of the society can have a positive effect and develop as a new strategy aimed at satisfying the needs of the elderly by means of creating special products and services designed for this age group.

In the ageing society, elderly people should be considered as a productive social group that can be useful for the rest of the population. Therefore, exploiting the elderly people's experience is so significant. Economy needs to be prepared for the challenge of presence of the elderly on the labor market both as work-

ers and as major consumers. The stereotype of an elderly person will need to be changed as this group will soon constitute a significant group of consumers with growing possibilities and needs.

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Wpływ zmian demograficznych na rozwój gospodarki narodowej

Streszczenie. *Współczesne trendy demograficzne odnoszące się do zjawiska starzenia się społeczeństwa skłaniają do analizy skutków zapaści ludności i ich wpływu na gospodarkę narodową. Problem zmian demograficznych nie dotyczy jedynie obserwacji związanych z przyrostem naturalnym, trwaniem ludzkiego życia czy migracją, dodatkowo odnosi się do zjawisk ekonomicznych, gdzie wzajemne powiązania o charakterze demograficzno-ekonomicznym stają się oczywiste. Ujęcie makroekonomiczne definiuje bowiem związki zachodzące między rozwojem demograficznym i społeczno-gospodarczym państwa. Badania w tym zakresie przedstawiają szeroką bazę informacji na temat wpływu zmian demograficznych ludności na rozwój gospodarki narodowej. Celem niniejszego opracowania jest przedstawienie wpływu zmian demograficznych na gospodarkę Polski. Okres badawczy obejmuje lata 2004-2015. Zakres opracowania to przegląd literatury oraz zgromadzenie materiałów źródłowych, które zaprezentowane zostały w części empirycznej.*

Słowa kluczowe: *struktura demograficzna, gospodarka narodowa, starzenie się, ludność*

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Minimal Wage versus Economic Development – Overview

Abstract. *Currently one can observe a growing interest into the significance of minimum wage for the labor market and its influence onto the economy. Most economists assume that the increase in wages does not have a negative effect onto the economy provided it is lower than the growth in work productivity. There are, however problems, determining the extent of the minimum wage increase and its significance for the labor market and GDP. The purpose of the following paper is to present a synthetic overview of existing knowledge and analyses results in terms of the interdependences between the changes in the minimal wage and the labor market and GDP. This is the starting point for further research which should give the answer to the question on the connection between the labor market, economic development and the minimum wage in the local context.*

Keywords: *minimum wage, labor market, economic development*

Introduction

Poland is a member state of the EU and its ambition is swift economic development. However, so far it has been mostly low wages and manufacturing of unprocessed goods and providing simple services that have been the basis for GDP increase. [Jankiewicz 2014: 14 and 18] Despite discussing development [starting with Prime Ministers' exposes (for exemple of 2007 and 2011), and finishing with government documents] the major goal was just economic development, which resulted in a slow pace of quality of life changes together with maintaining a relatively high level of poverty [Jankiewicz 2016: 242-250].

Should Poland want to catch up with the countries of so-called "old" EU in the 21st century, the country can no longer focus on the same factors and the increase in GDP as the main goal. It becomes indispensable to make Polish economy innovative, so that on the basis of knowledge it will result in a fast economic development [Gomułka 1998]. A significant factor that influences changes in the quality of life (which is a significant development factor) is a minimum wage which guarantees the employees the basic level of income. The subject literature presents different opinions on the role and the importance of minimum wage onto the labor market and economic development, starting with the opinions that is has a totally negative effect onto the both values in question, up to assuming that (under certain conditions) it might have a positive effect (in the medium and short term).

The purpose of the following paper is to present in a synthetic way both the theoretical deliberations and the results of the studies conducted in a number of countries and concerning the influence of the minimum wage onto the labor market and the economic development. The presented analysis will be the starting point for further research into the relationship between the wage changes and the labor market and the economic development on a local scale in Poland.

1. Evolution in the approach towards minimum wage in Poland

In their pursuit of prosperity and the improvement of life quality many countries concentrate on economic development as their target. This has replaced the previous measurement connected just with quantitative changes, that is GDP. Taking care of the citizens' life quality, on one hand, can be reflected in the environment protection and better access to health care, and on the other hand, it can focus on increasing the economic level of life. The consequence of adopting economic development as the main target is the state's obligation to establish the minimum level of income the worker should be paid in exchange for his or her work. Thus, the minimum wage is established, that is the lowest possible wage that the worker can earn is legally determined, which is related to the subsistence level. This value is presented as the rate or minimum wage for the work performed within a given period of time (usually one month) [Wikipedia] The gist of this regulation is ensuring that a working person will be provided with the sufficient income established by the state and assumed to be basic regardless of the worker's skills and other ingredients of his or her income.

International Labor Organization (ILO) in 1928 adopted a declaration calling upon particular countries to establish minimum wage. This was justified by means of the following arguments:

– bringing a halt to the abusive exploitation of workers, especially those with low education and low qualifications,

– ensuring the sufficient level of life for people performing the simplest tasks and therefore, diminishing the poverty levels,

– eliminating unfair competition on the labor market (including discrimination towards women, minors and foreigners) [ILO 2014].

In Poland minimum wage has been established since 1956, however, its role in the remuneration system and granting other benefits has been changing. At first it was connected with the socialist economy changes and thus [Monitor Polski 1982; 1986; 1990]:

– up to 1977 minimum wage was the guaranteed to all full-time workers joint level of income,

– in the years 1977-1981 minimum wage referred to a particular pay grade and was determined as the minimum wage for the basic salary in the lowest wage bracket,

– in the years 1982-1986 both the minimum wage and the minimum level of basic salary were determined for a particular pay grade,

– from July 1986 to August 1990 minimum wage was the basic salary for the lowest pay grade and referred to wage brackets and therefore it influenced the overall remuneration level (its changes resulted in the changes of pay scales).

In the 1990s Poland commenced system transformation (shift form socialist to market economy), which resulted in the changes in the approach towards minimum wage. One of the very first decisions under the new political system was transferring the decisions on establishing the minimum wage from the Council of Ministers to the Minister of Labor and Social Policy. Then (1 September 1990) a new regulation on establishing minimum wage was adopted. Minimum wage was determined as a guaranteed monthly salary, regardless of exhibited qualifications, pay scales and the number and type of used in a particular company remuneration ingredients. Minimum wage, understood in such a way, did not include jubilee awards, profit bonuses, and pension allowances, payments from budgetary surplus in cooperatives and overtime.

In 2003 the obligation of annual increase in minimum wage was introduced. It was decided that this increase cannot be lower than the expected rise in prices for the following year [Act 2002]. In 2006 it was added that if the minimum wage did not exceed 50% of the average wage, the increase should account for at least 2/3 of the forecasted increase in the nominal value of GDP.

Currently, the value of the minimum wage for the next year is announced in the Official Journal of the Republic of Poland "Monitor Polski" as the Prime Minister's directive before 15 September each year [Journal of Laws of 2015, item 2008].

The term minimal wage concerns only employment contracts while other legally binding forms of employment (for example commission contact) have been excluded from this mechanism and no minimum wage is here established, so its value is the matter of negotiations between the employer and the employee. This was decided in order to maintain cost competitiveness of the economy by making it possible for the employers to pay rates lower than the minimum wage. Therefore, in Poland there are large groups of workers with so-called "junk" contracts (approximately 1 million people and including temporary contracts – 4 million people) and a new social group called precariat has been formed [Jankiewicz & Pająk 2014: 26, 125].

2. Minimum wage in the theory of economics – an overview

The significance of wages for the economy was dealt with in the 18th century by Adam Smith who then analyzed English economy. His interest in remuneration was connected with the changes in job supply and economic growth and not with social issues [Smith 2006]. He claimed that the worker's minimum wage should be established on the basis of costs that he or she had to bear to support his or her family. Wages that are too low result in starvation, and this, in turn, leads to lower birth rates and higher death rates. As a result "these workers would die out in the first generation" [Smith 2007: 81] and the economy would suffer from the insufficient work force. Therefore, he suggested that "the lowest category of ordinary workers" should earn "at least twice as much as they need for living, so that they could raise their children" [Smith 2007: 81; 2016]. He referred to the wages at the level of the cost of living as "natural wage" and with this respect it is the same as modern minimum wage. Smith, however, did not define the notion of the pay sufficient to cover the costs of living and whether it is related to the age of the worker or his or her efficiency. He only states that work is commodity so it should be shaped in the similar way as the prices of other goods, on the basis of supply and demand. [Smith 2010] The wages established by the market are usually different from "natural wages" and the employers, as they are more powerful, are going to maximize profits by keeping wages as low as possible. This should be considered as positive (according to Smith) as the increase in wages influences the drop in the pace of accumulation and in the slower increase in GDP.

Smith pays attention to the fact that the workers of the public sector are excluded from the market mechanism, as their work cannot be objectively assessed and they do not undergo the pressure of supply and demand (in terms of the rate of their wages and the employment numbers) which is important in private enterprises [Kwiatkowski 2002: 92-93] The approach presented by A. Smith reflected

the general opinions of the class that owned the means of production in the 18th century [Frieske 2005: 46].

Smith also took into consideration the structure of remuneration, especially the reasons for differentiating wages. He stated that this differentiation is due to a number of factors, including:

– type of work – that is the level of difficulty, inconvenience, hygiene conditions and danger of performing this type of work together with its perception by the society (whether it is positive or negative),

– costs of acquiring the skills necessary to perform a particular job,

– the degree of wage and employment stability together with the probability of finding a particular job,

– the level of responsibility the worker needs to take.

The issues of wage theory were also discussed by another economics classicist, namely David Ricardo. He made the notion of "natural wage" adopted by Smith more precise. For him it was the value sufficient to cover the costs of purchasing food and other necessary costs resulting from customs and social conventions. This means that it should change according to the changes in the basket of basic products and services which is sufficient to provide for the living of the worker and his or her family. Therefore, "natural wage" is going to increase together with the economic development due to the increase in the standard of living. Its change will depend upon technological progress, changes in work efficiency and prices of food and other goods.

This author introduced the notion of real wage, that is the wage determined by the market and paid to the worker. When this real wage is higher than the natural wage, the worker's standard of living increases, which, in turn, influences the inclination to have more children and leads to the increase in population. As a result, after a few years, there will be an increase in the supply (when the dynamics of work demand are lower) and the decrease in the real wage. If the worker's wages are below the nominal value, the population and work supply decrease. Thus, the relation between supply and demand on the labor market influences the level of wages and accumulation, which confirms Smith's opinions. In this way it influences the economic development, as reinvestment of profits is here a key factor [Ricardo 1957; Landreth & Colander 1998]. Ricardo was also interested (similarly to Smith) in the issue of job evaluation and differences in remuneration.

Opinions similar to the mentioned above economists were expressed by the representatives of neoclassical theory. As proponents of the free market they assumed that the wages should be shaped by supply and demand. In the case of demand surplus on the labor market, there will be an increase in pays, while the supply imbalance will be followed by the drop in wages. As a result labor becomes relatively more expensive or cheaper, which results in the shifts in employment rates. This approach was connected with the assumption that market participants

are rational in their behavior, that is entrepreneurs want to maximize their profit, while the workers want to maximize their incomes. It was assumed that excessive rise in wages will influence accumulation and, as the result, also the pace of changes in GDP [Hobson 1904; Harris 1972; Marshall 1961; Pigu 1915; Berveridge 1944; Jevons 1888; Clay 1929].

A. Marshall pointed out that there are problems with job evaluation, which was due to the fact that workers offer their labor "in bulk" and therefore it is impossible to exhibit and assess their real effort in a particular time. He assumed that in the long term there is balance on the labor market and it results from the job change. Remuneration is established at such a level so that the workers of a given sector should not want to change their jobs. Therefore, according to Marshal, wages determine process, which results in the relative balance in payments in different jobs. This is why, minimum wage should not be determined as this would have an unfavorable effect onto the balance mechanism [Marshall 1961; 2003; Stankiewicz 2000]. Similar negative opinion on determining minimum wage was expressed by Ludwig von Mises. He stated that constant state interference into the labor market leads to serious unemployment rates of the workforce [Mises 2011]. M. Friedman added that a limited access to certain professions which artificially increases wages has a similar negative effect. As a result, wage rigidities are observed resulting in maintaining unemployment [Friedman 2008].

A different approach towards the notion of minimum wage was exhibited by the proponents of the state intervention. J.M. Keynes assumed that the state can stabilize the business cycle by means of certain actions and in this way ensure undisturbed economic development [Jankiewicz 2004: 107-108]. This is due to the fact, that the state can influence demand without restrictions. Therefore, he did not take into account the wage influence onto employment, and analyzed the relations between the changes in employment and the output. He adopted wage rigidity (just as his followers) which meant that wages influenced the economy in terms of demand not in terms of employment. Thus, economic development is dependent upon the level and stability of supply, but not upon the minimum wage [Keynes 1985].

Keynes believed that it is extremely difficult for the employer to shape wages freely on the labor market, because of pay contracts and the activity of labor unions. Therefore , he believed that it is the legal regulations that should play an important role in determining minimum wage and the scope of the labor unions' intervention.

The presented above overall analysis indicates that in the theory of economics there is a relative ambiguity in terms of assessment of the minimum wage influence onto the employment and economic growth. This results from a number of factors that in the direct and indirect way influence the labor market and the GDP.

The economic theories are based on the assumptions which are too simplistic and do not reflect the real picture of the processes in the economy.

3. Minimum wage in Poland and in selected countries

Theoretical discrepancies in the approaches towards the influence of minimum wage onto the labor market and the economic development influence the remuneration policies in particular countries.

In the European Union 22 countries out of 28 establish minimum wage. Great Britain and Ireland, on the other hand, establish minimum hourly rates, similarly to the USA.

In Austria, Italy and Cyprus (and also in Scandinavian countries) minimum wage is not established at the central level but as part of a collective agreement between employers and labor unions, which means that its values differ in different sectors of the economy. It was similar in Germany up to 2014, however, at the beginning of 2015 a common hourly minimum rate was introduced. It only excluded people under 18, the long-term unemployed and particular groups of trainees.

Belgium and Greece have a hybrid system, in which a minimum wage is established by social partners but it is binding in all sectors (in Greece only in the private sector) [Eurostat].

In 15 OECD countries minimum wage is established either by the government solely, or on the basis of recommendations of Tripartite Commissions.

Multiple different solutions exist for minimum wage for young employees and trainees.

Recently the European Parliament has become interested in the notion of minimum wage. The parliament is trying to introduce minimum wage in the whole EU. Equal pay is being strongly advocated by so-called "old" member states and its aim is to minimize economic migration from the states at the lower level of the economic development together with cost competitiveness. This approach does not take into consideration the condition of particular economies, their efficiency, development level or the purchasing power of local currencies and thus, it can bring about more negative effects than the positive ones. For many countries that would mean a significant drop in the development rate. Especially as Eurostat data show significant differences in particular EU countries. In Bulgaria minimum wage was 215 euro in 2016 (the lowest rate), while in Luxembourg, it was 1.923 euro (the highest rate).

In Poland minimum wage has been growing steadily from 700 PLN in 2000 up to 1850 PLN in 2016. In 2017 the government is planning to increase minimum wage to the level of 2000 PLN. This puts Poland in the middle of the scale (with

Table 1. Minimum wage in selected EU countries in 2000 and 2016 (euro)

Country	2000	2016
Luxembourg	1191	1923
Holland	1092	1508
Belgium	1096	1502
France	1049	1467
Ireland	–	1546
Great Britain	952	1529
Romania	25	233
Bulgaria	34	215
Poland	161	431

Source: Eurostat.

the rate of 431 euro) in comparison to the other EU states. Highly developed countries, that is Luxembourg, France, Belgium and Germany are at the top, while the countries which underwent political transformation, that is Lithuania, Latvia, the Czech Republic and Hungary, have the lowest rates (350-370 euro).

As it can be inferred from the presented above statistical data the minimum wage in Poland is much lower in comparison to highly developed countries, however, its increase made it possible to keep a relatively high level among Central Eastern Europe countries.

A significant indicator that makes it possible to assess minimum wage in a particular country, is its relation to the average pay. In 2014 the level of minimum wage in the EU countries was from 33% (the Czech Republic) to over 50% of the average monthly salary for people working in industry, construction and services. Poland with its rate of 45% was placed in the group of countries with the highest level, together with Slovenia (53%), Luxembourg (50%), Lithuania (48%), Malta and France (both 47%), Belgium (46%), Ireland (44%) and Hungary, Portugal and Latvia (around 43%). A lower relation between the minimum wage and the average pay was reported for Great Britain (40%), Bulgaria (38.2%), Croatia (37%), Estonia (34%), the Czech Republic (32%) and Romania, Spain and Slovakia (36%). [Eurostat]

In Poland this relatively high relation between minimum wage and the average monthly salary results from the minimum wage fast growth since 2008. In the years 2007-2014 minimum wage increased from 35% to almost 45%, while between 2000-2007 it remained virtually at the same level (similarly to its real value). On the other hand, bearing in mind large numbers of workers with temporary contracts and junk contracts an increase in the number of people earning below minimum wage has been observed (at about 12% at present).

Simple analyses of changes in GDP and employment rates in Poland do not make it possible to state that there is an interdependence between the two (even

Table 2. Changes in minimum wage and GDP in Poland in 2000-2016

Year								
2000	2001	2002	2003	2004	2005	2006	2007	2008
Minimum wage – PLN								
700	760	760	800	824	849	899	934	1126
Change in minimum wage (year after year %)								
	8.6	0.0	5.3	3.0	3.0	5.9	3.9	20.6
Change in GDP (year after year %)								
4.3	1.2	1.4	3.9	5.3	3.6	6.2	6.8	5.1
Year								
2009	2010	2011	2012	2013	2014	2015	2016	
Minimum wage – PLN								
1276	1317	1386	1500	1600	1680	1750	1850	
Change in minimum wage (year after year %)								
13.3	3.2	5.2	8.2	6.7	5.0	4.2	5.7	
Change in GDP (year after year %)								
1.6	3.9	4.5	1.6	1.3	3.3	3.6	–	

Source: Eurostat, Central Statistical Office.

while taking into consideration time shifts). The factors which would need to be analyzed include the easiness and possibility of employing people on junk contracts (which means that workers' pay does not need to be at least equivalent to the minimum rate), transformational changes and shifts in global economy. All that makes the assessment of the simple relation between the labor market and GDP, and minimum wage very difficult. This conclusion can also be supported by other studies which were based on simple statistical models and the subject literature.

Z. Jacukowicz, who considered statistical data and the literature on the minimum wage in various countries, came to the conclusion that the existence of the correlation between the percentage of people employed and those who earned minimum wage cannot be statistically verified. This means that there is no relation between the level of minimum wage and the average pay and the situation on the labor market [Jacukowicz 2007]. Similar conclusions were drawn by W. Golnau [2007], M. Kabaj [2013: 8-15], A. Krajewska and S. Krajewski [2013: 317-330], and M. Idczak [2011: 48-60].

The model presented by B. Suchecki indicates that with the reference to all the employed people a 10% rise in minimum wage leads to the employment level reduction by less than 1% [Suchecki 1999: 155-188] However, this is a minor interdependence and was inferred by means of a very general model and for the time span of 1990-1997, that is the period of most turbulent changes in the economy – the shift from socialist to market economy.

S. Jankiewicz, on the other hand, claims that increasing minimum wage forces employers to seek new technologies, which facilitates improving quality and range of products, increases the export opportunities, and that, in turn, results in creating new jobs and economic development of the country. The prerequisite for this mechanism is determining minimum wage for at least a medium term (employers should not by surprised by sudden changes) [Jankiewicz & Pająk 2014].

Difficulties in determining the influence of minimum wage onto the labor market and economic growth are also taken into account in other countries. For example:

Doucouliagos and Stanley, after their analysis of over 60 studies regarding the USA concluded that there is very little, if any, interrelation [Doucouliagos and Stanley 2008]. Similar conclusion was presented by Leonard, Stanley and Doucouliagos (on the basis of 16 studies concerning Great Britain) [Leonard, Stanley & Doucouliagos 2013: 499-520] and Belman and Wolfson (on the basis of 200 studies concerning various countries) [Belman & Wolfson 2014].

P. Krugman is also not really convinced that such an interdependence really exists. He claims that some economists state that "insufficiency of general demand could be solved on its own provided the salaries and prices would decrease immediately in the face of unemployment," which is not true. In reality there is no such thing as "full employment" or "if it exists it would take a very long time to achieve" [Krugman 2001: 171].

Conclusion

Remuneration level is a key factor influencing economic development which is the most significant Polish target in the 21st century. Simple analyses presented in the following study indicate that it is extremely difficult to prove explicitly that minimum wage influences labor market and economic development. These difficulties stem from the fact that minimum wage is only one out of several factors that need to be taken into consideration in this case. These factor include: supply and demand on the labor market, global economy, and employment conditions (that is, flexibility of the labor code, the size of the grey market, possibility of using other forms of contracts apart from employment contract). It is also institutional conditions that influence the labor market, and, thus they also need to be considered. All the mentioned above factors make the macroeconomic analysis very difficult, however, a local analysis should be much easier to conduct.

The remuneration level (including minimum wage) influences the quality of life and therefore, it should be increased systematically. While taking actions aimed at catching up with highly developed countries we cannot forget about the necessity to increase remuneration level. It might be assumed that this rise, if it

is in line with the increase in work productivity, should be neutral from the point of view of labor market and economic development. The question that definitely needs to be dealt with is whether the changes in minimum wage which are higher or lower than work efficiency would influence these factors. Therefore, it is necessary to conduct further research into the matter, especially on a local scale and take into consideration institutional conditions. System dynamics, as it makes it possible to detect direct and indirect relations and to determine the feedback loop, could be used to conduct the analysis.

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Płaca minimalna a rozwój gospodarczy – ujęcie syntetyczne

Streszczenie. *Współcześnie obserwujemy duże zainteresowanie znaczeniem płacy minimalnej dla rynku pracy i jej wpływem na gospodarkę. Większość ekonomistów przyjmuje, że zwiększenie wynagrodzeń nie wpływa negatywnie na gospodarkę, jeżeli jest niższe niż wzrost wydajności pracy. Trudności natomiast dotyczą określenia poziomu wzrostu płacy minimalnej w odniesieniu do zmian w gospodarce i tego, jakie ma ona znaczenie dla rynku pracy i PKB. Celem artykułu jest syntetyczne przedstawienie stanu wiedzy i wyników analiz ekonomistów dotyczących zależności między zmianami płacy minimalnej a rynkiem pracy i PKB. Jest to punkt wyjścia do dalszych badań, które powinny dać odpowiedź na temat sprzężenia między rynkiem pracy, rozwojem gospodarczym a płacą minimalną na poziomie lokalnym.*

Słowa kluczowe: *płaca minimalna, rynek pracy, rozwój gospodarczy*

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The Impact of Human Capital on the Changes of Export Structure in the Process of Narrowing of the Technological Gap

Abstract. *The aim of this paper is to present the research results on the impact of human capital's accumulation at the level of higher education on changes in export structure of Poland's economy which result from an increase in learning productivity of a country and technological progress. The period between 1993 and 2015 was under consideration. The research was carried out with the help of the methods of Pearson's linear correlation analysis and Spearman's rank corelation analysis. The results confirm the importance of human capital as a factor affecting the level of learning productivity of the Polish economy and demonstrate its role as a determinant of the reallocation of export structure towards more technologically intensive commodities. Development of human capital at the level of higher education in Poland thus contributes to building the endogenous advantages based on knowledge, and giving higher income from exports, which later can be reinvested in further strengthening these advantages, eg. through innovative activities.*

Keywords: *human capital, export, competetivenness, Poland*

Introduction

Accumulation of human capital resources should lead to the improvement of learning productivity of an economy, which is reflected in an increase in technological complexity of a country's export structure. As a result there is a rise in profits from the sales of goods of a given country abroad, and thus there is welfare. This welfare growth results from the implementation of technological progress by more and more educated, and better-paid employee capital. Thus we

deal with the development of endogenous specialization of a national economy which, in this case, is the result of investing in human capital development. The deepening of this endogenous advantage requires, however, planned long-term actions, which will bring visible accumulated effects only after some time. The investments in human capital development discussed in this paper lead, in the long run, to, among others, beneficial changes in a country's production structure in the form of a growing share of processed goods that involve higher contribution of human capital and technology.

The main objective of the paper is to present the research results on the impact of human capital's accumulation at the level of higher education on changes in export structure of Poland's economy which result from an increase in learning productivity of a country and technological progress. The paper consists of the following parts: first, the author presents theoretical assumptions on which is based the methodology of empirical research. The next part discusses the materials and research methods. The part that follows discusses the research results and how they compare with the author's previous findings. The paper ends with conclusions.

1. Human capital and technological change

According to R. Nelson and P. Romer technological change is a very complex phenomenon and that is why it is extremely difficult to fully comprehend the processes that contribute to its occurrence. As a result particular researchers focus on an analysis of selected elements and relationships leading to technological progress [Nelson & Romer 1996: 14]. This explains why there are so many various ways of demonstrating it through the size of differences in selected criteria that are used to assess a country's technological level. Very often one can find different types of productivity indicators e.g. national or domestic product per capita, which is also, as recommended in the subject literature, a measure of learning productivity of an economy. The author discusses various kinds of international trade structure depending on the analyzed determinants of the occurrence of technological gap or activities aimed at decreasing the gap.

Countries develop human capital mainly thanks to investments in education and innovativeness, strengthening, at the same time, endogenous advantages in international trade, the source of which is technological change. In light of new theories of trade and endogenous growth the changes in international trade may be the result of the process of country learning. The very international trade is one of the factors stimulating the learning process and the diffusion of technology, thus contributing to an increasing productivity of an economy. The development of endogenous advantage in international trade, the source of which is accumulation

of knowledge as a result of the learning process, is staggered and requires appropriate human capital quality. Endogenous character of technological progress manifests itself in different rates of welfare growth of particular economies due to, among others, differences in dynamics of human capital investment.

One of the main sources of human capital development that this paper discusses is formal education, the other ones being e.g. learning by doing, or learning by mimicking, or learning by doing innovation. All of these forms of learning and knowledge accumulation are mutually complimentary in the process of human capital development. It is necessary to remember that only part of human capital skills is shaped through education at school or university. We also acquire important skills in family environment, which determine, to a large extent, a young person's attitude toward education and knowledge-assigned meaning. We also learn by mimicking other people in the workplace and by sharing knowledge with them in the process of cooperation. We also learn by imitating social groups in which we function (e.g. peers) [Krugman 1985: 35-49; Yang & Borland 1991: 460-482; Nelson & Romer 1996: 14; Durkin 1997: 401-411; Parente 2001: 50; Jerbashian, Slobodyan & Vourvachaki 2015: 167-170; Zhang 2015: 59-60].

The pace of technological progress depends on learning productivity of an economy. The higher the potential of knowledge absorption by people, the higher the productivity is. A country's learning productivity is dependent on the efficiency of employee capital in the absorption of knowledge from different sources including technology. And it is not only about the acquisition and absorption of knowledge, but, first of all, it is about its implementation in different types of activity, which leads to technological change. Undoubtedly the ability to absorb knowledge depends on human capital quality including employees' qualifications and skills that could be acquired and developed, as highlighted above, in the process of education. A higher level of employees' education should, at least by definition, increase the potential of knowledge absorption. It manifests itself in the fact that more people are able to understand and implement technologically more advanced improvements. Thus the accumulation of human capital plays an essential role in the absorption of new technologies including those coming from abroad and being transferred, among others, via international trade, direct investment, scientist exchange or patents [Lejour, Steen & Timmer 2000: 220-222; Hoffmann 2003: 435; Mingyong, Shuijun & Qun 2006: 300-320; Teixeira & Fortuna 2006: 1-31; Bhattacharya & Raychaudhuri 2004: 23-56; Soukiazis & Antunes 2012: 6].

Thus one can state that the accumulation of human capital through education increases the chance of the technological change occurrence in economy. The visible effect is the evolution of the character of a given economy's comparative advantage in the direction of goods that require higher qualifications and higher technological complexity. In this way education leading to beneficial changes in

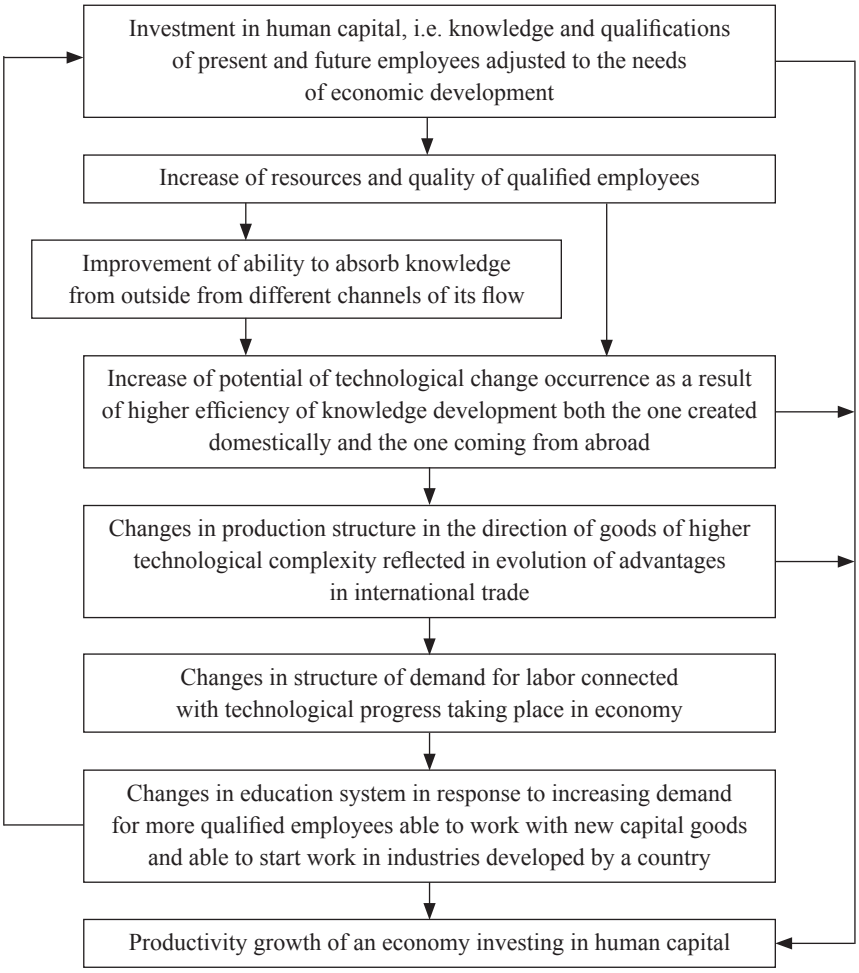

Figure 1. Impact of investment in human capital on the change of character of an economy's comparative advantage

Source: Majewska-Bator 2010, p. 155.

the structure of qualification and production reallocation in the direction of higher added value goods brings about an increase in export profits. To sum it up, bigger investments in the development of efficiently working education system increase, in the long run, supply of better quality human capital, which results in higher production of technologically more complex goods at the cost of smaller share of labor-intensive goods, and low-processed goods. The above mentioned relationships are synthetically illustrated in Figure 1.

2. Materials and research methods

The focus of this paper is on indicators regarding Poland's economy as a whole, which are the so-called indirect measures of a given phenomenon. The research period included the years 1993-2015. However, in the case of the study on the impact of higher education indicators on the changes in Poland's exports structure, the research period was a bit shorter because the data about export structure were available from 1995. The study was carried out with the help of the methods of Pearson's linear correlation analysis and Spearman's rank correlation analysis for the relationships of Gross Domestic Product per capita (GDP pc), exports per capita (EXP pc) and Poland's exports share in the global market and export groups differentiated from the adopted human capital indicators. The decision to choose Spearman's rank correlation analysis and Pearson's linear correlation analysis was made after the analysis of similar subject studies conducted by other authors.

The author used a time-lag study method as regards changes in export structure and indicators of learning productivity of an economy against human capital indicators. Thus exogenous variables of human capital, that is the higher education indicator in a year t_0, show the causes of the explained phenomenon of GDP pc growth, EXP pc and Poland's EXP share in global exports and a given group of Poland's exports in a year t_{+1} and t_{+2}.

The variables expressed in absolute values were log transformed. The log transformation method is not used for percentage variables because it does not standardize results. It is necessary to emphasize that the research results should be interpreted as a possible approximation of the occurrence of variables included in the study and the correlation between them.

In order to assess human capital resources of a given country one often uses different types of indicators for the level and structure of a society's education, which later are correlated with productivity variables [Majewska 2013: 174-176]. Among them are this study's indirect measures of human capital quality. These indirect measures are higher education indicators. The data regarding the indicators of human capital quality come from a Central Statistical Office annual report entitled "Szkoły wyższe i ich finanse" [Higher Education Institutions and Their Finances].

The first indirect measure of human capital quality is the number of higher education institutions' graduates with the division into the ones from technical higher education institutions and the ones from economic higher education institutions. They are indirect indicators of technical knowledge because they concern education in the area of exact sciences, economic sciences and engineering. For technical knowledge is the ability to design activities and processes that add up to the realization and completion of certain actions or creation of certain objects. It

Table 1. Education structure of univeristies' graduates by division into selected types of universities in 1993-2014

Year	Number of graduates in total	Graduates of technical universities			Graduates of economic universities		
		Total	% share in number of graduates in total	Growth rate	Total	% share in number of graduates in total	Growth rate
1993	64201	10593	16.50	–	4366	6.80	–
1994	69758	11092	15.90	4.71	5162	7.40	18.23
1995	88330	14329	16.22	29.18	8525	9.65	65.15
1996	115120	17472	15.18	21.93	13463	11.69	57.92
1997	145509	23663	16.26	35.43	19931	13.70	48.04
1998	174004	29173	16.77	23.29	30264	17.39	51.84
1999	214570	34233	15.95	17.34	44103	20.55	45.73
2000	260314	41311	15.87	20.68	65930	25.33	49.49
2001	303074	44713	14.75	8.24	82581	27.25	25.26
2002	342138	51973	15.19	16.24	93583	27.35	13.32
2003	364834	56158	15.39	8.05	99250	27.20	6.06
2004	382851	57069	14.91	1.62	100010	26.12	0.77
2005	391465	56298	14.38	–1.35	94867	24.23	–5.14
2006	393968	55 696	14.14	–1.07	87965	22.33	–7.28
2007	410107	55209	13.46	–0.87	94025	22.93	6.89
2008	420942	53398	12.69	–3.28	86469	20.54	–8.04
2009	439749	52606	11.96	–1.48	86173	19.60	–0.34
2010	478916	59282	12.38	12.69	88425	18.46	2.61
2011	497533	74494	14.97	25.66	86322	17.35	–2.38
2012	485246	77155	15.90	3.57	77170	15.90	–10.60
2013	455206	78248	17.19	1.42	69355	15.24	–10.13
2014	424564	78436	18.47	0.24	62466	14.71	–9.93

Source: own study and calculations based on Central Statistical Office data [Higher Education Institutions and Their Finances].

includes a description of technological features and parameters, and construction principles or the sequence of actions or ways of conduct that enable to accomplish a given task. Thus technical knowledge includes applied knowledge, that is, knowledge that deals with the ways different objects function or can be used. The basis for the development of technical knowledge is scientific knowledge. As a result of scientific knowledge development there appears e.g. a patent which later is implemented and then constitutes technical knowledge [Jantoń-Drozdowska & Majewska-Bator 2011: 262-264].

Data presented in Table 2 show that in the analyzed period of 22 years, that is between 1993 and 2014 there was a rise of 561.3% in the number of gradu-

Table 2. Structure of doctoral degrees awarded in Poland be by division into selected types of universities in 1993-2014

Year	Total number of degrees	Doctoral degrees awarded at technical universities			Doctoral degrees awarded at economic universities		
		Total	% share in the total number of degrees	Growth rate	Total	% share in the total number of degrees	Growth rate
1993	1749	359	20.53	–	61	3.49	–
1994	1339	195	14.56	–45.68	25	1.87	–59.02
1995	2112	371	17.57	90.26	73	3.46	192.00
1996	2218	436	19.66	17.52	75	3.38	2.74
1997	2356	462	19.61	5.96	92	3.90	22.67
1998	3172	633	19.96	37.01	116	3.66	26.09
1999	3724	669	17.96	5.69	135	3.63	16.38
2000	4138	726	17.54	8.52	154	3.72	14.07
2001	4111	780	18.97	7.44	172	4.18	11.69
2002	5105	973	19.06	24.74	194	3.80	12.79
2003	5090	1001	19.67	2.88	248	4.87	27.84
2004	5314	1057	19.89	5.59	255	4.80	2.82
2005	5496	1 073	19.52	1.51	290	5.28	13.73
2006	5667	1 160	20.47	8.11	297	5.24	2.41
2007	5226	1 104	21.13	–4.83	281	5.38	–5.39
2008	4941	1114	22.55	0.91	249	5.04	–11.39
2009	4 659	901	19.34	–19.12	260	5.58	4.42
2010	4 449	872	19.60	–3.22	202	4.54	–22.31
2011	4 938	910	18.43	4.36	215	4.35	6.44
2012	5153	925	17.95	1.65	183	3.55	–14.88
2013	5610	977	17.42	5.62	236	4.21	28.96
2014	5278	975	18.47	–0.20	221	4.19	–6.36

Source: own study and calculations based on Central Statistical Office data [Higher Education Institutions and Their Finances].

ates in Poland, with a 640.5% increase at technical universities and 1330.7% at universities of economics. In 1993 Poland's total percentage share of graduates of technical universities and economic universities in the total number of graduates was 23.3% and 22 years later it increased to 33.2%. Although the number of technical universities' graduates was still on the rise in the years 1993-2004, their percentage share in the total number of graduates did not rise. It was 2011 that saw a reversal of declining percentage share of technical universities' graduates in the total number of graduates. However, the percentage share of economic universities' graduates in the total number of graduates kept going up in the years 1993-2003, and then it started going down. As a result in 2013 it was

lower than the share of technical universities' graduates in the total number of graduates.

Then data presented in Figure 1 show that the number of people acquiring technical knowledge in Poland is still too low, especially in comparison to those countries that experienced the so-called economic miracles e.g. Asian Tigers. It is a worrisome phenomenon because in this situation in the future it will be difficult to achieve a faster pace of technological progress and enhance Poland's welfare. The reason for that will be a shortage of well-qualified human capital

The other indirect measure of human capital quality is doctoral degrees that can be treated as indictors of potential development towards the creation of specialist scientific knowledge. In this case the author analyzed the impact of doctoral degrees awarded at technical and economic universities on the indicators of learning productivity of an economy and selected export groups. The data in Table 2 demonstrate that in the analyzed period of 22 years the number of doctoral degrees awarded at higher education institutions in Poland rose by 201.8%, with a 171.6% rise at technical universities and 262.3% rise at economic universities.

Yet the percentage share of doctoral degrees awarded at technical universities in the total number of degrees fell by 2.1%, at economic universities it rose by only 0.7%. The majority of doctoral degrees at technical universities were awarded in the years 2003-2008. At that time the number of doctoral degrees was above 1000. As it comes to doctoral degrees awarded at economic universities their number, beginning in 2003, was above 200, with the exception of 2012. One can then state that the number of doctoral degrees awarded at technical and economic universities leveled off in the last years covered by this analysis.

By contrast, as an indicator of Polish economy's learning productivity the author adopted two indicators, which according to research methods of this phenomenon, are frequently used. The two indicators are GDP pc and EXP pc of Poland. It is assumed that along with a increasing level of knowledge of a particular type of activity there is a drop in required input necessary for achieving a given outcome, which is the result of different types of learning. The third indicator of learning productivity of an economy adopted by the author is share of Poland's exports in global exports. This indicator should increase along with the acquisition of experience in international trade. Exporters adjusting their products to global consumer needs learn and become, at the same time, more competitive. Moreover, they expand their sales markets. If the consumers come from countries with a more diversified and technologically advanced demand structure, we deal with supply technicization of the exporter's country. It means a rise in production value of a given economy due to larger contents of knowledge in manufactured commodities. As a result there is a growth in GDP pc and EXP pc, that is welfare. As it comes to EXP pc it was computed by dividing Poland's total exports value by the size of population reported by UNCTAD. The data on GDP pc, and Polish

Table 3. Changes in the level of learning productivity of Poland's economy in GDP pc, EXP pc in USD at current prices and Poland's exports share in global exports in % in the years 1993-2014

Year	GDP pc	Growth rate of GDP pc	EXP pc	Growth rate of EXP pc	EXP in total as % of global exports
1993	2457	1.77	367	–2.71	0.374
1994	2827	15.06	447	21.71	0.399
1995	3623	28.18	593	32.67	0.442
1996	4082	12.67	633	6.73	0.452
1997	4096	0.35	667	5.41	0.460
1998	4511	10.11	732	9.72	0.512
1999	4382	–2.85	710	–3.00	0.478
2000	4477	2.17	825	16.13	0.492
2001	4982	11.28	936	13.45	0.581
2002	5190	4.17	1070	14.30	0.633
2003	5687	9.57	1398	30.72	0.708
2004	6632	16.63	1952	39.58	0.814
2005	7968	20.13	2325	19.15	0.852
2006	8987	12.80	2879	23.81	0.913
2007	11227	24.92	3640	26.44	1.000
2008	13883	23.65	4425	21.55	1.056
2009	11428	–17.68	3541	–19.97	1.087
2010	12479	9.20	4141	16.94	1.044
2011	13725	9.98	4889	18.08	1.029
2012	12986	–5.39	4801	–1.80	1.002
2013	13760	5.96	5308	10.55	1.082
2014	14319	4.06	5700	7.40	1.159

Source: own study based on UNCTAD data http://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx [access: 30.08.2015].

exports in total, and share of Poland's exports in global exports come from the UNCTAD statistics.

Data in Table 3 show that in the years 1993-2014 Poland's GDP pc rose by 482.8%, EXP pc by 1453.1%, and Poland's EXP share in global exports grew by 0.8 percentage points. In the analyzed period of 22 years, 1995 and 2007-2008 saw the highest growth of GDP pc. EXP pc increased the fastest in the years 1995-1995 and 2003-2008. In 2007 Poland's exports share in global exports reached 1%.

Yet the current level of GDP pc and EXP pc in comparison to other developed countries is relatively low and rises too slowly. The reason for that may be, among others, the character of Poland's comparative advantages. This process is well illustrated in Table 4 which presents leaders of GDP pc and profits from exports per inhabitant. The advantage of the majority of the world countries except for, e.g. Arabic countries as regards the level of income from exports just results from pro-

Table 4. Leaders of GDP pc and EXP pc in USD at current prices in 2014

Position	Country	GDP pc	Country	EXP pc
1.	Luxembourg	116248	Singapore	74418
2.	Norway	98211	Qatar	58333
3.	Qatar	92118	Belgium	42072
4.	Switzerland	87443	United Arab Emirates	41272
5.	Australia	62414	Holland	39879
6.	Denmark	60724	Switzerland	37728
7.	Sweden	59130	Luxembourg	34575
8.	Singapore	54593	Norway	28087
9.	San Marino	54346	Kuwait	27794
10.	United States	53702	Ireland	25434
11.	Ireland	52602	Brunei	25177
12.	Holland	51481	Faroe Islands	23387
13.	Austria	51155	Austria	20929
14.	Iceland	50484	Denmark	19637
15.	Canada	50294	Germany	18533

Source: own study and calculations based on UNCTAD data: http://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx [access: 30.08.2015].

duction reallocation towards industries with more technological contents thanks to governments' well-thought and long-term activities. This issue was a research subject for, among others, researchers dealing with countries' development paths, and researchers dealing with theories of endogenous development and new theories of trade [e.g. Majewska-Bator 2010: 93-99; Jantoń-Drozdowska & Majewska 2013: 284-288].

In order to illustrate the impact of indicators of human capital quality on the changes in economy's comparative advantages as a criterion for segmentation of export structure of processed goods, the author adopted a rate of qualification and technology contents. Data on Poland's international trade structure come again from UNCTAD statistics. Table 5 presents evolution of Poland's export structure segmented by level of qualification and technology contents. The data show that in the years 1995-2015 there was a clear fall in the share of material-intensive and labor-intensive products, and with low qualification and technology contents in favor of a rise in the share of medium and high qualification and technology products.

The above-mentioned positive changes in Poland's export structure that took place in the years 1995-2015 do not mean, however, that Poland has significant comparative advantages in trade of products with higher qualification and technology contents. That it is so can be seen from Table 6 which presents indicators of specialization in international trade (IST). The indicators come from UNCTAD

Table 5. Changes in Poland's export structure of processed goods in % in the years 1995-2015

Year	Material- and labor-intensive products		Products with low qualification and technology contents		Products with medium qualification and technology contents		Products with high qualification and technology contents	
	Share %	GR	Share %	GR	Share %	GR	Share %	GR
1995	38.18	–	22.62	–	23.58	–	15.62	–
1996	37.37	8.92	21.18	4.18	25.31	19.44	16.15	15.05
1997	37.31	3.34	17.02	–16.85	27.40	12.07	18.26	17.02
1998	34.89	8.56	19.71	34.47	29.05	23.07	16.34	3.86
1999	35.03	–2.89	18.20	–10.67	31.53	4.99	15.24	–9.77
2000	30.86	3.88	16.92	9.59	36.31	35.78	15.91	23.12
2001	29.79	11.19	18.87	28.48	35.95	14.05	15.38	11.33
2002	28.53	10.59	18.72	14.52	37.16	19.32	15.59	17.05
2003	27.60	27.46	17.83	25.51	38.93	38.07	15.63	32.11
2004	24.44	21.31	18.00	38.30	42.33	48.94	15.23	33.49
2005	22.87	9.76	16.58	8.07	44.35	22.90	16.20	24.74
2006	20.73	11.93	15.99	19.03	45.39	26.38	17.89	36.31
2007	19.78	22.80	16.36	31.71	45.35	28.60	18.51	33.19
2008	18.31	14.14	16.45	24.03	44.37	20.64	20.87	39.10
2009	18.82	–18.38	13.47	–35.00	43.61	–21.94	24.10	–8.32
2010	18.56	12.74	13.06	10.80	42.58	11.60	25.80	22.36
2011	18.69	18.79	15.08	36.20	43.06	19.26	23.18	5.96
2012	18.82	–5.65	14.81	–7.95	42.24	–8.06	24.13	–2.41
2013	18.90	14.25	14.87	14.23	41.93	12.91	24.30	14.52
2014	19.49	9.84	14.44	3.46	41.22	4.73	24.85	8.95
2015	19.14	–9.65	14.08	–10.26	41.47	–7.43	25.31	–6.28

Source: own calculations based on UNCTAD data: http://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx [access: 30.08.2015].

statistics. The value of specialization indicator (IST) comes in between –1 and 1. The positive value of the indicator shows that a country specializes in production of a certain commodity, the negative value shows just the opposite. These indicators are calculated according to the following formula:

$$IST = \frac{x_j^i - M_j^i}{x_j^i + M_j^i},$$

where *i* stands for a given group of products, *j* refers to a specific country, *X* means exports, and *M* imports of products.

On the basis of these indicators it can be stated that Poland has the highest indicator of specialization in trade of material-intensive and labor-intensive

products, and the lowest in products with high qualification and technology contents for which the IST has negative values. However, there is a rise in the level of specialization in products with medium qualification and technology contents. Additionally, the negative IST indicator for products with high qualification and technology contents is declining.

Yeti t is necessary to note that in comparison with other economies of lower labor costs and economically less developed, the current level of Poland's specialization in material-intensive and labor-intensive products may turn out to be insufficient in order to maintain competitiveness in this respect in international markets. Thus it is necessary to put more emphasis on the strengthening of the country's endogenous advantages based on intellectual capital development [Jantoń-Drozdowska & Majewska 2016: 115-116].

Table 6. Changes in indicators of specialization in Poland's international trade in the years 1995-2015

Year	Material- and labor-intensive products	Products with low qualification and technology contents	Products with medium qualification and technology contents	Products with high qualification and technology contents
1995	0.148	0.264	–0.331	–0.479
1996	0.103	0.169	–0.398	–0.508
1997	0.070	0.011	–0.435	–0.509
1998	0.048	0.064	–0.416	–0.536
1999	0.061	0.036	–0.370	–0.582
2000	0.093	0.035	–0.212	–0.545
2001	0.113	0.075	–0.156	–0.506
2002	0.115	0.032	–0.126	–0.473
2003	0.150	–0.002	–0.095	–0.429
2004	0.151	–0.017	–0.029	–0.415
2005	0.174	0.001	0.039	–0.380
2006	0.159	–0.017	0.047	–0.332
2007	0.145	–0.043	0.032	–0.312
2008	0.117	–0.027	0.017	–0.283
2009	0.132	–0.004	0.082	–0.215
2010	0.139	–0.055	0.081	–0.205
2011	0.143	–0.011	0.081	–0.215
2012	0.184	0.003	0.106	–0.189
2013	0.199	0.012	0.110	–0.167
2014	0.184	–0.003	0.095	–0.157
2015	0.173	0.003	0.089	–0.140

Source: own study based on UNCTAD data: http://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx [access: 30.08.2015].

3. Discussion of research results

Table 7 shows the level of the Pearson linear correlation coefficients and Spearman's rank correlation coefficients that were calculated for the dependence between higher education indicators and GDP pc, Poland's EXP pc in USD and Poland's export share in global exports in % in the years 1993-2015. All the correlation coefficients, both Pearson's linear correlation and Spearman's rank correlation, turned out to be statistically significant. Their values prove the significance of human capital development for the improvement of learning productivity of Poland's economy, which is reflected in increasing welfare.

Moreover, for the equation taking into account one-year and two-year delay of GDP pc, Poland's EXP pc and Poland's export share in global exports against higher education indicators, the strength of correlation relationship does not diminish. What is more, in case of doctoral degrees, that is specialist knowledge, the strength of correlation relationship clearly goes up over time. It brought about the leveling-off of initial difference between the impact of knowledge acquired at a master's degree level and knowledge acquired in the process of PhD dissertation development. In the previous studies relating to the years 1995-2006 but not taking into account Poland's export share in global exports, the correlation coefficient values showed that more specialist knowledge acquired at a doctoral degree level has a stronger impact on GDP pc and EXP pc growth than knowledge acquired at a master's degree level.

In this study as well as in the previous studies one can see a stronger relationship between the number of technical universities' graduates in Poland and changes in GDP pc and EXP pc than in the case of economic universities' graduates. The same applies to Poland's export share in global exports. This type of situation does not occur in the case of doctoral degrees as the strength of correlation relationship for both their total number and the doctoral degrees awarded at technical and economic universities was similar.

The comparison of the above mentioned results with the ones conducted in earlier studies for the period of 1995-2006 indicates a diminishing significance of the analyzed education indicators for the rise of learning productivity, thus welfare. It relates, to a larger extent, to doctoral degrees. This can be caused by the fact that when the knowledge gap decreases, the very quantitative rise in resources of educated human capital is not enough. It is necessary to put more emphasis on the quality of education and doctoral degrees. The reason for that could be a drain of young and talented scientists by foreign universities and research institutes which offer better working conditions and development opportunities [see: Majewska-Bator, 2010: 287-290, 376].

Table 7. Results of Pearson's linear correlation and Spearman's rank correlation analysis for the relationship between high er education indicators and GDP pc, Poland's EXP pc in USD at current prices and Poland's export share in global exports in % in the years 1995-2015

Number of cases: $t_0 - 22$, $t_1 - 22$, $t_2 - 21$	GDP pc_{t_0}	EXP pc_{t_0}	EXP sh_{t_0}	GDP pc_{t+1}	EXP pc_{t+1}	Share EXP $t+1$	GDP pc_{t+2}	EXP pc_{t+2}	Share EXP $t+2$
Pearson's correlation									
Analyzed period	1993-2014			1993-2015			1993-2015		
Number of higher education institutions' graduates	0.88*	0.88*	0.86*	0.88*	0.90*	0.88*	0.89*	0.92*	0.91*
Number of technical universities' graduates	0.87*	0.87*	0.84*	0.86*	0.88*	0.87*	0.85*	0.89*	0.89*
Number of economic universities' graduates	0.75*	0.74*	0.71*	0.76*	0.78*	0.74*	0.78*	0.82*	0.80*
Number of awarded doctoral degrees	0.80*	0.80*	0.78*	0.79*	0.82*	0.81*	0.81*	0.84*	0.86*
Number of doctoral degrees awarded at technical universities	0.78*	0.78*	0.76*	0.77*	0.79*	0.79*	0.80*	0.83*	0.83*
Number of doctoral degrees awarded at economic universities	0.78*	0.78*	0.77*	0.78*	0.80*	0.79*	0.80*	0.83*	0.83*
Spearman's rank correlation									
Analyzed period	1993-2014			1993-2015			1993-2015		
Number of higher education institutions' graduates	0.95*	0.96*	0.94*	0.96*	0.97*	0.93*	0.97*	0.99*	0.95*
Number of technical universities' graduates	0.90*	0.93*	0.87*	0.91*	0.94*	0.89*	0.90*	0.92*	0.90*
Number of economic universities' graduates	0.57*	0.57*	0.57*	0.66*	0.58*	0.57*	0.68*	0.63*	0.64*
Number of awarded doctoral degrees	0.76*	0.78*	0.74*	0.80*	0.80*	0.80*	0.81*	0.78*	0.85*
Number of doctoral degrees awarded at technical universities	0.75*	0.74*	0.72*	0.77*	0.72*	0.78*	0.80*	0.73*	0.82*
Number of doctoral degrees awarded at economic universities	0.74*	0.73*	0.77*	0.78*	0.73*	0.77*	0.83*	0.76*	0.80*

* statistically significant coefficient at the level $\alpha = 0{,}05$.

Source: own calculations.

The character of correlation relationships presented in Table 8 shows that the higher the indirect measures of human capital in Poland, the lower the export share of material-intensive and labor-intensive products, and those with low qualification and technology contents, and the higher the export share of products with

Table 8. Results of correlation analysis for relationships between higher education indicators and the level of export shares of products with intensive-material and intensive-labor, low qualification and technology, medium qualification and technology, and high qualification and technology contents in % in the years 1995-2015

	Number of university graduates			Number of doctoral degrees awarded		
	Total	Technical universities	Economic universities	Total	At technical universities	At economic universities
Pearson's correlation						
Number of cases: 20						
EXPIMLP t_0	–0.93*	–0.89*	–0.78*	–0.85*	–0.85*	–0.86*
EXPLQT t_0	–0.83*	–0.80*	–0.67*	–0.67*	–0.65*	0.68*
EXPMQT t_0	0.96*	0.91*	0.91*	0.94*	0.95*	0.96*
EXPHQT t_0	0.57*	0.57*	0.28	0.35	0.32	0.33
Number of cases: 21						
EXPIMLP t_1	–0.95*	–0.92*	–0.84*	–0.88*	–0.86*	–0.86*
EXPLQT t_1	–0.83*	–0.80*	–0.71*	–0.76*	–0.77*	–0.77*
EXPMQT t_1	0.96*	0.93*	0.95*	0.95*	0.95*	0.95*
EXPHQT t_1	0.60*	0.58*	0.37	0.44*	0.42	0.44*
Number of cases: 21						
EXPIMLP t_2	–0.97*	–0.94*	–0.91*	–0.93*	–0.91*	–0.91*
EXPLQT t_2	–0.83*	–0.81*	–0.75*	–0.77*	–0.77*	–0.78*
EXPMQT t_2	0.96*	0.95*	0.97*	0.97*	0.96*	0.95*
EXPHQT t_2	0.64*	0.60*	0.46*	0.52*	0.51*	0.52*
Spearman's rank correlation						
Number of cases: 20						
EXPIMLP t_0	–0.96*	–0.79*	–0.51*	–0.58*	–0.63*	–0.66*
EXPLQT t_0	–0.89*	–0.76*	–0.30	–0.54*	–0.46*	–0.57*
EXPMQT t_0	0.76*	0.64*	0.73*	0.75*	0.85*	0.92*
EXPHQT t_0	0.73*	0.57*	–0.05	0.27	0.20	0.26
Number of cases: 21						
EXPIMLP t_1	–0.93*	–0.77*	–0.63*	–0.65*	–0.70*	–0.77*
EXPLQT t_1	–0.88*	–0.76*	–0.41	–0.63*	–0.62*	–0.68*
EXPMQT t_1	0.70*	0.69*	0.88*	0.81*	0.90*	0.95*
EXPHQT t_1	0.76*	0.60*	0.09	0.44*	0.36	0.44*
Number of cases: 21						
EXPIMLP t_2	–0.90*	–0.79*	–0.72*	–0.79*	–0.85*	–0.89*
EXPLQT t_2	–0.88*	–0.82*	–0.62*	–0.71*	–0.75*	–0.74*
EXPMQT t_2	0.68*	0.74*	0.96*	0.88*	0.92*	0.96*
EXPHQT t_2	0.77*	0.68*	0.32	0.51*	0.53*	0.54*

* statistically significant coefficient $\alpha = 0{,}05$.

EXPIMLP – export share of intensive-material and intensive-labor products; EXPLQT – export share of products with low qualification and technology contents; EXPMQT – export share of medium qualification and technology contents; EXPHQT – export share of high qualification and technology contents.

Source: own calculations.

medium and high qualification and technology contents. The strength of correlation relationships increases for the balance with a one-year and two-year time delay in export structure in relation to the growth or drop in the level of indirect measures of human capital quality. As one can see, the results are in line with the above mentioned theoretical considerations. According to them human capital development should lead to positive changes in export structure, and thus to exports resulting in higher added value of manufactured goods.

The level of the received correlation coefficients indicates differences in the strength of the impact of particular higher education indicators on changes in the analyzed export structure. A stronger correlation relationship occurred for the total number of university graduates and the number of technical universities' graduates rather than for the number of economic universities' graduates. As regards the number of awarded doctoral degrees the strength of correlation relationship is similar for these three indirect indicators of human capital quality no matter what group of trade is taken into consideration.

Moreover, for the exports of products with high qualification and technology contents the value of Pearson's linear correlation and Spearman's rank correlation rises over time, becoming statistically significant for all the analyzed indirect indicators of human capital quality in the balance taking into consideration a two-year time delay in the case of Pearson's linear correlation.

The research results show that what is essential in building comparative advantages in international trade is both knowledge acquired at technical universities and at economic universities. For these two types of knowledge are complimentary to each other as regards the expansion of companies on international markets. The former one is used more for modernization and enhancement of technological complexity of products, the latter one for winning sales markets and later maintaining them, and better management of business activity.

Conclusions

The study results for Poland presented in this paper prove the significance of human capital as a factor affecting the level of learning productivity of Poland's economy and point to its role as determinants of reallocation export structure toward technologically more advanced goods. Thus Poland's human capital development at a higher education level contributes to building endogenous advantages based on knowledge and providing higher income from exports, which later can be reinvested in further strengthening of these advantages, e.g, through innovative activities. It may result in an increase, in the long term, in Poland's so far relatively low income from exports per capita.

Thus human capital is the factor enhancing competitiveness of Poland's export structure, whose source is not only lower production costs but, to a larger extent, development of different types of knowledge thanks to better qualified workers. This kind of situation stimulates Poland's shift on the country's development route to an knowledge-based economy associated with welfare. However, for the process to move on over time, it is necessary, in the first place, to attend to the maintaining and growth of education quality not only at a higher education level. It is also necessary to create working conditions for young people and senior workers who want to develop specialist scientific knowledge.

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Oddziaływanie kapitału ludzkiego na zmiany w strukturze eksportu w procesie zmniejszania luki technologicznej

Streszczenie. *Głównym celem opracowania jest prezentacja wyników badań dotyczących oddziaływania akumulacji kapitału ludzkiego poprzez edukację na poziomie szkolnictwa wyższego na zmiany w strukturze eksportu Polski, które wynikają ze wzrostu produktywności uczenia się gospodarki i postępu technologicznego. Okres badawczy stanowiły lata 1993-2015. Badania przeprowadzono metodą korelacji liniowej Pearsona i porządku rang Spearmana. Wyniki badań potwierdzają znaczenie kapitału ludzkiego jako czynnika oddziałującego na poziom produktywności uczenia się gospodarki Polski i wskazują na jego rolę jako determinanty realokacji struktury eksportu w stronę dóbr bardziej intensywnych technologicznie. Rozwój kapitału ludzkiego na poziomie szkolnictwa wyższego w Polsce przyczynia się zatem do budowania endogenicznych przewag opartych na wiedzy i dających wyższe dochody z eksportu, które później można reinwestować w dalsze umacnianie tych przewag, np. w drodze działalności innowacyjnej.*

Słowa kluczowe: *kapitał ludzki, eksport, konkurencyjność, Polska*

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Education Inputs Index as the Background of Education Outcomes at Secondary Education Level

Abstract. *Education inputs are often presented as an essential determinant of education quality, usually expressed in the form of students educational performance represented by the results of external exams. Authors concerned with the educational function of production are not unanimous as to the above assumption – some argue that the inputs have a positive impact on the quality of education while others state that they have no such impact. The above-mentioned issues prompted the present author to pursue a research aim which consisted in demonstrating the impact of secondary education inputs on the educational performance of students.The study covered a random group of 100 districts, selected to represent five categories depending on the level of Local Human Development Index (with 20 districts per one category). Data on education inputs were obtained from the Local Data Bank and covered a period between 2012-2014, while exam performance data referred to 2015. All data were analysed using univariate and multivariate analysis of variance. The analysis demonstrates that education input levels were more significant at lower secondary school level. They have been found to be less significant at secondary school level; statistically significant differences have been identified only between extreme categories at secondary education level and for the aggregated index covering lower secondary school and secondary school education levels.*

Keywords: *education inputs, education quality, education quality index*

Introduction

Rational investment in education of the young generation is the responsibility of the state, which is derived from the theory of public goods [Polcyn & Stępień 2016: 266-280]. The rationality of education inputs depends on material factors

associated the amount of money spent on school facilities or teachers' salaries. It is very likely that the quality of education can be modified by changing socio-economic variables.

The purpose of the study described in this article was to examine the relationship between the level of inputs in post-primary education and student outcomes. The objective of the analysis is particularly relevant for the assessment of the effectiveness of education, which has a direct influence on the quality of the human capital created in the process of education.

As is often pointed out in the literature, the human capital has a direct effect on GDP growth, which is why it is crucially important to develop an effective and rational approach to how financial resources are invested to improve its quality.

1. Sources of education inputs related to student outcomes

One key element of education inputs are teachers' salaries. The salary expenditure is closely related to the student-teacher ratio. This relationship is regarded as the main determinant of education quality.

Traditionally, smaller class sizes and specialised teaching methods were considered to be sufficient reasons to move students with special needs out of regular classes. In one study [Thurlow et al. 1993] didactic variables for classes with different student-teacher ratios were compared. The study involved primary school students (grades 1-6) and teachers. Different class variables were compared that reflected the key didactic variable expressed as the student-teacher ratio: 1:1, 3:1, 6:1, 9:1 and 12:1. There were significant differences in both quantitative and qualitative didactic variables, most of which favouring a lower student-teacher ratio. In the following years even more advanced research was initiated – Wisconsin's Student Achievement Guarantee in Education (SAGE), which began in the academic year 1996-97 [Molnar et al. 1999]. Under the SAGE programme, participating schools were to reduce the student-teacher ratio to the level of 15:1. The programme was accompanied by a qualitative analysis of the life in participating schools and classes. The results for the years 1996-97 and 1997-98 led to conclusions that were in line with the Tennessee Study of Class Size in the Early School Grades (known as Project STAR) launched in 1985. Individualisation of teaching was found to be the key determinant of education.

Hoxby [2000] measured the influence of class size on scholastic attainment using a longitudinal study (long periods) of each class in selected primary schools. Assignment to classes of different size was independent of parents' incomes or their recommendations as to the preferred class size for a given student. Students themselves were not aware that they were being studied and natural changes in the

population generated fluctuations in class sizes under a given policy adopted in the reference period. Two methods were used: the first one involving the isolation of a random factor in the population size, and the second one consisting in tracking changes in the number of classes. Both methods indicate class sizes from 10 to 30. However, even the use of those two methods did not reveal a beneficial effect of reducing class size. Similarly, no evidence was found to support the claim that class size reduction was more effective in school where there was a high concentration of Afro-American students from low-income families.

Observations concerning the individualisation of the learning process and the lack of visible effects of reducing class sizes can be indicative of another phenomenon. There is a theory which states that when one student disrupts class work, learning outcomes for the remaining students deteriorate [Lazear 2001]. Under the disruptive model of educational production, it is assumed that the optimal class size is higher for more disciplined (well-behaved) students, which can explain why it is sometimes hard to find beneficial effects of class size reduction.

In contrast, there is agreement as to the positive effect of reducing class size for disabled people and children with special needs. One substitute for smaller class sizes is class discipline, and perhaps, as Lazear argues, this is why Catholic schools in his study had much better results than the others. According to the studies mentioned above, in most cases student segregation by ability maximises education outcomes.

An extensive article for the European Commission published in 2003 reported results of a study investigating the effect of class size on education quality [Wössman 2003]. The study was an attempt to assess the impact of family background, resources and institutions on scholastic attainment of students in 17 education systems of Western Europe. In Europe, as in the United States, family background has a strong effect on student outcomes. The most sustainable results for students from different family backgrounds have been achieved in France and the Flemish region of Belgium, while the least sustainable results have been observed in Great Britain and Germany. There are studies reporting stronger effects resulting from differences between schools in one country in terms of management autonomy, methods of knowledge testing and homework [Wössmann, Ammermuller & Heijke 2005], which indicates that education quality is more dependent on school resources than on the school itself. The next article, published in the same year [Wössmann, Propper & Duflo 2005] described a study of student performance from the viewpoint of the production process, where inputs from students, teachers and resources were associated with the creation of the key 'output': students' cognitive abilities. The purpose of Wössmann's study was to assess the educational function of production based on a representative sample of lower secondary school students from 15 West European countries. The authors conclude that class size is a particularly important element of the educational element in the

production process, since it can be relatively easily changed by decision makers. However, no statistically and economically significant effect of class size was found. The results of the study suggest that at least in the context of resources and the organisational structure of West European education systems at lower secondary school level, investing money to implement a general class size reduction is unlikely to improve educational outcomes.

In the Polish education system teacher salaries are determined by stages of professional advancement, which depend of education level and teaching experience. A study conducted in primary schools, entitled Early Childhood Longitudinal Study (ECLS), analyses the relationship between qualifications of primary school teachers and reading literacy and maths skills of first grade pupils. The authors [Croninger, Rice, Rathbun & Nishio 2007] reported a positive correlation between students' reading skills and their teacher's qualifications and experience. Another finding was a potential link between teachers' qualifications and improved reading and maths performance of first graders in schools where teachers reported more intensive class work in these areas. However, these effects are more visible at school level than between individual teachers.

After 1993 the number of secondary schools in New York had nearly doubled as a result of the appearance of new "small" schools and the reorganisation of many existing schools into smaller "learning communities" [Iatarola, Schwartz, Stiefel & Chellman 2008]. There was a concern about potential differences between students from small and large schools. The study was undertaken to answer the question whether small schools would find it easier than large schools to educate their students given the fact that they received more resources and used them in more diverse ways to produce better educational outcomes. It was found that despite higher expenditure per student, a lower student-teacher ratio and a lower share of students with special needs compared to large schools, there were disproportions between students in terms of English skills. Incoming students had lower test results. There is therefore no unequivocal evidence to suggest that smaller schools facilitate access to education. From the perspective of the whole school system, the actual changes in the distribution of school resources were relatively moderate.

School resources are limited by the funds available to a given school, but there are also other methods of improving education quality. The cost-effectiveness of class size reduction (CSR) can be compared with the cost-effectiveness of rapid formative assessment (RFA), a promising alternative for raising student achievement. Drawing upon existing meta-analyses of the effects of student-teacher ratio, evaluations of CSR in Tennessee, California, and Wisconsin, and RAND cost estimates, CSR was found to be 124 times less cost effective than the implementation of systems that rapidly assess student progress in math and reading two to five times per week [Yeh 2009]. Analysis of the results from California and Wisconsin

suggest that the relative effectiveness of rapid formative assessment may be substantially underestimated and that there are other more promising alternatives. The authors also question the results of Project STAR, claiming that of CSR-related effects were actually due to the Hawthorn effect (the impact of the awareness of being observed on the subject's behaviour). When such experimental programmes are implemented across the state, they will be able to benefit from the Hawthorn effect, and consequently, will not lead to better test results, which is compared by Wössmann's study from 2015.

In spite of these results, class size reduction keeps gaining popularity in the USA. It is obvious that supporters of CSR programmes often refer to the positive results of Project STAR, but some researchers remain sceptical. Using Project STAR data, a study was conducted to compare two types of schools depending on educational achievements of students attending small and normal size classes and then analyse distributions of student and teacher characteristics in both types of schools [Sohn 2010]. The distributions differed, which undermines the claims about the degree of randomization in Project STAR and potentially the validity of its results.

Class size reduction has become a very popular method of decreasing differences in student achievements but it remains highly controversial. One study analyses results of implementing the SAGE programme [Burch, Theoharis & Rauscher 2010]. Its authors describe the case of 9 schools whose directors were identified as a critical and often overlooked factor affecting the CSR implementation. Those directors turned out to be the most „influential" in three areas: use of space, meeting the needs of learners and building teacher capacity. By comparing different practices used by schools, the researchers identified "leadership" practices and guidelines for CSR, which are linked to higher student achievements.

One commonly used method of segregating students is the so called tracking. Tracking consists in dividing students depending on ability and achievements. Assigning students to different tracks (classes) depending on academic achievement is a typical practice in the USA and Canada. Alternatively, students are assigned to different schools, with a more practical or more academic orientation, which is a solution mainly adopted in Europe. Advocates of this approach claim that tracking can increase the efficiency of education by focusing on the needs of different groups of students. Its critics tend to emphasise the resulting inequalities. It is not easy to evaluate the effects of tracking, partly because of the different ways in which the system of tracking is implemented, taking into account average academic achievements and the way these achievements are distributed depending on the subject, and the way this system is used in different countries. Some studies indicate that tracking actually exacerbates inequalities in academic achievement. However, current studies in the USA question these results, suggesting that careful assignment of students to different classes and endogenic use of

tracking produces radical improvements. Experimental studies involving tracking in the USA have produced different results. One experiment conducted in Kenia suggests that tracking can accelerate academic achievement of low and high achievers alike.

In an attempt to understand the effect of schools and teachers on student outcomes, with special emphasis on potential problems, such as overlooked or incorrectly measured variables as well as problems associated with the selection of students and schools, one can come across new results, which do not confirm the previous ones. Thanks to a unique selection of panel data in the UTD Texas Schools Project, it was possible to identify teacher quality based on student performance and the impact of individual teacher and school characteristics. Results of this project suggest that teachers have an enormous influence on students' reading and maths performance, although few differences in the level of teacher quality can be explained by observable variables, such as teacher qualifications or experience. The results of the study indicate costly effects of CSR are lower than the benefits derived from a positive change of one standard deviation in teacher quality, which shows the role of effectiveness in evaluating the quality of an entire school [Hanushek 2011].

Decisions about class sizes are often motivated by budget constraints and not by best practices in learning (including online learning). One example of a study on this subject is a comparison of experiences of teachers and students in the second semester of two online courses of Spanish, which was published by [Russell & Curtis 2013]. The study involved two courses: one with 125 students and another one with 25 students. Each class had only one teacher without any assistants. It was found that the large number of students had a negative impact on the level of student satisfaction with online learning. In addition, during classes of the large course, the quality and quantity of student-student and student-teacher interactions was limited. The teaching experience was not fully utilised because the large class size affected the teacher's ability to create conditions conducive to learning.

How, then, to maximise student outcomes? There is a possibility of adjusting the class size to suit the teacher's effectiveness. This relationship can be positive or negative. One the one hand, in pursuit of maximum effectiveness, school directors can increase the number of students in classes taught by better teachers. Alternatively, they can reward better teachers by assigning fewer students to their classes. Results of a study investigating the effects of such solutions were published in 2013. The study surveyed schools to find out whether directors rewarded effective teachers by reducing the size of their classes or increased their classes to improve the school's results. The study found that more effective teachers tend to get bigger classes. This finding implies the need to introduce rules concerning class size and regulations for the education policy [Barrett & Toma 2013].

Most analyses of teacher quality end without any assessment of the economic value of teacher quality, the so called altered teacher quality. A paper by Hanushek [1997] combines information about teacher effectiveness with the economic impact of higher achievement (ability to start a job or studies). The demand for teachers results from their impact on economic outcomes. Alternative valuation methods are based on the impact of increased achievement on individual earnings and on the impact of low teacher effectiveness on economic growth through aggregate achievement. A teacher one standard deviation above the mean effectiveness annually generates marginal gains of over $400,000 in present value of student future earnings with a class size of 20 and proportionately higher with larger class sizes. The author argues that by replacing the bottom 5–8 percent of teachers with average teachers, the U.S. could move near the top of international math and science rankings with a present value of $100 trillion [Hanushek 1997].

In recent decades there have been many changes in the distribution of public spending on education in the budgets of many countries. According to Ansell [2008], two forces shape the aggregate pattern of human capital expenditure: the level of democracy and the level of openness of a given state [Ansell 2008].

In another article [Arcalean & Schiopu 2010], the authors claim that an increase in public spending on education crowds out the total level of private contributions and increases the share of resources that households devote to K-12 education. For a given public budget, a higher share of K-12 public funding induces higher private education spending overall, of which a larger share goes towards higher education. The model proposed by the authors broadly matches data on education finance in the OECD countries. The calibrated parameter values indicate that at both stages public and private inputs are good yet imperfect substitutes, with a higher degree of complementarity in basic education. The authors show that the growth maximizing share of public spending devoted to K-12 should be high, irrespective of the size of the public budget. In order to maximise growth, high tax countries should use more of their public resources in tertiary education relative to low tax countries [Arcalean & Schiopu 2010].

There is no agreement in the literature about whether increased education spending improves education outcomes. However, a change in the level of expenditures is one of the main political levers for governments. In England school expenditures were increased by 40% in 2000. Studies conducted in this country suggest that the increase had a significant and positive influence on pupil attainment at primary school level. According to estimates, this expenditure can be relatively cost effective. There was also a certain degree of heterogeneity in the effect of school expenditure depending on economic disadvantage [Holmlund et al. 2010].

Similarly, Dos Santos [2012] argues that higher investments in the education of children from disadvantaged families are much more cost-effective as a crime-prevention policy than expenditures on school resources and police protection.

Winters [2011] conducted a study to examine the determinants of teacher salaries in the United States, including union activity in the teachers' own and in neighbouring districts. Using the 1999-2000 Schools and Staffing Survey and the School District Demographic System and Bureau of Labour Statistics datasets, the author found that union activity (measured by the legal status of collective bargaining and teacher union membership density) increases salaries for experienced teachers by as much as 18% to 28%. Studies that ignore such spatial dependence are likely to be misspecified and may lead to misleading conclusions.

The question of teacher salaries gives rise to various phenomena in the system of teaching. One example of this is described by Dang [2013]. A study carried out in Vietnam showed that low education quality and very large classes stimulate the market of private tutoring, which generates additional costs for households. The same full-time teachers (or contract teachers) have poorer teaching results in the same school and for this reason are employed privately to provide tutoring classes. This results in shifting education costs to households.

The promotion of education equity and improvement of educational quality in China are contextualised in tenets of Confucianism and policy directives, inspiring educational research and practice. Drawing insights from Confucianism, policy, research, and practice, Mu et al. [2013] conclude that the promotion of educational equity through high quality provision of education for disadvantaged groups can help to narrow the gap in educational quality currently existing in China.

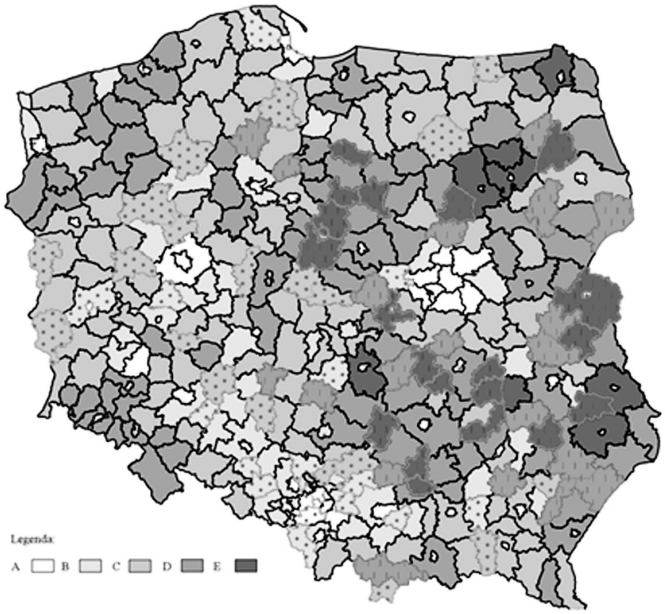
In many places in the world people are asking whether using democratic mechanisms it is possible to prompt a government to alter provision of basic services to its citizens. Harding and Stasavage [2014] argue that in an environment of weak state capacity, in which it is difficult for voters to attribute outcomes to executive actions, we suggest that electoral competition is most likely to lead to changes in policies where executive action is verifiable. The authors show that in Africa, democracies have higher rates of school attendance than non-democracies. Moreover, evidence suggests that this is primarily due to the fact that democracies are more likely to abolish school fees, not to the fact that they provide more school inputs (buildings, teaching staff).

The same issue is approached differently by Edwards and Garcia Marin [2015], who investigate whether the inclusion of social rights in political constitutions can be linked to better education outcomes. Their study was based on data for 61 countries that participated in the 2012 PISA tests. The authors find no evidence that including the right to education in the constitution has been associated with higher test scores. In their opinion, the quality of education depends on socioeconomic, structural, and policy variables, such as expenditure per student, the teacher-pupil ratio, and families' background [Edwards & Garcia Marin 2015].

2. Research methodology

The study described in the this section is based on a group of 100 districts, selected to represent five categories of Local Human Development Index (with 20 districts per one category) described in [Arak et al. 2012: 13]. The spatial distribution of selected districts is shown in Figure 1.

Figure 1. Districts by LHDI level
(dots and lines are used to mark districts selected for the analysis)



Source: own work based on a map from *National Human Development Report*, 2012: 13.

Data about education inputs for 2012-2014 were obtained from the Local Data Bank maintained by the Central Statistical Office. The dataset included information about the share of children in preschool education, per student expenditures of municipalities, including towns with district rights (pre-schools, primary schools, lower secondary schools, secondary schools combined), the number of students for each school type and the number of teachers.

The second group of data concerned final exam performance in middle and secondary schools in 2015. The data with exam results were obtained from The Educational Research Institute of the Ministry of National Education. The difference between the reference periods for the two datasets should help to identify

relationships of interests by taking into account the time spent by students at subsequent stages of education.

Analysis of the relationships between education inputs and aggregate scholastic achievement for middle and secondary school students was based on the aggregate measure of inputs and the aggregate education index.

The relationship between the education expenditures index and exam performance in middle, secondary and technical secondary schools was analysed separately.

The aggregate index of education inputs was calculated as the square root of a sum of squared values of (EI_{PI}) for each education level (lower secondary school, technical secondary school and secondary school) and divided by the square root of 3. The resulting index is an aggregate measure ranging from 0 to 100.

The Education Index – Policy Input EI_{PI} (proposed in UNDP Report LHDI 2012) has been modified in the following way:

$$EI_{PIi} = \sqrt[2]{EEI_i \times STRI_i} \tag{1}$$

where i – denotes i-th district.

The Education Expenditures Index EEI_i was calculated according to the formula:

$$EEI_i = 1 + 99 \times \frac{EEI_{ei} - EEI_{min}}{EEI_{max} - EEI_{min}} \tag{2}$$

where:

i – denotes i-th district,

EEI_{ei} – denotes expenditures of municipalities including towns with district rights in division 801 (education, NACE Rev.1) in the i-th district (mean for 2012-2014), per student (summed up for pre-schools, primary schools, lower secondary schools, secondary schools combined),

EEI_{max}, EEI_{min} – the minimum and maximum values of the above mean values for 2012-2014.

$STRI_i$ was calculated according to the formula:

$$STRI_i = 1 + 99 \times \frac{STRI_{ei} - STRI_{min}}{STRI_{max} - STRI_{min}} \tag{3}$$

where:

i – denotes i-th district,

$STRI_{ei}$ – the total number of students in schools at each level divided by the number of teachers in the i-th district, the mean for 2012-2014 (in practice there were 3 coefficients, i.e. for lower secondary schools, and all kinds of secondary schools combined),

$STRI_{max}$ – the minimum and maximum values of the above values observed
$STRI_{min}$ in districts in the period 2012-2014 (also 3 coefficients each).

The aggregate education index (AEI) was calculated as the square root of the values of (EI) for each education level (lower secondary school, technical secondary school and secondary school) and divided by the square root of 3. The resulting index is an aggregate measure ranging from 0 to 100.

EI

The Education Index (EI) (proposed in Arak et al. 2012) is calculated as the geometrical mean:

$$EI_i = \sqrt[2]{PEI_i \times PLSEI_i} \tag{4}$$

where:

i – denotes i-th district,
PEI – Pre-school Education Index,
$PLSEI$ – Performance in Lower Secondary School Education Index.

PEI_i is calculated according to the following formula:

$$PEI_i = 1 + 99 \times \frac{PEI_{ei}}{PEI_{max}} \tag{5}$$

where:

i – denotes i-th district,
PEI_{ei} – percentage of children in pre-school education in the i-th district (the mean for 2012-2014),
PEI_{max} – percentage of children in pre-school education in the i-th district observed (the maximum mean value for 2012-2014, from all districts).

$PLSSEI_i$ is calculated according to the following formula:

$$PLSSEI_i = 1 + 99 \times \frac{PLSSEI_{ei} - PLSSEI_{min}}{PLSSEI_{max} - PLSSEI_{min}} \tag{6}$$

where:

i – denotes i-th district,
$PLSSEI_{ei}$ – deviation from the mean for the mean of exam results at different school levels (3 coefficients were calculated, i.e. for lower secondary schools, for secondary schools and secondary technical schools) in i-th district (for 2015),
$PLSSEI_{max}$ – the minimum and maximum values of the above mentioned exams observed in districts in 2015.
$PLSSEI_{min}$

Districts selected for analysis were orderd in descending order by the aggregate index of education inputs (EI_{PI}). They were then divided into five categories denoted with letters, from A (denoting districts with the lowest values of the edu-

cation input index to E (districts with the highest values of the aggregate index of education inputs).

The next stage involved contrast analysis for different categories of the predictor (education inputs), using the simple contrast. The purpose of contrast analysis is to identify which predictor categories significantly determine the variables of interest, i.e. the education index in different school types and the aggregate education index.

3. Analysis of results

The characteristics of the input index in different district categories are shown in Table 1. The values of the LHDI display the same pattern as the indices of education inputs at lower secondary and secondary levels and the aggregate input index.

Table 1. District categories by the level of education inputs

Input level	Input index			
	Lower secondary	Secondary	Secondary technical	Aggregate index
A	28.57	20.27	25.74	25.18
B	31.89	22.94	27.85	27.89
C	34.37	26.18	30.56	30.69
D	38.88	28.18	35.47	34.61
E	42.23	32.03	38.27	37.97
Mean	35.19	25.92	31.58	31.27

Source: own elaboration.

A very interesting relationship can be noticed when one examines the aggregate education index. It shows a growing trend in the aggregate education index accompanied by a similar trend on the level of education inputs (Tables 1 and 2).

Table 2. Distribution of the aggregate education index across district categories depending on the level of education inputs

Input level	Aggregate education index (AEI)			
	Lower secondary	Secondary	Secondary technical	Aggregate index
A	48.08	70.96	66.65	62.25
B	50.58	73.71	65.32	64.11
C	51.51	71.67	67.23	64.26
D	61.45	77.96	69.02	69.98
E	60.97	76.91	67.24	68.91
Mean	54.52	74.24	66.69	65.90

Source: own elaboration.

Multivariate significance tests indicate the need to reject the null hypothesis about the similarity of the vectors of the mean values of the education index (for lower secondary, secondary and secondary technical schools) and the aggregate education index in favour of the alternative hypothesis that these values differ significantly, which confirms the validity of the analysis (Table 3).

Table 3. Multivariate significance tests (variables describing education outputs)

	Test	Value	*F*	*df*	*df* for error	*p*
Levels of inputs	Wilks	0.722	1.982	16	281.70	0.014
	Pillai	0.291	1.861	16	380.00	0.023
	Hotelln.	0.368	2.082	16	362.00	0.009
	Roy	0.317	7.524	4	95.00	0.000

Source: own elaboration.

Univariate results indicate a significant variation in the education index for lower secondary and secondary schools (Tables 4 and 5). There is no evidence of significant variation in the education index for levels of inputs in secondary technical schools (Table 6).

Table 4. Univariate results for dependent variables – lower secondary school

	Degrees of freedom	Education Index (EI)			
		SS	*MS*	*F*	*p*
Levels of inputs	4	3111.7	777.9	6.388	0.000135
Error	95	11569.7	121.8	–	–
Total	99	14681.5	–	–	–

Source: own elaboration.

Table 5. Univariate results for dependent variables – secondary schools

	Degrees of freedom	Education Index (EI)			
		SS	*MS*	*F*	*p*
Levels of inputs	4	771.1	192.8	2.522	0.046072
Error	95	7262.5	76.4	–	–
Total	99	8033.6	–	–	–

Source: own elaboration.

Table 6. Univariate results for dependent variables – lower secondary schools

	Degrees of freedom	Education Index (EI)			
		SS	*MS*	*F*	*p*
Levels of inputs	4	241.4	60.3	0.770	0.547667
Error	95	7448.8	78.4	–	–
Total	99	7690.1	–	–	–

Source: own elaboration.

Univariate test also revealed a statistically significance difference for the aggregate education index (Table 7).

Table 7. Univariate results for dependent variables – aggregate education index

	Degrees of freedom	Aggregate Education Index (AEI)			
		SS	*MS*	*F*	*p*
Input levels	4	898.6	224.6	3.567	0.009350
Error	95	5982.6	63.0	–	–
Total	99	6881.2	–	–	–

Source: own elaboration.

Tukey's HSD test calculated for secondary technical schools shows a significant difference between input level A and levels D and E. Moreover, there are differences between input level B and levels D and E, as well as between level C and level E (Table 8).

Table 8. Tukey's HSD test – variable "Education Index (EI) – lower secondary schools"

No.	Input levels	A	B	C	D	E
1.	A	–	0.952870	0.862579	0.002225	0.003441
2.	B	0.952870	–	0.998907	0.020198	0.029584
3.	C	0.862579	0.998907	–	0.042292	0.059950
4.	D	0.002225	0.020198	0.042292	–	0.999931
5.	E	0.003441	0.029584	0.059950	0.999931	–

Approximate probability for post hoc tests; error: between-group $MS = 121.79$, $df = 95.000$.

Source: own elaboration.

Tukey's HSD tests did not show any significant differences in the Education Index between inputs levels for secondary and secondary technical schools (Tables 9 and 10).

Tukey's HSD test revealed a significant difference only between levels A and D for the aggregate education index (Table 11).

Table 9. Tukey's HSD test – variable "Education Index (EI) – secondary schools"

No.	Input levels	A	B	C	D	E
1.	A		0.857440	0.999111	0.092657	0.208724
2.	B	0.857440		0.946743	0.542076	0.777156
3.	C	0.999111	0.946743		0.162155	0.327960
4.	D	0.092657	0.542076	0.162155		0.995497
5.	E	0.208724	0.777156	0.327960	0.995497	

Approximate probability for post hoc tests; error: between-group $MS = 76.447$, $df = 95.000$.

Source: own elaboration.

Table 10. Tukey's HSD test – variable "Education Index (EI) – secondary technical schools"

No.	Input levels	A	B	C	D	E
1.	A	–	0.999357	0.888896	0.526254	0.887111
2.	B	0.999357	–	0.959920	0.677388	0.958961
3.	C	0.888896	0.959920	–	0.967880	1.000000
4.	D	0.526254	0.677388	0.967880	–	0.968695
5.	E	0.887111	0.958961	1.000000	0.968695	–

Approximate probability for post hoc tests; error: between-group *MS* = 78.408, *df* = 95.000.

Source: own elaboration.

Table 11. Tukey's HSD test – variable „Aggregate Education Index"

No.	Input levels	A	B	C	D	E
1.	A	–	0.946433	0.929346	0.022252	0.068819
2.	B	0.946433	–	0.999997	0.141613	0.317289
3.	C	0.929346	0.999997	–	0.161182	0.350451
4.	D	0.022252	0.141613	0.161182	–	0.993083
5.	E	0.068819	0.317289	0.350451	0.993083	–

Approximate probability for post hoc tests; error: between-group *MS* = 62.975, *df* = 95.000.

Source: own elaboration.

Contrast analysis conducted for the education index calculated for lower secondary schools showed that a change in inputs from level A to E explains about 45% of the growth in the education index for lower secondary schools. A respective change from level B to E explains about 30%, and a change from level C to E – about 25% of the increase in the education index for lower secondary schools (Table 12). The dependence of the education index on the input level indicates the considerable effect of the level of education inputs on student outcomes at this education level.

Table 12. Contrasts for the Education Index (EI) – lower secondary schools

Contrasts	Education Index (EI)				*CI*	*CI*
	Value	*SE*	*T*	*p*	–95.00%	+95.00%
Contrast 1 (A vs. E, i.e. 1;0;0;0;-1)	–12.8866	3.489792	–3.69265	0.000370	–19.8147	–5.95848
*SScontrast/SSeffect	0.53 (45.30%)					
Contrast 2 (B vs. E, i.e. 0;1;0;0;-1)	–10.3947	3.489792	–2.97859	0.003675	–17.3228	–3.46654
*SScontrast/SSeffect	0.35 (29.91%)					
Contrast 3 (C vs. E, i.e. 0;0;1;0;-1)	–9.4576	3.489792	–2.71008	0.007982	–16.3857	–2.52949
*SScontrast/SSeffect	0.29 (24.79%)					

Source: own elaboration.

Results of contrasts between the education index calculated for secondary and secondary technical schools and input levels show a statistically significant difference for extreme levels, i.e. a change from A to E. This kind of change for secondary schools explains about 48% of the increase in the education index (Table 13). A change in the level of inputs from A to E also explains about 49% of the aggregate education index (Table 14). Thus, it can be concluded that the level of education inputs at secondary school level and the level of inputs in education expressed in terms of the aggregate education index for the two levels (with statistically significant differences) are very similar.

Table 13. Contrasts for the Education Index (EI) – secondary schools

Contrast	Education Index (EI)				*CI*	*CI*
	Value	*SE*	*T*	*p*	–95.00%	+95.00%
Contrast 1 (A vs. E, i.e. 1;0;0;0;-1)	–5.94010	2.764913	–2.14839	0.034226	–11.4291	–0.451057
*SScontrast/SSeffect	0.46 (47.92%)					

Source: own elaboration.

Table 14. Contrasts for the Aggregate Education Index

Contrast	Aggregate Education Index				*CI*	*CI*
	Value	*SE*	*t*	*p*	–95.00%	+95.00%
Contrast 1 (A vs. E, i.e. 1;0;0;0;-1)	–6.66130	2.509486	–2.65445	0.009314	–11.6433	–1.67934
*SScontrast/SSeffect	0.49 (48.85%)					

Source: own elaboration.

Summary

The statistical analysis has revealed a greater importance of the level of education inputs for the Education Index at the lower secondary school level. The effect is less prominent in secondary education; statistically significant differences were only found between extreme categories of input levels for secondary schools and in education expressed in terms of the aggregate education index, comprising lower secondary and secondary education.

The results confirm the observation the level of education outputs is not determined solely by the level of financial inputs. This statement is confirmed by observations reported in the literature on the determinants of education quality. It can be assumed that education quality is determined by many socio-economic factors; moreover, the impact these factors have on education quality can vary depending on a particular society.

The identification of determinants of education quality is crucial from the viewpoint of creating human capital, which, in consequence, is instrumental in GDP growth.

The present article is a small contribution to a better understanding of this research problem.

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Wskaźnik nakładów na edukację jako tło efektów kształcenia na poziomie edukacji ponadpodstawowej

Streszczenie. *Nakłady na edukację są często wskazywane jako czynnik decydujący o jakości edukacji, wyrażanej najczęściej osiągnięciami edukacyjnymi uczniów mierzonymi wynikami egzaminów zewnętrznych. Doniesienia zawarte w literaturze na temat badań nad edukacyjną funkcją produkcji nie są zgodne co do wskazanego założenia, spotykane są zarówno doniesienia o pozytywnym wpływie nakładów na jakość edukacji, jak i o braku istotności takiego wpływu. Przedstawione problemy sprawiły, że jako cel badań przyjęto wykazanie wpływu poziomu nakładów na edukację ponadpodstawową na osiągnięcia edukacyjne uczniów. Badania przeprowadzono na losowej grupie 100 powiatów, wytypowanych po 20 z każdej z pięciu klas powiatów zależnie od poziomu rozwoju społecznego. Dane pozyskane z Banku Danych Lokalnych obejmowały lata 2012-2014, a dane o osiągnięciach egzaminacyjnych dotyczyły 2015 r. Analizy przeprowadzono, stosując jednowymiarową i wieloczynnikową analizę ANOVA. Wykazały one większe znaczenie poziomu nakładów dla wskaźnika edukacji na poziomie gimnazjum, a mniejsze znaczenie na poziomie edukacji ponadgimnazjalnej. Stwierdzono statystycznie istotne różnice tylko pomiędzy skrajnymi klasami w edukacji na poziomie liceum oraz edukacji wyrażanej zagregowanym wskaźnikiem edukacji obejmującym edukację gimnazjalną i ponadgimnazjalną.*

Słowa kluczowe: *nakłady na edukację, jakość kształcenia, wskaźnik jakości kształcenia*

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Income Taxation and Tax Optimization in Transnational Corporations

Abstract. *One of the basic aims of the transnational corporation's (TC) financial activity is maximization of profits after tax, that is minimization of taxes. Because profits after tax in particular countries vary, then tax optimization poses a challenge. If the TC runs its activity in the form of a "permanent establishment" or a subsidiary, they are subject to two different tax systems, i.e. that of the host country and home country. Bilateral agreements on double tax avoidance enable tax payments only in one country. Avoidance of double tax remittances can take place in the form of tax credit, i.e. deduction from home tax, the tax paid abroad or in the form of exclusion, i.e. exemption of foreign income from home-country tax.*

Keywords: *transnational corporation, tax neutrality, corporate income tax, withholding tax, value added tax, double taxation, exclusion method, tax credit method*

Introduction

From a microeconomic point of view taxes are an instrument of a state's economic, financial and social policy, and a basic source of its income. However, for companies or individuals tax is an expense – tax types and tax levels affect basic economic decisions of transnational corporations. Operating globally they have to take into consideration different tax systems in particular countries including their home country's tax system, which is of essential relevance because, generally, it is the home country where the transnational corporation's tax burden is located. It is common knowledge that low taxes or tax reliefs are not a basic criterion when

it comes to choosing the country by a transnational corporation for its investment operations. The majority of direct foreign investment (DFI) takes place in highly developed countries where, generally speaking, taxes are high. However, with more or less comparable other criteria investors will certainly prefer countries with lower tax burdens. Also when some other factors of investment location e.g. infrastructure, availability of low skilled labor force, social capital and so on, are not fully in line with the transnational corporations' criteria they may take investment decisions if their calculations show that they will receive compensation through tax reliefs. That is why generally developing countries use, as an incentive for foreign investors, convenient tax solutions and compete with one another in this area. From the point of view of the tax criterion the TCs will also prefer those countries whose taxation systems are in compliance with the principles formulated long ago by Adam Smith in his work *The Wealth of Nations* i.e. taxes are equal, transparent, simple, convenient and efficient [RPC 2015].

As practice shows a commonly used method of tax avoidance or its significant reduction is the establishment or subsidiaries in tax havens. The ability to take advantage of tax arbitrage or different forms of "getting away with" taxes, especially when it comes to income transfers from the subsidiary's countries to the home country of the corporation affects significantly their income level, and is decisive in terms of further expansion and competitive advantage. The essential thing here is the application of transfer pricing, selection of appropriate forms of financing subsidiaries, "thin capitalization" i.e. financing subsidiaries through the parent company's credits, creation of reinvoicing centers, central cash deposits and offshore companies in tax havens [Rymarczyk 2013]. The lowering of the TCs' taxes is conducive to their governments' activities by establishing bilateral or unilateral agreements on double taxation avoidance or taking unilateral decisions in this respect.

Tax management or rather tax planning or tax optimization is a question of not only top priority in the TCs' overall international strategy, but also it is a difficult issue that involves highly qualified, and often, international staff. They have to monitor, on an ongoing basis, the existing tax systems in particular countries because they are often subject to change, especially in less economically viable systems. Moreover, different forms of tax avoidance affect the budgets of particular countries, which leads to various restrictive actions taken by their tax offices. Managers responsible for taxes in the TCs have to know very well the tax legislation of the country of their investment, and international tax legislation in order not to come into conflict with them, which may result in not only substantial financial losses, but also corporate image losses. As a result they often make use of tax advisory services of domestic and international tax agencies or the like.

The focus of this paper is on basic and general principles as regards financial systems, not on the analysis of the systems in particular countries. Besides, such

an analysis would be impossible due to its large variations and the scope of this paper, whose aim is to present ways of imposing tax on the TCs and what they do to optimize taxes.

1. Tax neutrality as a fundamental principle of the tax system

Tax neutrality is one of the most fundamental principles that should characterize different tax systems according to classic and liberal views on that matter. Neutral tax is such tax that does not cause distortions in natural capital flow to the most effective places and forms of its allocation. It merely depletes cash flow. From the TC's point of view one can distinguish two types of tax neutrality [Butler 2012]:

– domestic tax neutrality, which means that the TC's income from foreign and domestic operations are equally taxed by tax authorities of its home country. It is the so called capital export neutrality.

– foreign tax neutrality, also known as capital import neutrality, where taxes imposed on foreign corporations' activities in a given country are the same as the ones imposed on local companies.

Tax neutrality can only be found in an ideal tax system model. In practice what is possible is only some kind of approximation towards it by tax authorities.

There are substantial differences in tax systems and tax rates among particular countries. In a given country corporate income tax for local and foreign business entities is generally identical. It is, however, different from country to country, e.g. in Germany it is 33%, in Poland 19%, and only 13% in Ireland. Even within the same tax jurisdiction there appear tax differences. They are connected with:

– different types of assets – income from active business operations are taxed according to a different tax rate or at a different time than income from passive investment, and losses from one of these types of activity cannot be offset with the profits from the other one;

– differentiation of financial instruments – there are different tax rates for income from debt securities (e.g. bonds), from equities (e.g. shares) and hybrid securities, e.g. preferred shares, or pre-emptive rights and warrants. Different tax rates refer to payments related to these financial instruments treated as not only income by their owners, but also expenses by their issuers. For example, the issuer of debt securities can deduct interest paid on debt securities from income tax, but paid dividends cannot be deducted;

– different organizational types of business activity abroad. In the first place there are differences in taxes as it comes to the TC's foreign branches and foreign subsidiaries, which will be discussed later in this paper.

Generally speaking, there is a lack of tax neutrality, the consequence of which is the fact that the TC's decision regarding the place, type of investment and its organizational form is affected, to a large extent, by the existing tax differences and not by its possibly highest economic and social efficiency.

2. Types of taxes and tax systems

The TC's income comes from two or more than two countries, thus they are subject to, at least, two different tax jurisdictions. There are two basic tax systems. The first one is a worldwide taxation system based on the principle of the taxpayer's residence. The other one is a territorial taxation system based on the principle of the source of income. Particular countries use one of them or both of them. The application of worldwide taxation means that a given country imposes tax on all of the resident's income i.e. the income from domestic and international sources, the so-called residence principle. The income from foreign subsidiaries is taxed according to the tax rates of their home countries only after they are transferred to the parent company. If their income has been taxed earlier in the country of their location then it means that they are double taxed unless there is a mechanism preventing this situation, which practically takes place. This system can be found in eight OECD countries (Chile, Greece, Ireland, Israel, South Korea, Mexico, Poland and USA). It is believed that this kind of system is not favorable for the TCs based in countries with a high income tax rate (see USA), because this tax rate is used for imposing tax not only on domestic income but also on the one transferred from abroad, where it is lower. This state of affairs makes the TCs delay their transfers, i.e. "parking" abroad and investing in specially designed pro-tax-avoidance financial instruments, establishing holding companies in tax havens, and relocating headquarters to countries with a low income tax rate and using territorial taxation.

Territorial taxation is about imposing tax on only the income generated in a given country by both residents and non-residents (the so-called source principle). In other words, it is imposed no matter where the taxpayer is located or no matter what operations the taxpayer has conducted, if the income is made in the country that uses this system. From among the 34 OECD countries 26 use this system (Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Italy, Japan, Luxembourg, Holland, New Zealand, Norway, Portugal, Slovakia, Slovenia, Spain, Switzerland, Turkey, Great Britain). Yet some countries use territorial taxation for residents and worldwide taxation for non-residents.

Among the most burdensome taxes that the TCs pay are: corporate income tax (CIT), withholding tax, and value-added tax (VAT). Apart from them the TCs

may pay a number of other taxes depending on the country of their business activity, including taxes imposed by local authorities. The latter may also be equally important as the above-mentioned ones. For example, in Switzerland each canton imposes their taxes which are much higher than the country's maximum corporate income tax. To that is added a relatively small municipal tax.

Income tax or corporate income tax is a tax directly charging income from active business operations i.e. production or service provision. Rates of income tax vary from country to country being the source of tax arbitrage for the TCs. In tax havens they are at zero percent or several percentage points. The highest rates are found in such countries as the United Arab Emirates – 55%, Japan – 42%, the Democratic Republic of the Congo – 40%, the US – 35%, the Netherlands and France – over 34%, Belgium – a little below 34%, Germany – 33%.

Table 1. Corporate income tax in selected countries

Country	Tax rate (%)
United Arab Emirates	55.00
Japan	42.00
Democratic Republic of the Congo	40.00
USA	35.00
Holland	34.50
France	34.43
Belgium	33.99
Germany	33.00
Spain	30.00
Italy	27.50
Sweden	26.30
Denmark	25.00
Poland	19.00
Czech Republic	19.00
Chile	17.00
Ireland	12.50

Source: Price Waterhouse Coopers 2015.

Yet, one should take into account that the definition of taxable income varies from country to country. Generally everywhere before income tax the following are deducted: wage costs, equipment costs, depreciation costs, advertising and insurance costs.

Tax on passive income is an indirect tax imposed on the taxpayer who does not directly generate this income [Eun, Resnick, Sabherwal 2012]. It is imposed on dividends, income from royalties i.e.. patents, licenses, publication rights, interest (bonds, loans), management fees, and lease fees. It is deducted from the payments transferred by the company to the taxpayer, i.e. corporation or indi-

vidual and handed over to local tax authorities. In this way the tax authorities are sure to receive due tax on passive income within their tax jurisdiction. The rate of this tax is set generally on the basis of bilateral tax agreements between countries and varies depending on the type of passive income. For example, in the USA this tax imposed on income of the taxpayers having headquarters in Western European countries with which the US has signed bilateral agreements on tax avoidance is generally zero. However, it is 30% for countries with which the US hasn't signed such agreements. And income from direct investment is taxed lower than that from an investment portfolio.

Value added tax is an indirect tax imposed in most countries on domestic sales and exports, and imports of commodities and services. Within one country VAT rates may be different depending on the type of activity and volume of turnover. In the European Union, despite the advanced process of the tax harmonization, its rates vary significantly from country to country. The lowest rate can be found in Luxembourg – 15%, the highest in Hungary – 27%, and in Poland – 23% [Wikipedia 2015]. As it comes to exports of goods and intra-Community supply of goods[1] the rate is zero percent. Generally speaking when it comes to exports of goods the countries apply a zero rate of VAT, i.e. the exporter receives the whole VAT refund calculated in the purchasing price of an exported good. One can observe a certain tendency, namely, wherever income tax rates are relatively low, rates of VAT are relatively high, which is aimed to offset tax revenue in the budget. It is commonly used in EU member states and Latin America. But e.g. the US uses sales tax charged on the consumer's end purchase.

3. Taxation and organizational form of TC's foreign activity

The basic forms of international business activity, i.e. internationalization of business, are direct exports, direct imports, branches, subsidiaries and joint ventures. In the case of direct exports practically all business activity is conducted in the country of the company's headquarters. Income generated as a result of this type of activity is taxed on the spot, and losses deducted from income. In this case there is no double taxation. Duties and other non-tariff payments, which can be treated as taxes, are basically incurred by the importer. Theoretically there may occur export customs duty, i.e. tax paid by the exporter, but imposed by the customs administration of their country, which in practice rarely takes place. Transit duties also relatively seldom occur and are typical of the transit of oil and gas

[1] Intra-Community supply of goods is movement of goods from one country to another.

through pipelines across the territories of several countries, and also are imposed on the exporter.

Direct imports mean looking at a foreign business transaction from the buyer's perspective. As in the case of direct exports similarly the importer's income is subject to taxation in their country, and losses are treated as the costs of business activity. Moreover, the importer pays duties and incurs non-tariff burdens (import taxes, variable levies, consular fees, handling charges, stamp duties) in favor of the budget of their country. Tariff and non-tariff fees can be included by the exporter and importer as tax deductible expenses.

The TC can run foreign activity in the form of a branch, i.e. a unit being its integral part (direct branch operations). The branch is not a legal entity and the TC's headquarters is fully accountable for its liabilities. The branch is subject to the jurisdiction of the country of origin. That is why the possibility of interfering by local authorities in its functioning is definitely lower than in the case of a subsidiary. Since its capabilities to run operations are by definition lower than that of the subsidiary, the TC rather seldom uses this form, if so then at an initial stage of its business operations abroad. The branch is often used as a center for international advertising, warehousing goods, collecting orders, repairs, after-sales service and the like.

Under certain circumstances its profits may be double taxed, i.e. in the host country, and in the home country. It is so if the branch meets the requirements of the permanent establishment, i.e. if we deal with its permanent and physical presence in the host country (e.g. in the form of office or department store), and if it runs basic business operations (e.g. it manufactures goods or takes decisions about accepting or declining orders). In this case its income is taxed in the host country according to the territorial taxation principle, and in the home country according to the residence principle (worldwide taxation) [Sercu 2009: 708-709]. Since there is no transfer of dividends, interest, and royalties, there is no withholding tax. Thus the income of the branch is double taxed (unless there is an agreement or decision on double taxation avoidance).

The most common organizational form of the TC's foreign activity is a wholly-owned subsidiary. It is a legal entity and, as a separate entity, is subject to the host country's jurisdiction. As a result it is taxed with corporate income tax according to this country's existing tax rate which is in line with the source principal of taxation. Moreover, what is taxed is profits transferred in the form of dividends and royalties to the TC's headquarters, who owns the subsidiary. The headquarters adds the transferred profits to the domestic ones and according to the residence principal pays corporate income tax on them unless there is an agreement on double taxation avoidance with the country hosting the subsidiary. It means that the subsidiary's income is triple taxed.

Joint ventures are taxed, as is the subsidiary, i.e. income from business operations conducted by partners from different countries (usually from two) within the same enterprise based on the signed agreement. Of course this involves the joint venture's foreign partner's income.

4. Ways of double taxation avoidance

There is no doubt that double or triple taxation would affect negatively the tendency to undertake direct foreign investment. That is why countries use different forms of exemption from multiple taxation. They may be of unilateral character, i.e. result from the principles of a given country's jurisdiction, or they may result from bilateral or multilateral agreements between countries. The most common type of agreements are bilateral agreements based on the OECD Convention. It specifies two methods of double taxation avoidance, namely exclusion method and tax credit method.

The former one, also known as capital import neutrality, is based on the assumption that one should neither penalize nor award, in terms of taxation, a business entity only because it is owned by a foreign corporation. The assumption is that income or assets taxed in the country of the source of income or location are exempt from taxation in the country of the taxpayer's residence. It may, however, be included while calculating tax on the remaining income or assets.

On the other hand, the capital export neutrality method is based on the assumption that the tax authorities of the country of investment origin should not create tax incentives for investment in the country with relatively low tax. In other words, corporate income tax imposed on the business entity located abroad should be the same as if it was located in its owner's country. As a result, tax paid in the country of income origin or location of assets is deducted from the tax collected by the tax authorities of the taxpayer's country.

Unused tax credit may be used, however, in two cases. The first case is when the TC paid, in the past, domestic tax on foreign income exceeding tax credit. It is the so-called carry back principle.

The other case is when in the near future the TC has to pay domestic tax on foreign income higher than tax credit, it may eliminate the differences by taking advantage of excess tax credit from the past, i.e. making use of the carry forward principle. The application of either principle is limited in time by appropriate tax laws.

The occurrence of excess tax credit results in an effective tax rate being higher than a standard domestic tax rate. In order to eliminate this phenomenon, i.e. liquidate unused tax credit, one can apply two methods. The first one is about relocation of indirect costs. Increasing by the headquarters the burden of these costs for

a foreign branch located in the country with high taxes will result in lowering the taxes paid abroad, and eliminating their surplus over taxes due to be paid in the country. However, for a number of reasons the headquarters has limited possibilities to maneuver these costs. The other method is about applying transfer pricing; this, however, may end up in restrictions by the tax authorities, who may conclude that the prices of their services exceed market prices (arms-length principle). In this situation all of these costs or part of them will not be deducted from sales in either country. This will lead to taxes being higher than before the relocation of costs. One should also take into account the fact that the relocation of costs through transfer pricing may bring about a rise in import customs duty that the branch will have to pay.

4.1. Problems connected with the application of exclusion method in the case of the permanent establishment

The exclusion method is applied in both unilateral tax jurisdiction and international agreements on double taxation avoidance. The exclusion in unilateral agreements is not often full (it comprises e.g. 50%, 75% or 90% of a foreign branch's income [Sercu 2009: 718]. It is justified by the fact that certain expenses related to management of a foreign branch incurred by the headquarters are deducted from its domestic income. If they are estimated at 25%, the privilege of the exclusion will refer only to 75% of the foreign branch's income. In bilateral agreements the full exclusion most frequently occurs only if a foreign rate of taxation is similar to the domestic one. In other cases partial exclusion is justified by the pursuit of not creating large incentives to transfer income to countries with low taxes.

4.2. Double taxation avoidance in the case of a subsidiary

A subsidiary constitutes, in an economic sense, unity with the whole corporation. In the financial sphere it results in transferring to the mother company income generated by its subsidiary. However, the losses generated by the subsidiary fall fully on the very subsidiary – the parent company does not take any responsibility for it. Apart from that between the subsidiary and the parent company and the subsidiaries themselves there are different financial transfers going on. They are the result of transactions which sometimes are a hidden form of income transfer. The basic methods of income transfers are as follows:

– concluding sales transactions based on transfer pricing; it is one of the most common forms of income transfer between the TC's particular units,

– intra-corporate capital transactions, i.e. trading in shares, bonds and other securities, and granting loans,

– license fees, consulting fees, remuneration and the like (the so-called royalties and management fees), and lease fees.

The most common and the simplest form of income transfer from the subsidiary to the headquarters are dividends, i.e. part of its profit that is not reinvested. The dividends in the subsidiary's country are double taxed, first with income tax, and next with withholding tax the moment they are transferred to the headquarters. In the headquarters' country, however, they may be excluded from taxation by means of tax credit or exclusion methods, as is the income transferred from the "permanent establishment". It is worth noting that in many countries the application of indirect tax credit is permissible only if the headquarters has controlling interest on the subsidiary transferring dividends. In the US, for example, it is 25%. If the share is lower, the investment is treated as portfolio and it is not possible to deduct tax credit from the transferred dividends. If excess tax credit cannot be used by means of the already mentioned methods of "carry back" or "carry forward", or by combining the income of the low tax country based subsidiary with the income of the high tax country based company, the TC should consider the possibility of transfers being delayed until it becomes possible or separate payments according to their type. This method lies in dividing the subsidiary's income into the part transferred to the headquarters as royalties, interest or management fee, which are not taxed with income tax, but only with withholding tax, and the residual part as dividend, which is taxed higher i.e. with income tax and withholding tax.

4.3. Application of exclusion method

The exclusion of the subsidiary's foreign income from domestic taxation is applied basically to only dividends [Sercu 2009: 730]. Remittances in some other form such as royalties, management fees and lease payments are taxed much lower than the dividends because the only tax paid on them is the income tax paid abroad. That is why in the case of these forms of transfers what is rather applied is the tax credit system. If the exclusions occur, then they are much lower than in the case of dividends.

Tax planning by the TC consists in computing overall taxation of every form of remittances and selecting such a form which will guarantee the lowest taxation. As it comes to dividends the overall tax will be a sum of income tax and tax on dividends abroad possibly increased by the taxation of part of the income that was not excluded from taxation in the home country. However the other forms of remittances will be taxed with a withholding tax plus the home-country headquarters' tax less tax credit.

It can be concluded from the above that the TC's headquarters receiving foreign profits in some other form rather than dividends can partially or completely avoid paying corporate income tax in the home country. This can be achieved also

if the remittances were transferred to the headquarters in the form of tax-deductible dividends to an offshore holding company located in a tax haven. After paying (or not paying at all) a very low tax this company transfers them as dividends to the parent company. Under an exclusion system the parent company will pay no tax. Of course, the tax authorities of different countries take various measures against methods of double taxation avoidance that are against the tax law or principles, and diminish their income. However, its efficiency is limited and, to a large extent, is dependent on the quality of tax law and qualifications, experience, efficiency and honesty of tax officers.

Conclusions

One of the main aims of the TC's financial activity is maximization of after-tax profits, i.e. minimization of paid taxes. Because tax systems in particular countries differ, tax planning is challenging for managers and requires knowledge and experience. In particular they have to make decisions as to what type of foreign business activity to choose, where to locate costs and income, in what form and how to transfer it to the headquarters or between the TC's subsidiaries.

If exports or imports are the form of foreign activity, the tax issues are quite simple – all of the income is taxed in the exporter's or importer's country and there is no multiple taxation of income. However, the issue gets complicated in the case of FDI. In theory a permanent establishment may be double taxed, i.e. with host-country income tax and according to the principle of residence. In practice it is generally taxed in only one country on the basis of an unilateral agreement on double taxation avoidance or unilateral decision.

However theoretically, the subsidiary may be taxed with income tax in the host country, with withholding tax on dividends and with income tax in the home country of the TC. As in the case of a permanent establishment, it pays tax only in one country, based on bilateral agreements on double tax avoidance.

Double tax avoidance may take place in the form of tax credit or exclusion.

The TC tries to manage remittances in such a way as to reduce tax burdens. The common method used by the TC to reduce taxation is transfer pricing and creating offshore holding companies in tax havens. It is not always effective due to the restrictions of particular countries and the activity of international organizations "civilizing" the functioning of tax havens.

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Opodatkowanie dochodów i optymalizacja podatkowa w korporacjach transnarodowych

Streszczenie. *Jednym z podstawowych celów działalności finansowej korporacji transnarodowej (KTN) jest maksymalizacja zysków po opodatkowaniu, czyli minimalizacja podatków. Ponieważ zyski po opodatkowaniu w poszczególnych krajach różnią się miedzy sobą, optymalizacja podatkowa stanowi dla nich duże wyzwanie. Jeśli KTN prowadzi działalność w formie „stałego oddziału" lub spółki córki, to podlegają one dwóm różnym systemom podatkowym, tj. kraju goszczącego i kraju pochodzenia. Bilateralne porozumienia o unikaniu podwójnego opodatkowania umożliwiają płacenie podatku tylko w jednym kraju. Uniknięcie podwójnego opodatkowania może nastąpić w formie kredytu podatkowego, tj. odliczenia od podatku krajowego podatków zapłaconych za granicą lub w formie wyłączenia, czyli zwolnienia dochodu zagranicznego od podatku krajowego.*

Słowa kluczowe: *korporacja transnarodowa, neutralność podatkowa, podatek dochodowy, podatek potrącany, podatek od wartości dodanej, metoda wyłączenia, metoda kredytu podatkowego*

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Basic Factors for Dynamics of Net International Investment Position: Polish Case

Abstract. *The dynamics of changes of net foreign liabilities specifies the condition of financial sustainability of the country. It is important therefore to indicate these factors which decide on relations between net international investment position and GDP. This applies to the factors recorded in the balance of payments and to these, beyond this account - the valuation of foreign assets and liabilities. The value and the structure of net foreign liabilities is result of these decisions made in the past. These past choices have an impact on a significant part of the current account – specifically the net investment income, which as fixed by exogenous decisions, remain outside country's management direct control. The decomposition of changes of the ratio of NIIP to GDP identifies the factors which, as in the case of Poland, determine country's external balance sheet. These factors also indicate the freedom of choice for the decision-makers, if they have to alter foreign net liabilities of the country and their relationship with GDP.*

Keywords: *net international investment position, unregistered capital flows, stabilization of foreign finances*

Introduction

In this paper, we made an analysis of long-term international financial stability of an economy by examining the dynamics of net international investment position (NIIP) and the changes in the ratio of NIIP to GDP (hereinafter for simplification called as "the *S* ratio"). The current account balance indicates country's competitiveness level and measures an effectiveness of foreign and residents

capital investments. On the other hand, the structure of gross capital flows decides on the category of investment, its currency and time structure and is responsible for financial stability at a given amount of net export and GDP growth. The basic research question was: to what extent is it possible in an economy functioning in a liberal system of capital flows and floating exchange rate with considerable net foreign liabilities, to alter, by decisions of economic policy and without reducing GDP growth rate, the size and structure of NIIP. Using the Polish case we estimated significance of main components of the balance of payments and valuation of assets and liabilities on the dynamics of the *S* ratio. The decomposition of the changes of the *S* ratio was used to demonstrate how the valuation influenced the NIIP.

1. NIIP and long-term balance

The NIIP exhibits the state of foreign liabilities of residents towards non-residents, as an effect of foreign direct investment, portfolio investment (equity securities and debt securities), credit and loan decisions and the like which occurred in the past. The state of NIIP is a result of a sort of the specific game between creditors and debtors. Markets can tolerate growing foreign indebtedness as result of information asymmetry. Nevertheless if in some point they find the level or structure of foreign liabilities as inappropriate to the economy's fundamentals we could observe sudden stops, capital flights, costs of capital rise and in consequences financial crisis. That requires financial relations with the foreign partners to be constructed in a way which could enable to absorb external shocks. That invokes to a long-term approach to the balance of payments. Described in theory by among others Gourinchas and Rey [Gourinchas & Rey 2013] it demonstrates that the amount of net foreign liabilities is time limited by the terms of its repayments. In other words, excess absorption over income is carried out in a given country by the commitments to foreign investors to repay accumulated gross foreign liabilities by means of future surpluses generated on the current account of the balance of payments or by reducing gross foreign assets.[1]

The decreasing net foreign liabilities enforced by the markets (creditors) or as a result of internal conditions (e.g. too high costs of servicing lowering national disposable income) makes it necessary to increase domestic savings in a form of net exports or surplus of foreign capital (investment) income. The higher the ratio of the net international liabilities to GDP the higher must be the economy's future savings used for debt repayments. Therefore apart from the state of net foreign

[1] The important difference between the economy's net foreign liabilities and domestic liabilities of the public sector lies in the fact that net foreign liabilities stipulate movements of value between countries, and domestic ones across generations of the same country.

liabilities it is necessary to examine the dynamics of the S ratio. The economy's financial stability to be kept in a steady state requires proper management of the relationships between net foreign liabilities changes and growth of GDP. The key role in stabilization process is played by the capability to change "path dependent" level and structure of main components of the balance of payments.

The shift in the ratio of NIIP to GDP (called the S ratio) can be expressed in the following way:

$$(M_t - \mathrm{M}_{t-1}) / N_{t-1} = (Y_t - Y_{t-1}) / Y_t, \tag{1}$$

next, if

$$M_t / Y_t = M_{t-1} / Y_{t-1}, \tag{2}$$

because

$$M_t = M_{t-1} + BCC_t, \tag{3}$$

then

$$BCC_t / M_{t-1} = y_t^* \tag{4}$$

where:

M – NIIP,
BCC – balance in the current and capital account,
Y – GDP,
y_t^* – level of GDP growth which, at a given balance in the current and capital accounts, stabilizes the share of foreign liabilities in GDP (hypothetical growth).

It can be concluded from equation (4) that maintaining or improving the S ratio and therefore stabilization of foreign finances depends on the capability to shape appropriate proportions between overall domestic expenditures (i.e. domestic absorption) and the rate of national income growth. From the bookkeeping point of view, the NIIP changes should strictly correspond with the current and capital account balance. That is however another issue which could play important role in that stabilization process. It is a difference between the "hypothetical" NIIP calculated as a sum of the current and capital accounts balances and the actual, statistical NIIP (reported by relevant authorities). The latter introduces into the picture the subject unrecorded in the balance of payments, namely valuation of foreign assets and liabilities. The IMF studies show that correlation coefficient between the actual balance of the current and capital accounts and "hypothetical" NIIP in developed and developing countries has been going down in time [Lane & Milesi-Ferretti 2006] and this phenomenon has been growing in importance since the late 1990s [Gourinchas 2008; Gourinchas et al. 2011; Körner & Zemanek 2012; Lane & Milesi-Ferretti 2014]. M. Obsfeld [2012] indicates the sources

of these transformations which are taking place between the balance of payments and actual NIIP. In the past, we observed the growing role of valuation effects on a wealth's creation and wealth's transfers between nations. They result, apart from clearly statistical issues (errors, omissions, investments in transit, etc.) from the valuation changes of assets and liabilities emerging from foreign exchange and assets price changes.

The weak correlation between the accumulated balance of the current and capital accounts and NIIP calls for, from the point of view of economic policy, answering the question: to what extent does the actual, real state of foreign net liabilities is a result of recorded and unrecorded capital transfers between a given country and its economic partners and to what extent it is a consequence of the capital valuation of foreign liabilities and assets?

2. The issue of valuation of foreign assets and liabilities

Since the end of the 20th century the strategy of a country's adjustment to changing world markets has been more and more dependent not only on the size and symmetry of capital flows[2] but also on its type, currency and time structure [Gourinchas & Rey 2013], that is on the factors that affect the size and changeability of valuation of country's foreign assets and liabilities.

The scale of valuation depends, as we have already indicated, apart from statistical errors, on foreign exchange currency volatility and asset's price changes and is carried out over the whole analyzed time and calculated at the end of the reporting period [Gourinchas & Rey 2013; Lane & Milesi-Ferretti 2005][3]. Growing volatile cross-border capital flows (in relation to GDP), volatile currency and time structure have increased a role of valuation. On the other hand, the capital flows influenced the exchange rate and interest rates levels consequently affecting the amount of net exports, net investment income and therefore the balance of payments position and the foreign balance sheet.

The research by P. Lane and G. Milesi-Ferretti indicates presence of a significant relationship between excess deficit in the current account (in relation to economy's fundamentals) and the tendency of foreign currency to depreciate, which in turn may cause, through the exchange currency channel, valuation changes alter-

[2] Forbes and Warnock [2012] conduct an analysis of factors causing capital flow ("push and pull factors").

[3] In his work in 2007, Curcuru contends that apart from revaluation changes resulting from currency rates and asset prices the differences are due to "other" unidentified statistical causes [Curcuru et al. 2007]. The issue of identification sources of valuation change has also been discussed by Hausmann and Sturzenegger [2007].

ing the ratio of NIIP to GDP. The strength of correlation between valuation and depreciation/appreciation of the national currency depends on the share of different types of foreign assets denominated in the foreign currency in gross country's foreign position [Lane & Milesi-Ferretti 2014]. For example, it is more likely for equities rather than debt securities to respond to the foreign exchange changes. The debt securities could be also more responsive to interest rates shifts. The fast changing and increasing share prices of companies in emerging markets play a significant role altering assets value, especially when the valuation is performed not at book value but at the market-to-market principle. If foreign liabilities are denominated mostly in the foreign currency, depreciation of domestic currency (*ceteris paribus*) will deteriorate the S ratio (when denominated in local currency). In case the foreign assets and liabilities are incurred in local currency only depreciation does not change the S ratio, although amount of assets and liabilities calculated in the foreign currency will vary.

The size of valuation depends also on the relationship between amount of gross foreign assets and foreign liabilities, i.e. the symmetry of capital flows in an economy, which is measured by the transformed Grubel-Lloyd index [Obsfeld, 2004]. At present, valuation of assets and liabilities, alongside with the increased capital flows in many economies affects the NIIP level more than changes in net exports [Hausmann & Sturzenegger 2007; Gourinchas 2008; Gourinchas et al. 2011; Gourinchas & Rey 2013]. Lynn and Miles-Ferretti gave examples of the significance of valuation for the size of the economy's net foreign liabilities. The USA and Great Britain capitalized on the differences between assets and liabilities valuation, however Germany, the Netherlands, Finland, Sweden, to name a few, lose. In Holland since 1990 valuation changes have brought about negative differences between the accumulated current account and an actual ratio of NIIP. In 2002, the ratio of NIIP was over 100% of a nominal GDP[4] [Jansen & Rojas-Romagosa 2015]. During that time, the BRIC countries experienced also considerable wealth losses measured by the ratio between the accumulated current account and real NIIP.

It is worth to observe that the changes of valuation levels in medium-sized countries are often independent from their economic policy, as Pierre-Olivier Gourinchas and Helene Rey stated. In many countries including emerging economies the valuation became a dominant factor that shapes the level of NIIP thus cofirming their partial dependency on the world market dynamics. The valuation processes constitute channels for wealth transfers between countries in different directions, especially when valuation changes get accumulated in time. Hence it could also make sense to include in the calculation of the foreign liabilities' servicing ratio a valuation not recorded in the balance of payments accounts. In

[4] In Holland, valuation losses rose again after 2008.

other words, in the process of stabilizing external balances, one should be able to assess, with certain probability, how a macroeconomic policy curried out in a country and abroad will affect valuation and therefore change the level of NIIP, hence a future benefit distribution between the investor and the recipient of capital [Lane & Milesi-Ferretti 2014].

As already has been mentioned the ratio of NIIP to GDP is essential while assessing the stability of foreign finances by international institutions (EC, the IMF, the World Bank, etc.) rating agencies or investment banks. This ratio has an impact on the assessment of a country's creditworthiness and its access to the credit market. Published statistics do not generally provide information about the level of valuation impact on international investment position. In other words, the assessment of a country's financial stability is curried out without taking into account the ongoing valuation processes and their *raison être* which may lead to erroneous conclusions as to the country's economic performance. It is an important issue for the domestic financial stability management. Registering by respective authorities the valuation is a deferred process. This delay results from the necessity to verify the consequences of capital flows which are taken as provisional during the year. Moreover, it is burdened with substantial uncertainty originated from the exchange rates and asset prices changes that are hard to forecast. It requires inductive inference of valuation trends and the profile of resident's and foreign investments.

John B. Taylor assumed that in the long run the ratio of the current account to GDP is statistically stationary, i.e. in a given period the current deficit in relation to the long-term mean will decrease heading towards stationary average [Obsfeld, 2004]. It requires, however (according to Nigel Lawson's doctrine) that the dynamics of the ratio of NIIP to GDP should not be co-determined by the valuation of foreign assets and that the up-to-present imbalance on the current account should not result from the policy of public sector (budget deficit) [Edwards 2001]. The policy assuming lack of public intervention into the stabilization processes passes over structural reasons of external disequilibrium and restricted markets efficiency. If these assumptions are not valid it could imply that in practice the economic authorities should intervene and take decisions in order to improve or, at least, safeguard the S ratio accepted by the markets. Such actions require knowledge of the relationship between all components of the balance of payments as well as assets valuation processes and GDP.

3. Implications for unrecorded capital flows

To examine the dynamics of the *S* ratio, in other words, the trend of financial stability, it is important to analyze two streams of capital corresponding with the

current and capital accounts, financial accounts including the so-called balance of errors and omissions.

Recorded financial flows are well defined and include direct investments (equity and debt), portfolio investments (equity securities and debt securities), other investments (credits, current accounts, trade credits, etc.) and official reserve assets (foreign currency reserves) and errors and omissions. The balance of errors and omissions (*BEO*) is a result of unrecorded capital flight, errors connected with statistics of trade flows (customs and bank statistics) and/or purposeful actions of business entities (e.g. VAT fraud in exports, under – or – over invoicing, etc.) [Lane & Milesi-Ferretti 2006].

From the balance of payments definition errors and omissions (*EO*) equal to the difference between the balance on current and capital account and the flows of the net foreign direct investments (ΔFDI), portfolio investments (ΔP), other investments (ΔO) and the changes of official foreign reserves (ΔR). Unregistered capital flight could be therefore interpreted as a unilateral transfer which change structure of the financial account of balance of payments. In 2013, BIS suggested that high *EO* balance could undermine the quality of balance of payments information. Global Financial Integrity estimated illegal transfers in the years 2003-2012 as an effect of dishonest invoicing of exports and imports from developing countries at around USD 5.1 trillion. As a result of unrecorded flows of short-term capital these countries confronted an outflow of around 1.485 trillion US dollars [Kar & Spanjers 2014]. This was an inference made based on the interpretation of the EO reported in the official balance of payments statistics and not confirmed by an explicit research. The IMF statistics for developing countries shows an outflow of unrecorded capital of USD 1.276 trillion in the years 2000-2014 (in the Asian countries alone, the accumulated negative balance of errors and omissions was USD 2.632 trillion).

4. Estimates of revaluation of foreign assets and liabilities

The valuation of foreign assets and liabilities is a result of exchange rate and price of assets changes calculated at the end of the investment year carried out over the whole analyzed period. Below are estimated calculations of the valuation of foreign assets and liabilities according to the following formula [Hobza & Zeugner 2014; Curcuru et al. 2007]:

$$W_t^z = \widehat{A_t^z} - (\widehat{A_{t-1}^z} + \sum F_t^{Az}) \tag{5}$$

where:

W_t^z – asset valuation level in period t,

$\widehat{A_t^z}$ – state of assets z (according to NBP data) in period t,

$\widehat{A_{t-1}^z}$ – state of assets z in period t–1 (according to NBP data),

F_t^{Az} – change of assets z in period t (inflow or withdrawal of investment in period t – data according to NBP balance of payments),

t – particular years from 2005 to 2014.

To compute valuation of assets and liabilities we estimate a hypothetical NIIP calculated as the value and structure of the NIIP provided (in case of Poland) by the National Bank of Poland (NBP) for each year increased by the balance on current and capital account in each subsequent year according to the equation $M_t = M_{t-1} + BCC_t$.

In Table 1 data for yearly and cumulative valuation are presented.

Table 1. Revaluation of foreign assets and liabilities

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Year	NIIP data (NBP)	BCC (NBP)	NIIP at beginning of year t	Hypothetical NIIP at end of year t $(2t) + (4\ t+1)$	Valuation in year t (2)-(5)	Hypothetical NIIP $(2t)+(7\ t+1)$	Valuation accrued (7)-(2)
2004	–381 179	–46 689	–	–	–	–	–
2005	–413 723	–22 641	–381 179	–403 820	–9 903	–403 820	–9 903
2006	–480 786	–36 260	–413 723	–449 983	–30 803	–440 080	–40 706
2007	–584 536	–62 379	–480 786	–543 165	–41 371	–502 459	–82 077
2008	–714 760	–71 539	–584 536	–656 075	–58 685	–573 998	–140 762
2009	–786 782	–32 164	–714 760	–746 924	–39 858	–606 162	–180 620
2010	–940 609	–52 065	–786 782	–838 847	–101 762	–658 227	–282 382
2011	–977 919	–50 879	–940 609	–991 488	13 569	–709 106	–268 813
2012	–1 064 733	–24 766	–977 919	–1 002 685	–62 048	–733 872	–330 861
2013	–1 142 250	16 818	–1 064 733	–1 047 915	–94 335	–717 054	–425 196
2014	–1 174 085	7 303	–1 142 250	–1 134 947	–39 138	–709 751	–464 334

Source: author's calculations based on the NBP data in PLN of 8.02.2016.

The estimation of valuation, which is a consequence of exchange rates and assets prices alterations, calls for information on the foreign currency and time structure of assets and liabilities. But this is restricted data available only to respective institutions (NBP in Poland). An approximate estimate of the impact of foreign exchange and asset prices on the level of valuation may be deducted from the correlation between foreign exchange and yearly contribution of valuation to gross assets and liabilities. Subsequently the correlation coefficient can be a proxy for the significance of the exchange rate for yearly levels of valuation.

The correlation coefficient, in the years 2005-2014, between the level of valuation of gross foreign assets (calculated as the share of valuation of liabilities of

a given investment class at the end of the year) and changes of the exchange rate of the US dollar and euro (at end of year[5]) was high and diverse. For the US dollar the correlation coefficient was 0.93, for the euro 0.72. The high correlation coefficient for asset valuation was probably due to the significance of official foreign currency reserves in the value of total foreign assets (on average 44%).

The correlation between gross liabilities valuation and foreign exchange was much weaker. The correlation coefficient for valuation of the liabilities with the USD rate of exchange was 0.62, and 0.38 for the euro. The correlation coefficient for the liabilities could suggest that the valuation in the range from 40% to 60% was due to foreign exchange swings, and the remaining part due to price changes.

Table 2. Foreign currency structure of assets and liabilities

Assets	Euro	USD	PLN	Pound and other currencies	Assets in total
	301.0	199.0	134.0	174.3	808.3
Liabilities	Euro	–	PLN	other	Liabilities in total
	581.8	–	1157.6	246.2	1985.6

Source: author's estimates based on NBP data of 8.02.2016. The ratio of NIIP to GDP following rate was taken: PLN/Euro = 4 and PLN/USD = 3.5 was taken. In 2014 GDP amounted to PLN 1719.1 billion, thus the ratio of NIIP to GDP was 65.8%.

In Table 3 we present a sensitivity of the ratio of the NIIP to GDP to the exchange rate changes, given assumptions presented in Table 2.

Table 3. Estimated sensitivity of ratio of NIIP to GDP to exchange rate changes

Deviation from the base exchange rate of euro and USD	0.90	0.95	1.00	1.05	1.10	1.15
NIIP/GDP (%)	**66.6**	**67.5**	**68.4**	**69.4**	**70.4**	**71.3**
Difference (%)	–1.87	–0.91	–	0.99	1.95	2.90

Source: author's estimates.

We took the foreign currency structure of NIIP given in Table 2 as a base for the sensitivity estimation. The depreciation of the zloty by 5% (identical for both currencies) causes an increase in the S ratio by around 0.9 percent points. Taking for the calculation January 18 2016 exchange rate of the zloty, the ratio of NIIP to GDP (*ceteris paribus*) would have increased, compared to one reported at the end of 2014, by 2.9 percent points, i.e. to 71.3%. However the depreciation of foreign currency improves export competitiveness rise and could add to export

[5] Currency exchange rates according to NBP Table C – NBP archives.

net upswing, on the other hand, with a specific currency structure of foreign assets and liabilities it increases the ratio of NIIP to GDP.

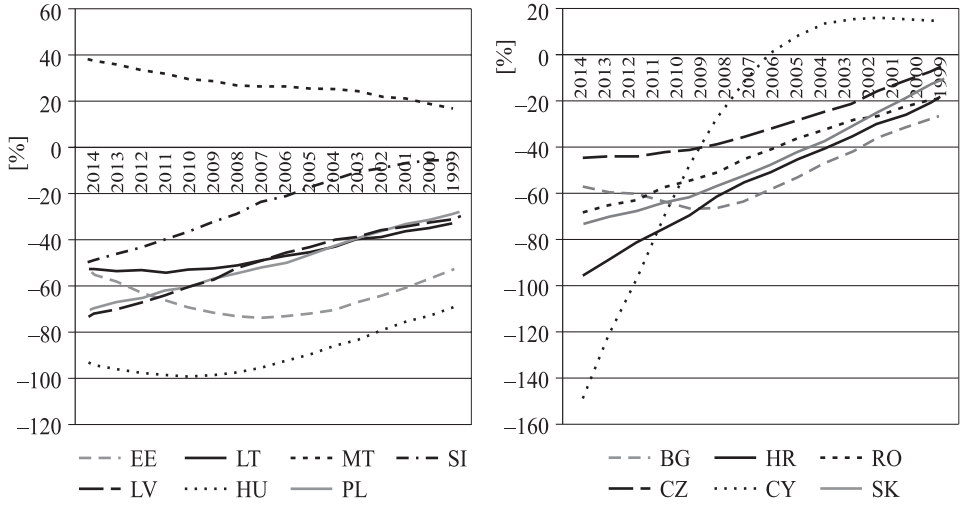
5. Stability of the dynamics of the ratio of NIIP to GDP

The NIIP adjusted by the valuation of foreign assets and liabilities determines, with a given current and capital account, the minimal growth rate of GDP, which holds the ratio of NIIP to GDP stable. In order to assess the dynamics of an economy's stability it is important therefore to examine the trend of differences between the actual growth rate of GDP (y) and the hypothetical growth (y^*) which stabilizes the S ratio. If $y < y^*$ the share of foreign liabilities in GDP rises.

At Charts 1 and 2 trends (Hodrick-Prescott.100) of the differences between y and y^*, observed in EU13[6] in 2004-2014 are presented.

Chart 1 was constructed using the statistical data provided by Eurostat and Chart 2 using the hypothetical NIIP, without valuation of assets and liabilities.

Chart 1. Dynamics of the ratio of NIIP to GDP – statistical data

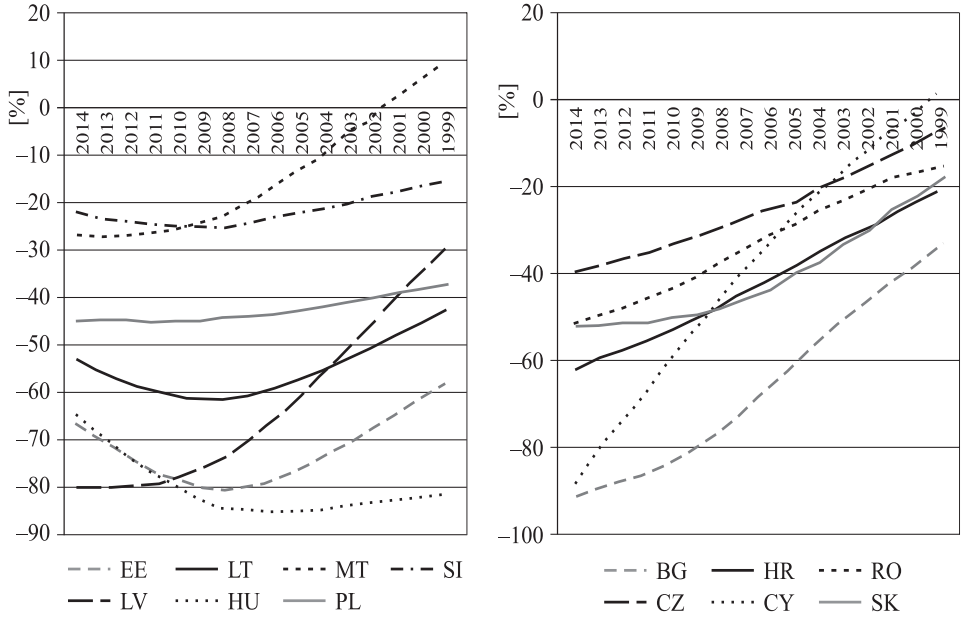


Source: author's calculations (data by Eurostat and Alert Mechanism CE of 8.02.2016). Country codes--Eurostat.

The analysis of trends in the new EU member states in the years 2000-2014 indicates different behavior of the financial stability. Comparing the 2014 data (HP) for the statistical and hypothetical ratio we found that the hypothetical ratio

[6] EU13 – countries which entered the EU in 2004.

Chart 2. Dynamics of the ratio of NIIP to GDP – hypothetical data



Source: author's calculations (data by Eurostat and Alert Mechanism CE of 8.02.2016). Country codes--Eurostat.

was lower than the statistical one in Hungary, Poland, Cyprus, Slovakia, Croatia and Romania. In these countries valuation processes decreased relationship of the NIIP in GDP.

In Table 4 we present the differences, in 2014, between the statistical and hypothetical ratio between NIIP and GDP, provided the NIIP from 2000 changes only by the current and capital balance (in national currency).

Table 4. NIIP difference between statistical and hypothetical data

Country	EE	LV	LT	HU	MT	PL	SI	BG	CZ	HR	CY	RO	SK
%	–7	2	7	31	–56	32	34	16	37	–22	–5	122	13

Source: author's calculation.

The difference between the statistical and hypothetical data demonstrates how diverse was sensitivity of the foreign assets and liabilities to price and exchange rates changes in these countries. In this context Poland's net international liability was highly vulnerable to exogenous foreign exchange and asset price changes.

6. Decomposition of the dynamics of the ratio of NIIP to GDP

Stabilization of foreign finances requires knowledge of dynamics between GDP and the current and capital accounts and the capital flows. From the balance of payments equation we get the following identity:

$$M_n \cong M_{n-1} + CCA_t + \Delta V_n = \Delta F + \Delta EO - \Delta R$$

where:

F – registered capital flows,
EO – errors and omission,
R – official foreign reserves,
V – valuation net,
CCA – current and capital account.

The decomposition of the dynamics of the ratio of NIIP to GDP indicates what factors and to what extent determine the registered changes. Let's denote in lower-cases the share of variables in GDP. We get equations (6) and (7):

$$m_t - m_{t-1} = x_t + xs_t + dp_t + dbiz_t + dpor_t + dpoz_t + dpdp_t + dw_t + \\ + dk_t - y_t/(1 + y_t) \times m_{t-1} + v_t$$

$$m_t - m_{t-1} = biz_t + por_t + poz_t + r_t + po_t + bo_t - y_t/(1 + y_t) \times m_{t-1} + w_t$$

where:

m – MPIN,
x – net export of goods,
xs – net export of services,
dp_t – compensation employees,
$dbiz_t$ – FDI income,
$dpor_t$ – portfolio income,
$dpdp_t$ – other primary income,
$dpoz_t$ – other income,
dw_t – secondary income,
k – capital account,
v – valuation,
y_t – nominal GDP growth in t.

In the years 2005-2014, an increase in the ratio of NIIP to GDP was caused by the balance of primary income from direct investments, valuation effects and negative balance of net export of goods. The stability of foreign finances was maintained due to the balance on the capital account and the nominal GDP growth rate.

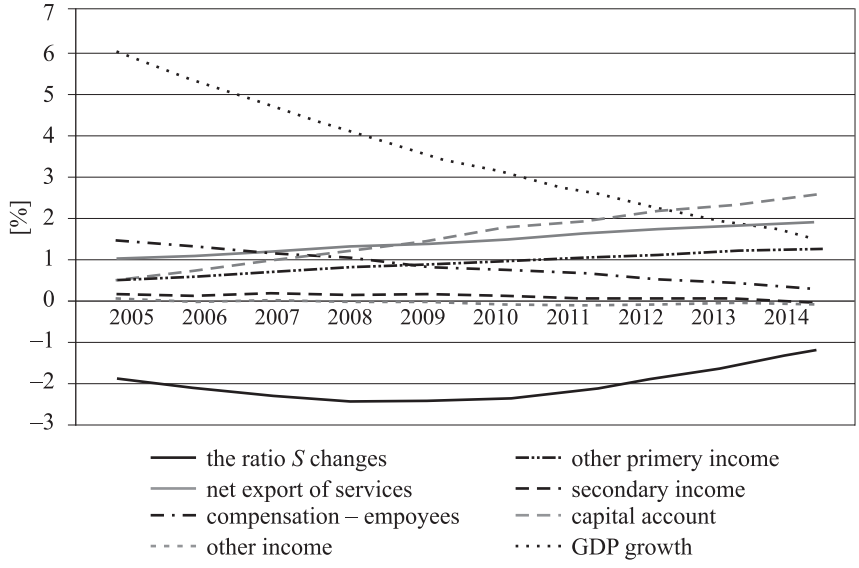
Table 5. Impact of current and capital accounts on the dynamics of the ratio of NIIP to GDP (in %)

Category	ratio *S*	*x*	*xs*	dp_t	$dbiz_t$	$dpor_t$	$dpoz_t$	$dpdp_t$	dw_t	*k*	*y*	*v*
2005-2014	–21.1	–28.4	14.1	7.8	–34.1	–8.8	–0.8	8.5	0.4	15.4	34.3	–29.4
Average	–2.1	–2.8	1.4	0.8	–3.4	–0.9	–0.1	0.8	0.0	1.5	3.4	– 2.9
St.dev.	6.2	1.8	0.4	0.4	0.5	0.2	0.1	0.2	0.2	0.7	4.2	5.0

Source: author's calculations.

The Charts 3 and 4 show (in PLN) an impact of the changes of components of current and capital account on the share of the NIIP in GDP. Chart 3 shows data stream, which in the analyzed period used to increase the *S* ratio, and Chart 4 demonstrates data stream which diminished the *S* ratio.

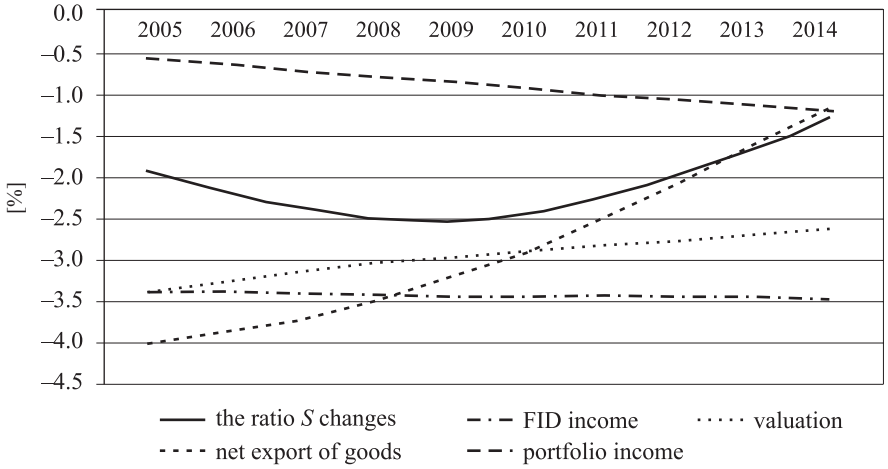
Chart 3. Increasing impact of the current account components on the dynamics of the ratio of NIIP to GDP



Source: author's calculations based on NBP data of 8.02.2916;

The dynamics of the ratio of NIIP to GDP (black unbroken line) indicates the improvement of the stability measured by the *S* ratio. To maintain the growing trend requires further improvement of the net export, net capital inflow and a higher nominal GDP growth rate. These factors could be shaped by organizing e.g. an appropriate macro-prudential policy.

Chart 4. Decreasing impact of components of the current account on the dynamics of the ratio of NIIP to GDP



Source: author's calculations based on NBP data of 8.02.2916.

The financial stability could be adversely affected by the following factors: a decreasing trend of employee transfers, the growing deficit on the balance of portfolio income and a lingering high deficit of primary income generated by FDI. Also valuation may deepen the erosion of financial stability measured by the *S* ratio. The impact of gross capital investments flow on changes of the ratio *S* is presented in Table 6.

Table 6. Impact of financial account on the ratio of NIIP to GDP (in %)

Category	Ratio *S*	FDI A	FDI L	Port. A	Port. L	Other A	Other L	Reserves	Der.	*EO*	*y*	*v*
2005-2014	–21.1	12.0	–33.6	4.8	–22.2	3.2	–20.3	16.0	0.7	13.5	34.3	–29.4
Average	–2.1	1.2	–3.4	0.5	–2.2	0.3	–2.0	1.6	0.1	1.3	3.4	–2.9
St.dev.	0.4	0.6	1.1	0.2	0.1	0.1	1.1	0.4	0.1	0.5	1.4	0.2

A – assets, L – liabilities, Port. – portfolio, Der. – derivatives.

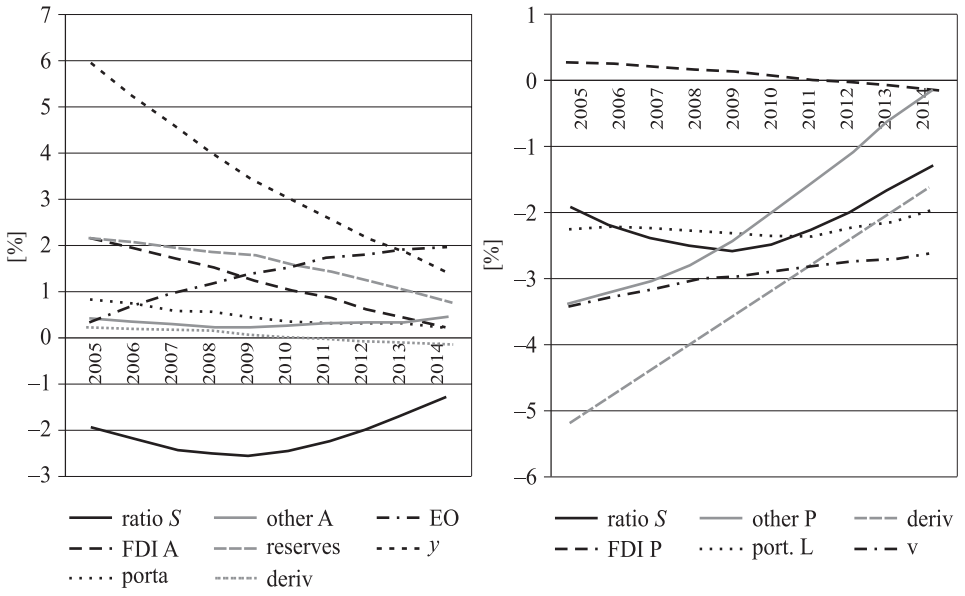
Source: author's calculations.

In the period of 2005-2014, the 21.1% fall of the *S* ratio was mainly due to the inflow of direct investment and valuation processes. The inflow of portfolio investment and the other investments had a similar adverse impact on the financial stability. The growth of official foreign reserves stabilized the long-term external balance and the impact of errors and omissions was likewise paradoxically posi-

tive. An increase in the capital outflow registered on the financial account as errors and omissions could have been offset by a reserves' decline or by the inflow of e.g. portfolio investment. Poland's foreign direct investment played also a relatively significant role for the stabilization of foreign finance stability.

The impact of gross capital flows on the *S* ratio (HP trends) was presented separately: for the flows, which increased, and these which decreased the *S* ratio.

Chart 5. Impact of streams of capital investment on the dynamics of the ratio of NIIP to GDP (chart on the left shows capital streams increasing the ratio, and on the right – decreasing)



Source: author's calculations.

The dynamics of the ratio of NIIP to GDP (black unbroken line at Charts 5) indicates improvement of the foreign financial stability. It is due to the following phenomenon: a lesser significance of flows of direct and other investment and a positive impact of foreign reserves (although decreasing) and the balance of errors and omissions. The strongest stabilization factor is still the nominal GDP growth rate however, its power decreases. It is also worth to stress that it is falling in significance, although at a slowing pace, the valuation role as a factor worsening the S ratio. Poland's foreign accounts receivable in the form of FDI, portfolio investment and other investments have a minor significance for the foreign financial stability.

Conclusion

The assessment of the stability of foreign financial should reflect the current state as well as the forecasted level of the relationship between NIIP and GDP. Such judgment is a complex issue since the dynamics of the ratio of NIIP to GDP depends not only on the development of net exports but increasingly on recorded and unrecorded capital flows, their structure, efficiency, and valuation. The stabilization, or rather reduction in the ratio of NIIP to GDP, is dependent on the internal factors e.g. the extend of financing budget deficit by non-residents or currency rates intervention and external factors as price of the cross-country capital flows which shift rate of return on portfolio investment, credit costs, or propensity to risk causing rapid capital movements. They determine freedom of action for the authorities when they intend to change the state of a country's net liabilities share in GDP. Using the Polish case we examine decomposition of this ratio and the implications of the different components of the current and capital and financial account of the balance of payments for the foreign financial stability.

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Podstawowe czynniki zmian międzynarodowej pozycji inwestycyjnej netto – przypadek Polski

Streszczenie. *Dynamika zmian zobowiązań zagranicznych kraju, tj. międzynarodowej pozycji inwestycyjnej netto, określa stan stabilności finansów zagranicznych kraju. Istotne w związku z tym jest wskazanie czynników decydujących o relacji międzynarodowej pozycji inwestycyjnej do PKB. Dotyczy to zarówno czynników rejestrowanych w bilansie płatniczym, jak i pozostających poza tym rachunkiem, tj. waloryzacji zagranicznych aktywów i pasywów. Stan zobowiązań zagranicznych netto kraju w danym momencie jest wynikiem historycznie podejmowanych decyzji. Wynik tych decyzji skutkuje określoną strukturą zagranicznych aktywów i pasywów. Struktura ta ma wpływ na istotną część rachunku bieżącego – dochody inwestycyjne netto – i jest korygowana zjawiskami egzogenicznymi, pozostającymi poza decyzjami kierownictwa kraju. Dekompozycja zmian udziału MPIN w PKB pozwala na wskazanie tych czynników, które – jak w przypadku Polski – decydowały o zmianach tego wskaźnika. Określa także swobodę korekty stanu zobowiązań zagranicznych netto dla decydentów gospodarczych.*

Słowa kluczowe: *międzynarodowa pozycja inwestycyjna, nierejestrowane przepływy kapitałowe, stabilizacja finansów zagranicznych*

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GDP Components as Sources of Economic Growth in V4 Countries

Abstract. *The standard of living of people determines the most important macroeconomic performance of the economy, such as the total value of produced goods and services, meaning the real GDP, GDP growth, employment level and respectively the unemployment rate, inflation rate, and the openness of the economy and balance of external economic relations. Despite its imperfections, through the assessment of economic developments and economic performance measurements, it is used in practice in the gross domestic product (GDP). GDP growth, as economic growth, in the short term is determined by the various segments of aggregate demand. The aim of this scientific paper is to analyse and quantify the contribution of an increase in individual AD components to economic growth in V4 countries and to compare these findings with each other. The paper is dedicated to an empirical site of economic growth, the subjects of the analysis are the economies of the V4 countries.*

Keywords: *gross domestic product, economic growth, components of aggregate demand*

Introduction

Development of economies in recent years constantly encourages the scientific and political controversy in which resonates the role and position of the state in the economy, a high level of indebtedness of several countries, the European

migrant crisis, sustainable development, and promoting economic growth, which contributes to the growth of the standard of living. Excessive rates of disparities between regions within countries, as well as, the EU Member States, and accumulation of a number of, especially, long-term problems are now exacerbating and creating a tense atmosphere in society as a whole. Despite growing economies and decreasing unemployment, the population of the Visegrad Group is increasingly unsatisfied with the lower standard of living, in which the region lags behind not only richer and more powerful economies (eg. Germany or France) but also lags behind economically comparable countries, such as Slovenia. However, there are considerable differences between countries within the Visegrad Group itself. A comparison of the economic level of these countries showed that in 2015 the Czech Republic reached 84%, Slovakia 76%, Poland 69%, and Hungary only 68% of the EU average GDP per capita in purchasing power. The similar position of these countries reflects the development of the standard of living in these countries, the highest being in the Czech Republic and the lowest in Hungary [Eurostat 2016].

The Visegrad Group (V4) is a grouping of four Central European countries: the Slovak Republic, the Czech Republic, Hungary, and Poland (with a combined total population of over 64 million people). This is an informal regional structure of four EU Member States and NATO which subscribe to the same values and have a common history, culture, and geographical position. V4 is a dynamic regional grouping of EU Member States, which creates space for strengthening coordination and consultation mechanism with a goal to find common positions and opinions on topical issues of foreign and European policy, regional development, and economic and cultural cooperation [Ministry of Foreign and European Affairs of the Slovak Republic 2016]. In 2015, the economic level of this region, with an area of more than 533,000 km^2, was 13,000 EUR per capita, while the average living standards of the EU 28 was 26,500 EUR per capita.

The living standard of people is determined by the most important macroeconomic indicators of the functioning of the economy, such as the total value of produced goods and services, which means GDP, GDP growth, employment level and respectively unemployment, inflation and openness of the economy, and the balance of external economic relations. Macroeconomic performance is affected by internal determinants (development of the workforce and their quality, the investment activity of entrepreneurs, the level of private and public consumption, technological change and innovation, monetary policy, etc.), external factors (foreign trade, natural disasters, war, monetary problems, etc.), and the nature of government intervention in the economy (fiscal policy, social policy, political stability, law enforcement, etc.). All macroeconomic determinants of economic development are transformed into the internal mechanism of the economy. Although there are different views among economists, in economic theory it is accepted that

a relatively simple model interprets how the economy works and how it achieves macroeconomic equilibrium and respectively, an imbalance. In this theoretical explanation is a model of aggregate demand and aggregate supply and, as a result of their activities, a model of macroeconomic equilibrium [Lisy et al. 2013: 70].

In the short term, it is for development of the macroeconomic balance and economic growth determining, primarily, the demand side of the economy. The development of the components of aggregate demand (household spending and government institutions on final consumption, gross capital formation, and net exports and imports of goods and services) is influenced by many different factors that alter its structure and determine the GDP growth. Some components of aggregate demand (eg. consumption expenditure by households) can be considered relatively stable; others (eg. the stock or investment in fixed capital) are more variable. Foreign trade is also affected by internal factors of the global evolution and demand in the countries of foreign business partners [Spěváček et al. 2012: 217-218].

The aim of this scientific paper is to analyse and quantify the contribution of an increase of individual AD components to economic growth in the V4 countries and to compare these findings with each other. In the paper, we dedicate the empirical side of economic growth, and the subjects of our analysis are the economies of the V4 countries. We examine the growth of these countries in respect to aggregate demand, while we analyse the proportion of the components of aggregate demand to GDP. Within the analytical part we use the methodological approach of Lisy et al. [2011: 177-178] and data was taken from secondary sources of Eurostat and the OECD.

1. Practical aspects of economic growth in V4 countries

Performance measurement is important for both economic theory and economic policy. "The performance of the economy and economic growth of a country is determined by the effective action and interoperability of four sectors, it means households, firms, state and abroad, which constitute a coherent, interacting and interdependent system of relationships" [Lisy et al. 2011: 16].

Despite some critics of GDP, most countries use the macroeconomic aggregate gross domestic product when measuring performance. One of the advantages of this indicator is precisely the fact that it is used almost all over the world, and thus, it simplifies international comparisons. Another advantage is that statistical data is used in the calculation of GDP that is available in the country and there is no need to obtain data from abroad. GDP is the most comprehensive measure of the overall level of the production of goods and services in the economy and, at

the same, is a measure of how many jobs the economy is able to generate [Lisy et al. 2013: 11-12].

As Mankiw [2015: 496-497] mentioned, GDP becomes an appropriate and supplementary indicator that reflects the quality of the standard of living of the population in the economy. For this reason, economic growth is one of the most important (if not the most important) macroeconomic objectives of each country.

Economists have dealt with economic growth for a long time ago (Smith 1776; Malthus 1799; Ricardo 1817; Mill 1848). However, the history of the modern theory of economic growth is not very old As Uramová et al. [2010: 214-215] reported, the first modern theory of economic growth appeared only in the early 20th century, when individual schools were searching for causes of its slowdown and new sources or opportunities for economic growth in the future (Keynesian, neo-Keynesian, and the neoclassical theory of economic growth). The late 20th century began to form new theories of economic growth, which underline the need to ensure long-term and balanced economic growth based on new factors (eg. the use of human potential, innovation, and technology). This is called the endogenous growth theory. Currently, several authors work on the issues of the quality of economic growth and its resources (Barro & Sala-i-Martin 2004; Varadzin et al. 2004; Helpman 2005; Lisý et al. 2011; Drobiszová & Machová 2014, and others).

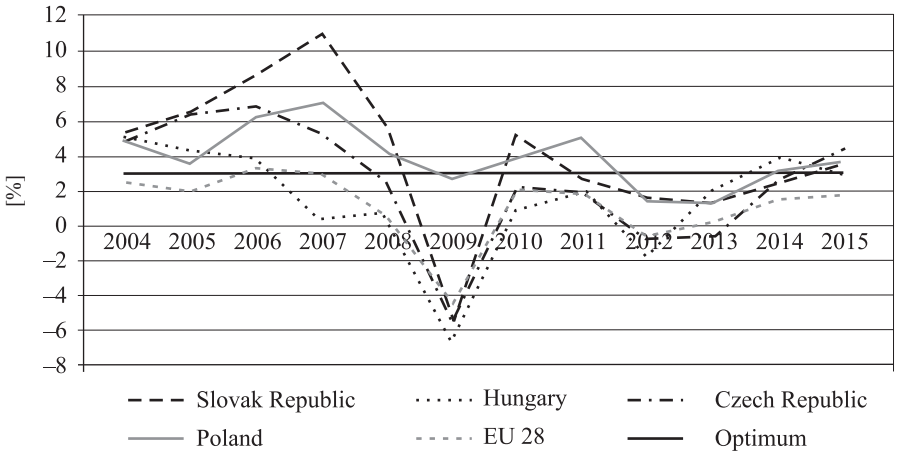
A generally accepted macroeconomic indicator, which collectively represents the performance of the economy as a whole, is the real GDP growth. From its development, it is possible to draw a number of consequences for economic practices. Since V4 countries can be considered as more or less open economies, it is clear that their economic growth depends largely on external relations, and that influence requires a certain rationality and stability of economic policy.

Figure 1 shows the development of the real GDP growth rate in V4 countries and the development of the average real GDP growth rate in the European Union (28) in the period between the years 2004 to 2015.

For better illustration, Figure 1 indicates the perfect respective optimal annual growth rate of real output, which is in accordance to the OECD at 3%. As Kliková and Kotlán [2012: 96-97] reported, this value is obtained on the basis of a detailed macroeconomic analysis and empirical research, and it is an average for developed OECD economies and the differences between countries are not reflected.

Before joining the European Union in 2004, a more or less homogeneous economic strategy was applied to the Visegrad countries. After EU accession, under the influence of internal and external changes, their economic direction developed in various ways. In particular, the development of the Hungarian economy was significantly different from the other countries in the region; it caused a slower economic growth in Hungary even before the economic crisis.

Figure 1. The GDP growth rate development in V4 and EU 28
(percentage change on previous year)



Source: own work using Eurostat as a reference.

From the perspective of growth and convergence based on both internal factors (investment, consumption) and external factors (capital flows, trade) it is evident that the member states which have coped better with the crisis are those which had produced high but not "overheated" economic growth, coupled with an appropriate level of internal and external financial stability, a low budget deficit, and a relatively healthy development of public finances. Of the V4 countries, this was the case for the economy in Poland, which is also characterized by less private indebtedness. For this reason, Poland is the only country from the V4 group that did not swing into negative numbers and, in 2009, registered the highest GDP growth of any country in Europe. Nevertheless, even in the case of Poland, we could not talk about „an economic miracle", because the decline in growth was about 5 percentage points, which is comparable to the decline in the GDP growth in Spain, Portugal, France, and Hungary. Although Poland is still unable to reach the level of potential output (set at 4 to 4.5% of GDP growth), we can state that Poland is characterized by the greatest stability of economic growth and the best economic condition (except in relation to the Czech Republic) among all of the V4 countries. There are several reasons: a floating exchange rate (depreciation of the Polish currency created external demand for cheaper goods and services, which increased exports and finally GDP), an underdeveloped banking sector that caused Polish banks to not invest in financial innovations and avoid taking "toxic assets" into their portfolios, a less open Polish economy (during the years 2011 to 2015 an average of 94% of GDP) when compared with the other V4 countries (eg. average openness of the Slovak Republic was 180% during the same period), and thus

less dependence on foreign trade, an extensive domestic market, consolidation of public finances, and a tighter lending policy (www.visegradgroup.eu).

Of the V4 countries, Hungary was the most affected by the crisis, and faced a 20-25% fall in export demand and, at the same time, had the largest decline in domestic demand. For this reason, the economic recovery after the crisis was moreslow when compared with other countries of the Visegrad Group.

After joining the EU, the Slovak economy was characterised by an economic boom and in 2007, the real GDP growth reached up to 10.8%, by far exceeding the growth of the V4 countries, but also exceeding the EU average over that period. Slovakia, as an extremely open economy, has not escaped the sharp decline in exports at the turn of 2008 and 2009. Exports fell by 16.5% and that pulled Slovakia into a deepening recession. The benefits of the "lucky timing" of Slovakia's entry into the European Monetary Union and adopting the euro in 2009 was felt in the stronger economic recovery of the Slovak economy in 2010 when compared to all the other V4 countries. Another reason was the financial incentives to overcome the consequences of the crisis in Slovakia.

The Czech Republic is characterized, like Slovakia, by a high level of openness. Therefore, even in the Czech Republic, just a drop in exports caused the recession in the economy in 2009. Compared to the Slovak economy, which in the pre-crisis period „overheated", the decrease of the real GDP growth in the Czech Republic was not significant. On the other hand, thanks to the exports, the Czech economy returned to economic growth relatively quickly and successfully.

The data in Figure 1 shows that GDP growth in the V4 countries oscillated around the indicated optimum of OECD last year, which shows that these economies contribute to the stabilization of EU economic development.

2. Empirical analysis of the components of aggregate demand

Aggregate demand (AD) represents the total amount of output that economic subjects (households, businesses, government and abroad) are able to buy in a given time period at a certain price level. It includes the total expenditure of individual economic entities for the purchase of final goods and services and, therefore, represents real GDP. The structure of aggregate demand (and respectively, GDP) can be generally expressed by the following formula:

$$AD = C + I + G + NX,$$

where C (consumption) represents spending by households to purchase consumer goods and services, I (investments) is corporate expenditure on investments, G (government) is government spending on goods and services, and NX (net

exports) is the expenditure of foreign entities as the difference between exports and imports of goods and services [Uramová et. al. 2010: 53]. Aggregate demand depends primarily on the price level, the level of incomes, as well as, the instruments of state economic policy (fiscal, wage, social, etc.). According to Mankiw [2013: 71], the aggregate demand curve in a graphical representation of the AD-AS model is such a combination of the price level and real output (aggregate expenditure), by which is the goods and services market and money market are simultaneously in equilibrium. Based on that, we can conclude that the growth of economic subjects' spending leads to GDP growth and other positive effects on the national economy that affect real macroeconomic indicators such as the employment rate, for example.

Lisy et al. [2011: 177] dealt with the question of a proportion of individual components of aggregate demand to GDP growth over the reporting period. To answer the question, he used the formula:

$$AD\ (GDP_t) = Y_t = C_t + I_t + G_t + NX_t, \text{ resp. } GDP_{t-1} = Y_{t-1} = C_{t-1} + I_{t-1} + \\ + G_{t-1} + NX_{t-1}$$

After editing the equation of the GDP growth rate calculation, we get:

$$\frac{\Delta Y}{Y} = \frac{\Delta C}{C} \times \frac{C}{Y} + \frac{\Delta I}{I} \times \frac{I}{Y} + \frac{\Delta G}{G} \times \frac{G}{Y} + \frac{\Delta NX}{NX} \times \frac{NX}{Y}$$

We mark growth rates of the individual AD components as g_y, g_c, g_i, g_g, g_{nx} and we write:

$$g_y = \frac{C}{Y} \times g_c + \frac{I}{Y} \times g_i + \frac{G}{Y} \times g_g + \frac{NX}{Y} \times g_{nx}$$

From the equation it is clear that the growth rate of the product is a combination of the growth rates of individual components of the aggregate demand, while of these rates are the proportions of the individual components of GDP [Lisý et al. 2011: 177].

In Table 1 we present the average proportion of the components of aggregate demand to the GDP in the V4 countries during the period 2004-2015, meaning after the EU accession up until the present.

Based on the analysis of secondary data, we can conclude that the structure of GDP changed in the monitored countries and, in the period between 2004 to 2015, it changed only slightly. In the long term, the most stable and the largest component of GDP is private consumption (C), which ranges in the V4 countries from 48% in the Czech Republic, to 61% in Poland.

The household consumption registered a generally increasing trend over time. In the period of crisis, however, these expenses grew at a slower rate. Several sci-

Table 1. The percentage proportion of individual components of aggregate demand to GDP in V4 countries (average for the period between 2004-2015)

Country	Components of GDP			
	C	I	G	NX
Slovak Republic	57.05	23.84	18.45	0.66
Czech Republic	48.44	27.14	19.83	5.12
Poland	61.41	20.13	18.38	0.15
Hungary	52.86	22.64	21.11	4.00

Source: own work based on the Eurostat.

entific studies show that after 2009, there was an increased preference of Slovak households for generating savings. Pauhofová and Martinák [2014: 14-15] state that the reasons leading to the lower consumption of Slovaks in the post-crisis period are mainly associated with the deterioration of the situation on the labour market, increasing uncertainty about future income and potentially increasing the risk of poverty. With some simplification these claims are also valid for other countries of the Visegrad Group.

The second largest component of GDP are the gross corporate investments (I), which are less stable when compared to private household expenditure. Investments are components of AD, which have the capacity to generate not only short-term effects on the national economy and affect real variables such as GDP and employment, but also have theability to enlarge production capacity and thereby contribute to increasing the economy's potential in terms of endogenous capacity. This fact is not always reflected in economic practice.

Similarly to private consumption, investment activity of businesses was also affected and slowed by the economic crisis. In Slovakia, the largest decline was recorded in 2009 just when the economy showed effects of the crisis and business investment fell by almost 3 billion EUR, which also led to a slowdown in GDP growth. In the reporting period between 2004-2015, gross corporate investment ranged from 20% of GDP in Poland to 27% of GDP in the Czech Republic. It is thus clear that while in Poland a larger share of GDP is constituted by high household consumption (private consumption when compared with the Czech Republic), in the Czech Republic a relatively larger share of GDP is made up of corporate investments (as opposed to gross investments as it is in Poland).

The level of government spending as part of AD depends on the degree of state involvement in the society. In the V4 countries the contribution to GDP remained stable during the period, on ranging from an average of 18% in Poland and Slovakia to 21% in Hungary.

We dealt with the issue of government spending, its development, and its structure in the years 1997-2011 in Mazúrová and Kollar [2015; 2016]. Based on

available OECD database, we have divided government expenditure by the function classification COFOG ("Classification of the Functions of Government") on productive and unproductive expenditure according to their relation to economic growth. We found out that during the reporting period a substantial portion of government spending in Slovakia concentrated into productive areas of the national economy, which affects economic growth positively.

The net exports during the period are the least stable component of AD. Based on the processing of secondary data, we found out that in the Czech Republic and Hungary the share of exports in GDP was around 4-5%, while in Slovakia and in Poland it was only 0-1% of GDP. Poland is compared to the less open economy of the Slovak Republic. Nevertheless, the contribution of net exports to GDP in Slovakia is low. This is explained by the fact that net exports, in terms of the methodology, are quantified as the difference between the values of exports and imports. Therefore, the lower the dependence of export proceeds from imports is, the higher the share of exports in GDP is. Our considerations are confirmed by several studies dealing with international trade in an open economy and empirically approaching development. As an example we mention a study of the National Bank of Slovakia, according to which „it could be stated that in relation to the nature of international trade of Slovakia in regard to export commodities there is a high intensity of exports to imports, which results in a significantly lower share of exports to the actual GDP between 2005 and 2012."[1]

As mentioned above, the great openness of the Slovak and Czech economy caused the collapse of these economies in 2009. Small open economies such as Slovakia and the Czech Republic are heavily influenced by the economic development of foreign partners. It also provides a positive "locomotive effect" in a boom period, but also, a negative impact of the recession induced a decline in these economies (eg. decline in the crisis period during 2009). The benefits and potential risks of increasingly opening an economy is discussed by Slaný and Žák [1999], Jurečka et al. [2013]. Inter alia, they note that on the one hand, the fall in foreign trade may contribute to a recession in the domestic economy, however, on the other hand, its growth may lead to the stabilization of the national economy without government interventions to support the economy, which unreasonably burden the state budget.

Further, in accordance to the paper's intention, we quantify the increase in the proportion of the AD components to the economic growth of the V4 countries in the reporting period, relying on the before-mentioned mathematical equation (according to [Lisý 2011: 177]). We present the results of mathematical calculations for individual V4 countries and their comparison in the following tables. It should be noted that while in the Eurostat statistics there are indicator of real GDP growth

[1] National Bank of Slovakia, www.nbs.sk [access: 15.08.2016].

used (see Figure 1), in our analysis, we use a base of nominal values, and therefore in determining the proportion of the AD components to GDP growth we do not rely on effects of inflation.

Table 2. Contribution of annual consumption (C) growth rate to the economic growth of the V4 countries (in %)

V4 – C	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Slovak Republic	6.41	7.46	12.20	9.32	1.93	0.82	1.82	1.68	0.30	1.22	1.23
Czech Republic	5.08	5.05	4.38	9.52	–2.80	3.03	2.25	–0.78	–0.84	–1.90	1.73
Poland	9.55	5.48	6.59	9.73	–9.87	7.94	2.88	1.50	0.17	1.54	1.01
Hungary	4.07	–0.91	6.33	2.21	–7.90	1.33	1.58	0.19	–0.10	–0.54	1.29

Source: own work based on the Eurostat.

Table 2 compares the contribution of household consumption to the economic growth of the V4 countries. Based on the results of the calculations we can conclude that in the period before the crisis, the GDP growth is mainly due to the growth of consumption expenditure by households in Poland, the Czech Republic, and Slovakia. In Hungary, the growth rate of consumption in 2008 was only 2.21%. In 2009, a significant decline in private consumption caused a slowdown primarily in Poland but also in other countries of the region. This component of aggregate demand only had a positive effect on GDP growth in Slovakia during 2009. The highest proportion of consumption on GDP growth was recorded after the crisis in Poland in 2010. In subsequent years the rate of household consumption grew in the V4 countries quite well. The exception was the slowdown in economic growth due to private consumption in the years 2012-2014 in the Czech Republic and Hungary. In 2015, the contribution of consumption to economic growth was almost the same in all of the V4 countries, but comparably lower than what it was a year before the economic crisis.

Table 3 presents the contribution of gross investment of enterprises to GDP growth in the V4 countries during the study period.

Table 3. Contribution of annual gross corporate investments (I) growth rate to the economic growth of the V4 countries (in %)

V4 – I	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Slovak Republic	5.33	3.64	4.74	2.72	–4.61	1.57	2.89	–2.13	–0.15	0.63	2.82
Czech Republic	3.62	2.92	4.42	3.68	–4.37	1.24	0.80	–1.02	–1.44	–0.49	2.11
Poland	3.49	3.08	4.69	3.66	–4.95	1.91	1.38	–0.41	–0.71	1.67	1.17
Hungary	1.71	–0.11	2.48	0.90	–3.88	–1.42	–0.07	–0.76	1.55	1.76	0.57

Source: own work based on the Eurostat.

As shown in Table 3, it is clear that corporate investments when compared to household consumption are a less stable component of aggregate demand. In the pre-crisis period, the growth rate of private investments was comparable in the countries of the Visegrad Group region. The exception was Hungary, where the proportion of this component of aggregate demand was lower (in 2006, investments contribute negatively to the GDP). During the economic recession of the V4 countries in 2009, there was also a decline of gross corporate investments (most notably in Poland). In 2010 and 2011, due to the impact of fiscal incentives, the growth rate of investments in these countries increased (however, much less in Hungary). In 2012, investment expenditure started to decline again and the economic growth rate decreased (most significant in Slovakia). In 2013, the investment growth rate was positive only in Hungary and continued to grow. In other countries, investments started to contribute to economic growth from the year 2014, and in the Czech Republic from the year 2015.

In Table 4 we present the contribution of government spending to economic growth in the V4 countries during the study period.

Table 4. Contribution of annual government spending (G) growth rate to the economic growth of the V4 countries (in %)

V4 – G	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Slovak Republic	1.70	2.98	1.94	2.97	1.91	1.57	0.05	–0.13	0.57	1.11	0.78
Czech Republic	2.22	1.86	1.20	2.69	0.01	0.84	0.12	–0.68	–0.17	–0.50	0.88
Poland	3.00	2.08	1.21	3.68	–2.69	2.70	–0.13	0.29	0.52	0.84	0.45
Hungary	1.85	0.12	0.99	1.73	–2.46	0.49	–0.32	–1.04	0.08	1.04	0.55

Source: own work based on the Eurostat.

Government spending is another component of aggregate demand, which contributed positively to economic growth in the pre-crisis period. It should be noted that in the paper we do not evaluate secondary effects of the growth of government spending on the economy debt, which is not a negligible fact. The highest growth rates recorded in government spending during this period were in Poland, and the lowest, in Hungary. In 2009, the growth rate of government spending in Slovakia slowed only slightly and was more pronounced in the Czech Republic. In Poland and Hungary, the growth rate of government spending influenced negatively on economic growth. In 2010, the support of the V4 economies by governments increased and was reflected in an increasing trend of this AD component to overall growth, especially in Poland and Hungary, less so in the Czech Republic. In Slovakia, the rate of growth in government spending slowed. In the following period, when the consequences of the debt crisis in the Eurozone began to manifest, the growth rate of government expenditure in the V4 countries

oscillated around a value of 0 or declined. In 2015, the growth rate of government expenditure was registered from 0.45% in Poland to 0.88% in the Czech Republic, which means that the proportion of government spending on economic growth was lower in comparison with other components of aggregate demand.

Table 5. Contribution of annual net exports (NX) growth rate to the economic growth of the V4 countries (in %)

V4 – NX	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Slovak Republic	–1.93	–0.48	2.51	–0.20	–2.40	2.50	–0.42	3.31	1.20	–0.68	–1.62
Czech Republic	1.44	5.03	–2.19	–0.05	–1.34	0.20	1.24	0.69	0.13	1.47	4.23
Poland	0.29	–0.18	0.33	–3.31	1.94	0.45	0.72	0.95	1.37	–0.08	1.31
Hungary	0.14	0.14	0.30	0.64	–0.54	4.21	1.31	–0.14	0.75	0.58	1.74

Source: own work based on the Eurostat.

In Table 5 we present the contribution of net exports to economic growth in the countries of the Visegrad Group during the period between the years 2005 to 2015.

From Table 5 it is clear that the net export is the least stable component of aggregate demand. For comparison, Poland and Hungary are less open economies, where the contribution of net exports to economic growth is higher in comparison with Slovakia, which is characterized by the highest degree of openness among the V4 countries. This comparison clearly shows that high economic openness does not always predetermine high growth in net exports, which would contribute to a higher economic boom. For this reason, net exports cause, in some years of the reporting period, a deceleration of GDP growth, mainly in Slovakia. This fact was reflected in 2009 when the impact of the crisis was a fall in foreign trade in the V4 countries –a negative growth rate of this component reached Slovakia, the Czech Republic, and Hungary. In contrast, this year Poland had a growth rate of net exports of almost 2%. In the period after the economic crisis the proportion of net exports to economic growth in the V4 countries were different, while in some economies reflected higher economic growth (eg. in Slovakia during 2010, 2012, and 2013). In 2015, the largest proportion of net exports to economic growth was in the Czech Republic (up to 4.23%), while in Slovakia, they caused a decrease in the economic growth rate of about –1.62%.

Conclusion

Economic growth is one of the traditional objectives of economic policy because its development determines other economic indicators that affect the standard of living of the population in the country. In this scientific paper, we have tried

to contribute to the clarification of economic growth in the V4 countries through the development of individual components of aggregate demand. Our aim was to analyse and quantify the contribution of the increase of individual AD components to economic growth in the V4 countries and to compare these findings with each other.

After the analysis, we have reached some conclusions. We confirmed that the most stable component of GDP in the V4 countries are private consumption expenditures by households, even though in recent years there has been a change in consumer behaviour, resulting in a slowdown of this aggregate. We believe that the household sector is adapting to the conditions of unstable economic development in recent years; this is natural and rational. For a more serious problem we consider the fluctuating private corporate investments in the surveyed countries. We believe that the subjects of economic policy should focus on identifying and eliminating barriers that limit investment activity of enterprises. It is necessary to choose a long-term pro-growth strategy that would allow businesses to develop in modern conditions. We consider that in the V4 countries, existing reserves of SMEs are in the background of political preferences, in spite of its positive effects not only on the labour market.

Government spending, which contributes to economic growth largely positively, is a sensitive topic especially in the context of fiscal consolidation. Within this paper, we were dealing with this issue particularly from the perspective of aggregated data, but we have included links to published papers, in which we were dealing with the analysis of government expenditure in relation to economic growth and, in terms of social policy and debt, in more detail. We believe that it is still necessary to evaluate the structure of government spending in order to more efficiently allocate public resources not only in Slovakia, but in all countries of the Visegrad Group.

In view of the nature of the economy of Slovakia and the Czech Republic, net export is an important component of their GDP. On the other hand, their „dependence" on foreign trade especially in times of crisis is reflected in the economic growth extremely negatively. The development of net export is influenced by the development of the economy of foreign partners and, as a component of AD, is significantly unstable. Nevertheless, we consider external demand as a significant source of economic growth, as was confirmed in the much less open economy of Poland. It is, therefore, important to promote the competitiveness of the Visegrad Group countries in international trade, not only in the European region, but also on a global scale.

In view of the identified similarities, but also differences in the V4 countries, we believe that future research should be directed at the areas that are subject to a detailed assessment of both the internal and external factors that influence the development of individual components of GDP and thus, the standard of living in

these countries. The proximity and similarity of the V4 countries, common history, and standards of the good neighbourhood should be the starting point for an even closer cooperation between these countries. Their „unity" against the bigger and stronger economies is a prerequisite for the further development of the region.

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Czynniki PKB jako źródła wzrostu gospodarczego w krajach V4

Streszczenie. *Standard życia ludzi w gospodarce określają najważniejsze wskaźniki makroekonomiczne, tj. całkowita wartość wytworzonych dóbr i usług, tempo wzrostu gospodarczego, poziom zatrudnienia, stopa bezrobocia, inflacja, otwartość gospodarki oraz równowaga zewnętrznych stosunków gospodarczych. Mimo swoich niedoskonałości, PKB jest podstawowym miernikiem oceny sytuacji gospodarczej i efektywności ekonomicznej. Wzrost PKB w krótkim okresie zależy od różnych czynników zagregowanego popytu. Celem artykułu jest analiza zmian udziału poszczególnych składników wzrostu gospodarczego w PKB dla krajów V4.*

Słowa kluczowe: *PKB, wzrost gospodarczy, składników zagregowanego popytu*

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Fisher Effect as an Example of Methodological Essentialism in Light of the Development of Economic Thought

Abstract. *Simplifying assumptions create the basis for theoretical framework and Irving Fisher's theory on changes in nominal interest rates in an inflationary environment also follows suit. These simplifications should be described by their authors within the scope of a given theory. However, Fisher sidestepped this issue in his research work. Thus, the aim of this article was to detect the simplifying assumptions of the Fisher effect as well as to indicate the extent of their impact on the theory described. Furthermore, the twentieth century's development of economic thought and changes in global economy established the basis for evaluating the adequacy of the aforementioned simplifications. Hence, this analysis supports the view of the necessity to view the Fisher effect as a historical generalization.*

Keywords: *Fisher effect, methodological essentialism*

Introduction

Irving Fisher in his monograph *Appreciation and Interest* proposed, for the first time, a hypothesis about the relationship between expected inflation in the economy and nominal interest rates [Fisher 1896]. According to this theory the interest rates in the economy change as change the expected inflation rates. It is the so-called point-for-point effect, also known as the Fisher effect, which can be demonstrated by a simplified equation:

$$In = Ir + F \tag{1}$$

where:

In – nominal interest rate,

Ir – real interest rate,

F – expected inflation rate in the economy.

Fisher maintained his view in subsequent works: *The Rate of Interest* [Fisher 1907] and *The Theory of Interest* [Fisher 1930]. The conclusion from Fisher's theory is that there is a constant real inflation rate occurring in the economy. The changes in nominal interest rates are supposed to be only the effect of changes in the expected inflation rate.

Since then there have been multiple attempts to falsify the Fisher effect. They have given divergent effects. Some empirical studies proved the hypothesis true [e.g. Gibson 1970; Carneiro, Divino & Rocha 2002], some others, however, negated the existence of that phenomenon [e.g. Rose 1988; Pelaez 1995; Miyagawa & Morita 2003]. Eventually there appeared research works that indicated the temporary occurrence of the Fisher effect in the economy [e.g. Yohe & Karnosky 1969; Mishkin 1992; Jareño & Tolentino 2013].

Up to now researchers dealing with this subject matter have literally interpreted Fisher's ideas trying to find the exact reflection of the Fisher effect in economic reality. The author of this paper looks at the Fisher effect as an example of a theory based on methodological essentialism. In this kind of theory the researched phenomenon is demonstrated in an idealizational form with the assumption that there is only one main causal factor.

Methodological essentialism does not negate other factors affecting the researched phenomenon. It accepts their gradation and tries to reveal the most significant ones ignoring the ones that are less essential or simply random [Nowak & Nowak 2000]. In pursuit of finding the "essence" of the problem on the basis of methodological essentialism, a scientific proposition may take the form that abstracts away from economic reality. As a result the study falsifying "the essentialism hypothesis" in pursuit of finding the reflection of reality in a proposition abstracting away from it may come ineffective. The subject literature has already indicated that Fisher's elaborations resulting in the equation, which was later called the Fisher effect, were based on certain idealizational assumptions. This issue, however, was treated in a non-exhaustive, or even, random manner [e.g. Cooray 2003].

This paper demonstrates methodological grounds for the Fisher effect treated as an essentialism proposition. The author performed a synthetic analysis of specific simplifying assumptions of the Fisher effect, at the same time relating to their adequacy in the contemporary world. In the final part of the paper the author pointed to methodological errors connected with the application of the falsification method that, like the Fisher effect, is based on idealistic assumptions.

1. Significance and aim of the simplifying assumptions the Fisher effect

Economizing at macroeconomic level is a complex process that involves billions of entities performing billions of economic operations every day. Hence we are doomed to simplifications while data collecting as well as while presenting the research results. The acquisition of knowledge about the mechanisms governing economic processes and the most significant relationships involves abstracting away from less essential issues.

By formulating a specific theoretical model we create a hypothetical construct of the mind which is a simplified image encompassing its most essential features. According to the views of the Poznań school of methodological essentialism "Scientific theories are not created so that they could become the exact images of reality, they are created so that they, being specific idealized deformations of phenomena, could disclose the essence of particular areas of reality" [Brzeziński, Klawiter & Łastowski 2009: 29]. Hence idealization resulting in the distortion of the examined phenomenon is justified or even desired [Lutz 2009].

The first thing one should do in the essentialism approach to a scientific theory is to formulate a simple proposition. In case of the Fisher effect it is the observation that "the nominal interest rates change as the expected inflation rates change". Without, for the time being, analyzing by means of research methods the scale of the relationship of these changes, at the next idealization stage one introduces a number of simplifying assumptions that boil down to the elimination of factors distorting the examined relationship. The factors should be recognized as:

– less essential,
– something whose impact on the examined phenomenon is hard to evaluate,
– insufficient now, but likely to occur in subsequent empirical studies (e.g. falsification of the theory being created),
– being in existence now, but likely not to occur in the future (e.g. in an economy under a different tax regime).

In the aftermath of subsequent introduction stages of idealizational assumptions the theory is elevated to higher levels of abstraction. On the one hand, it detaches the simple proposition from the realities of economic life, but on the other hand, it leaves the very "essence" of the research problem. After all the idealizational assumptions have reached the highest level of abstraction, the research problem takes the form of an "idealizational proposition". The Fisher effect can be seen just as an idealizational proposition that states that "the nominal interest rate increases exactly by the expected inflation rate". This, in turn, can be transposed into the following, "the cost of money in an inflationary environment rises by the expected price growth rate in the economy." Despite the fact that this approach

may seem trivial [Sobków 2015], it is possible according to Fisher's approach [Fisher 1896; 1907]. It is hard to prove it unequivocally because Fisher while presenting his view did not demonstrate the simplifying assumptions in detail. One may find a few reasons for him sidestepping this issue:

– fact that the theory does not have any simplifying assumptions,

– assumption that the relationship concerns the then American economy, hence the theory is a historic generalization incongruent with the conditions of some other economy operating, e.g. under a different legal or tax regime,

– recognition by Fisher of his theory being incomplete and leaving further analysis of the simplifying assumptions to other researchers.

Fisher, sometimes called „the greatest economist that the United States has ever produced" [Schumpeter 1951: 223] notes in his book *The Theory of Interest* that there are discrepancies between empirical observations of relationships and the formula that he himself indicated. He also contends that the congruity of his effect with the empirical observations may be provided for solely on the basis of concrete idealizational assumptions [Fisher 1930: 132]. Even if he was not aware of all the limitations of his effect it does not change the fact that such limitations may exist. The fact that a given researcher does not indicate such limitations does not excuse other researchers from indicating those limitations.

2. Idealizational assumption of the Fisher effect

The analysis of Fisher's publications on the relationship between the real and nominal interest rates in an inflationary environment [Fisher 1896; 1907; 1928; 1930] allows us to indicate five main simplifying assumptions. They are related to the following:

– the functioning of the law of supply and demand,

– investors' rationality,

– efficiency of the capital market,

– no other inflation premiums apart from the inflation rate,

– no income tax both on corporate income and individuals' income from interest.

2.1. The functioning of the law of supply and demand on the financial market

The law of supply and demand is one of the most basic economic principles. It explains the interaction between the supply of a resource and the demand for that resource and the price of a commodity. The law asserts that excess demand over

supply brings about an increase in price, and excess supply over demand causes price to drop.

If we assume that Fisher's hypothesis is true and that in the economy, regardless of the scale of inflation changes, the real interest rate is stable, and if the relationship between the inflation rate and the interest rate did not correspond to the point-for-point relationship, then under such circumstances there would be disequilibrium in the money market. In an noninflationary environment trading parties acknowledge a creditor's remuneration level at a level determined by the real interest rate. According to Fisher this level being stable would apply in an inflationary environment. Inflation would not change anything in terms of the creditor's real remuneration level, and the creditor would benefit from a loan in the same way as in an noninflationary environment. Many economists still hold this view today. The Polish literature is not an exception [e.g. Bajuc, Belka et al. 1996: 46]. This view is justified because if the interest rate did not keep pace with the expected inflation rate there would be a transfer of additional financial benefits from lenders to borrowers. After the loan granting period the lender could have in real terms a lower value of resources than before granting a loan. This situation, if it was to persist over a certain period of time, and at the same time if it was to be predicted (all in all the Fisher effect is based on an ex ante inflation rate), it would cause the borrowers to take more interest in this form of financing their activity. The investors could expect that apart from the benefits related to the efficiency of their businesses they would also gain some additional benefit from the depreciation of their loans. The more they would borrow, the more benefits they would have, which would increase demand for money, and as a result these values could be balanced only if there was a higher price level. According to Fisher the equilibrium would occur only if the postulated point-for-point condition was met. At the same time a certain loss expected by the lenders, or at least a lower economic efficiency of the loans would discourage them from this form of economizing their resources. It would have an impact on a drop in money supply on the market and it would be another factor disrupting the equilibrium.

The view that in an inflationary environment there might be a transfer of additional benefits between the lender and the borrower is well-founded in the economic literature. The conditions under which such transfers of additional benefits could occur were yet narrowed to the situation in which there are discrepancies between the expected and real inflation rates [e.g. Alchian & Kessel 1959]. Fisher held this view and related to it many times in his book *The Money Illusion* [Fisher 1928]. The aforementioned situation involved, however, the conditions under which the real inflation rate would correspond to the expected rate. Even then, and with the Fisher effect not taking place, there would be a transfer of additional benefits between the parties involved. Moreover, while in the second case the transfer of benefits was supposed to result from unpredictable events (the difference be-

tween the expected inflation rate and the real one is unpredictable by nature), in the second case the transfer of benefits could be predicted.

It is easy to find many economies where the law of supply and demand does not apply at all or, at least, is degenerated and the Fisher effect does not have to apply (e.g. in a socialist economy or in countries where there is a substantial amount of state intervention, especially with the central bank actively functioning). From a scientific point of view in such economies it is pointless to study the Fisher effect unless the research aim is to analyze the scale of no law of demand on the monetary market, and with the Fisher effect being a research measurement tool. The more skewed the expected hypotheses would be, the higher impact of state interventionism on the monetary market.

2.2. Investors' rationality

One of the paradigms of microeconomics is rational choice theory. Fisher, in his thinking about rationality in economy, compared rationality of economic laws to rationality in physics and astronomy [Fisher 1907: 107]. Nevertheless he expressed his doubts about real rather than methodological rationality on the monetary market [Fisher 1907: 278]. In his subsequent research works, the capstone of which is *The Money Illusion* [Fisher 1928], Fisher was more convinced to conclude that maintaining the congruity between his theory and empirical studies on the relationship of the nominal and real interest rates in an inflationary environment required a new conceptual apparatus, namely money illusion. Money illusion can be defined as irrational thinking about interest rates under the conditions of price growth. Summers, who elaborated more on that phenomenon, stated that there was no Fisher effect in the USA as early as 1940, and concluded that "money illusion infects financial markets" [Summers 1983: 232].

Rationality of choices made by other market actors cannot also be supported in light of empirical studies and development of economic thought (especially the development of behavior theory) that took place in the 20th century. The works by Kahneman and Tversky [1974] or by Simon [2013] indicated that people do not act rationally, and their decisions are even full of contradictions. Suffice it to say, in surveys the respondents could state that they preferred apples to oranges, oranges to pears, and pears to apples depending in what order they were asked the questions. Inadequate responses of the market are the reflection of their irrationality and psychosocial burdens resulting from the fact that the decisions are conditioned by habits and heuristics such as: making systemic errors in the way of thinking, paying too much attention to past experiences, or drawing conclusions on the basis of single facts or unrepresentative samples. To these factors can be added psychosocial burdens, so much close to the Polish reality originating from the experiences of the previous economic system. In contemporary science there

have even appeared studies indicating the possibility of explaining the variations of market return rates by means of weather factors (temperature, cloudiness) and defined in this way emotional factors (amount of natural light) [Balcerzak 2014].

In light of the above-mentioned research works Fisher's works and his speculations on the relationship of the nominal and real interest rates in an inflationary environment can be viewed as a foundation for still open discourse about investors' rationality of choices. Under these circumstances the Fisher effect may become another criterion for the irrationality of choice made by entities locating their resources. In the situation of the expected inflation rate at x% the deviation of the nominal interest rate against the real one in plus or in minus by more than x% could be a measure for the irrationality of choices of entities operating on the financial market. This issue needs to be further explored.

2.3. Efficiency of the capital market

The hypothesis of the efficiency of the capital market that presumes reliable valuation of assets through market mechanisms is today one of the fundamental and, at the same time, controversial assumptions. According to this concept each new piece of information that appears on the market is immediately incorporated and included in the price of assets, thanks to which they are reliably priced. This hypothesis is exactly in line with Fisher's propositions on which he based his theory of the relationship between the expected inflation rate and the nominal interest rate.

Present-day studies on the nature of capital markets indicate, nevertheless, non-linear character of economic systems. The information flowing into the market is not always incorporated immediately, on the contrary – at first it may be ignored and reveal its impact after getting beyond a certain point of information flow. With the non-linear character of economic system are linked features such as: the effect of long-term memory – a given process stores "memory" of past information without adequately responding to the inflow of new information. There may also appear a feedback effect – past information affects the future whereas new information affects the perception of past observations. It contradicts the thesis that there is a phenomenon of random walk on the financial market. The reality is that prices are subject to trends, store the memory of past observations and are self-correlated. The results of the research conducted by Lee and Tsong [2013] may confirm the aforementioned observations. On the basis of the studies of six OECD countries they demonstrated that the nominal interest rates and the inflation rates are correlated only in a long-term perspective. In the short term and with an earlier inflation rate the changes in the inflation rate do not have a point-for-point impact on the nominal interest rates. The Fisher effect can be observed only when for a certain period of time the inflation rates in the economy were already

high, and the investors after some time incorporate into their awareness and behavior new economic conditions.

2.4. No other inflation premium besides the inflation rate

Another assumption of the Fisher effect is a presumption that the investors in an inflationary environment will not expect any other inflation premiums. The difference between the real and the nominal value of interest rates in an inflationary environment, also called the break-even rate (BER) is limited in Fisher's works only to the inflation rate [Fisher 1896: 9].

Present-day scientists, looking at the issue of inflation premiums from the perspective of hyperinflation that hit many economies in the 20th century, to name Poland and Germany in the 1920s, or a double-digit inflation in the US in the 1970s and 1980s, do not have any doubts today that the elaborations on the inflation premium cannot be limited only to the inflation rate. Hoerdahl states that "break-even rates do not, in general, reflect expected inflation alone. They also include risk premia that compensate investors for inflation risk, as well as differential liquidity risk in the nominal and index-linked bond" [Hoerdahl 2008: 23]. But according to Bekaert and Wang the risk premium for operating in an inflationary environment is "the compensation demanded by investors, for not being perfectly indexed against inflation or, put differently, the insurance premium investors pay governments to shoulder the inflation risk" [Bekaert & Wang 2010: 758]. Given all the aforementioned circumstances, the relationship between the nominal and real interest rates in an inflationary environment should be expressed as follows [Bekaert & Wang, 2010: 779]:

$$In = Ir + F + r \tag{2}$$

where:

r – inflation risk premium,

F + r – break even rate.

In the final part of their speculations they state, "A well-known theory of interest rate determination due to Fisher [1930] holds that the inflation risk premium ought to be zero. If true, there is no expected benefit to the government of issuing inflation protected securities" [Bekaert & Wang 2010: 779]. But according to the view expressed in the title of the book *There's No Such Thing as a Free Lunch* by Milton Friedman, Noble prize winner in economics, there must exist an additional inflation premium.

Fisher in his equation sidesteps not only the issue of the inflation risk premium but also the inflation premium resulting from the scale of changes in expected

inflation. As it comes to Fisher's formula it does not matter if expected inflation is several percent or several hundred percent. What also does not matter is inflation character (constant – variable, increasing – decreasing, low dynamics – high dynamics). Some of the empirical studies may indicate that the degree of the impact of the Fisher effect may depend on the inflation rate [e.g. Phylaktis and Blake 1993]. Present-day economic thought also asserts that the premium expected by the investor for investments in instruments with highly variable rates of return will be higher than investments in more stable instruments. On this assertion is based, among others, portfolio theory. Yet it was developed no sooner than in the 1950s and 1960s, thus many decades after the publication of Fisher's fundamental works.

The fact that Fisher introduced to his elaborations an idealizing assumption (simplification) lying in not including the investment risk premium in an inflationary environment may be one of the essential elements affecting the results of empirical studies that falsify the Fisher effect. In the subject literature there has not been so far any comprehensive elaborations combining both the research on the Fisher effect and the scale of risk premium in an inflationary environment.

2.5. No income tax on corporate income and on individuals' interest income

In order to maintain, in an inflationary environment and under the conditions of corporate income taxation, the real rate of cost of money and at the same time avoid the violation of equilibrium of supply and demand for money, the nominal interest rate would have to increase more than point-for-point. In order to avoid additional transfer of benefits from lenders to borrowers, the increase in the nominal interest rate must include additionally the tax shield generated from interest paid by companies [Darby 1975; Feldstein 1976]. Otherwise thanks to an additional tax shield there would be a transfer of benefits from capital donors in favor of recipients if, in an inflationary environment, interest rose only by the rate indicated by the Fisher effect.

However, when Fisher published his works *Appreciation and Interest* (1896) and *The Rate of Interest* (1907) corporate income taxation did not exist in the US. It was introduced in 1909, although it was full-fledged no sooner than after the 16th amendment to the Constitution in 1913. Moreover, until the US joined the 1917 war the inflation rate was merely 1-2% [IRS 2015]. With a low tax rate and low inflation rate in that period the impact of the tax shield on the nominal interest rate would have been on average only a fraction of a per mille. Thus its influence on the calculations of future interest rates conditioned by inflation predictions could have been left out. The lack of corporate income tax would have been a fully explainable reason for not including this factor in Fisher's formula when he de-

scribed his views on the relationship of the nominal and real interest rates in an inflationary environment at the turn of the 20th century. He could sidestep this effect until the publication of his fundamental work *The Theory of Interest* [1930].

After this date there appeared significant tax and inflation changes in the US economy. Both of the rates rose sharply, and holding Fisher's assumption about zero percent income rates was getting away further and further from the reality of world economies.

With reference to the Fisher effect there occurred notions of the Darby effect or Darby-Feldstein effect. This effect describes the relationship between the nominal rate and real rate in an inflationary environment and the conditions of income taxation, where there would be no transfer of financial benefits from the tax shield between the donors and recipients of money:

$$In = Ir + F/(1-T) \tag{3}$$

where: T – income tax rate.

The studies towards confirming the Darby effect indicated actually proof for its occurrence [e.g. Peek 1982]. But many of them also indicated time narrowing and various intensity of the impact of the taxation factor on the nominal interest rates [e.g. Carlson 1979].

Conclusion

Economic theory is based on specific simplifying assumptions relating to clearly defined conditions. Thus one cannot expect a full resemblance between the "caricature" and the pattern of this "caricature." Nowak defined in a straightforward manner such attempts of empirical studies as methodological error of reification. He wrote, "error of reification lies in [...] direct relating an idealizational proposition to facts without performing concretization. This error, let's add, is possible because very often when researchers formulate idealizational laws they do so not in a clear mode including idealizational assumptions in the protasis, and in the apodosis a specific formula (equation), but in the form of equations only. As a result one may not take into account the fact that such an equation refers to idealizational conditions and may relate it directly to empirical conditions. [...] this equity is a shortcut of this law. Thus if equity of this type is treated literally, not as a shortcut to a fuller form of the law as indealizational law, then the danger is that the idealization law will be treated as a factual statement relating to empirical phenomena" [Nowak 1977: 102]. Nowak acknowledges the error of reification as the most serious "sin" of present-day methodology of scientific research, and its "culprit" is phenomenalistic assumptions of present-day empiricism. He also indicates that the error of reification may take two forms. In the first case the re-

searcher accepts an idealizational statement on the basis of empirical research, in the second case the researcher rejects the idealizational statement on the basis of this research [Nowak 1974: 69-72]. It is just the second case that we deal with as it comes to empirical research on the Fisher effect.

An important element of getting to know a concrete theory is the analysis of premises (especially simplifying assumptions), on which the theory is based. The Fisher effect is based on many assumptions. Some of them are based on basic paradigms of microeconomics, some others, however, refer to specific conditions of the US economy at the turn of the 20th century.

In this article the author carried out detection of idealizational assumptions adopted for the formulation of the Fisher effect, at the same time showing possible further steps of research on these issues. The more so that the simplifying assumptions are one of the errors in the measurement of investigated phenomena [Majda 2016].

Fisher's assumption that only the change in inflation expectations that has an impact on the level of changes in the nominal interest rate in an inflationary environment is unlikely. This fact has already been pointed to before. It is more sensible to state that the Fisher effect is an idealizational proposition leaving out all the other factors that have an impact on the nominal interest rate. Fisher himself confirms this approach in his book *Theory of Interest.* It was published in 1930. By 1930 Fisher had already witnessed the introduction of corporate tax in the US in 1913, hyperinflation (and related to it inflation risk premium) of the 1920s. One should also remember that the publication of *Theory of Interest* followed the 1928 publication of *Money Illusion*. Nevertheless, in *Theory of Interest* Fisher contended that despite all of this knowledge he still adhered to his conclusions expressed in his previous works. He wrote explicitly, "my theory of interest has been altered scarcely at all" [Fisher 1930: 5]. His deliberations on the results of his empirical studies are proof that he realized that his equation was an idealistic approach to reality, "One obvious result of such an ideally prompt and perfect adjustment could undoubtedly be that money interest could be far more variable than really is and that when it was translated into real interest this real interest would be comparatively steady. What we actually find, however, is the reverse – a great unsteadiness in real interest when compared with money interest" [Fisher 1930: 132].

The analysis of the present-day adequacy of the simplifying assumptions of the Fisher effect has proved many of them to be outdated. It supports the postulate to qualify the Fisher effect expressed in the form of idealizational proposition as a historic generalization that is time limited to the first half of the 20th century at the most [Sobków 2016].

In light of the aforementioned deliberations one can draw a conclusion that empirical research on the Fisher effect should not be focused on the analysis of correlations of inflation expectations and changes in the nominal interest rates

because these cannot fully bring useful results. This kind of research is based on the methodological error of reification. It allows a lot of room for further research on the Fisher effect and on real possibilities of defining its role and significance in the present-day economy.

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Efekt Fishera jako przykład esencjalizmu metodologicznego w świetle rozwoju myśli ekonomicznej

Streszczenie. *Jak każda teoria, również teoria Irvinga Fishera dotycząca zmian nominalnych stóp procentowych w warunkach inflacji oparta jest na założeniach upraszczających. Przedstawiając swoje poglądy, każdy autor powinien je szczegółowo opisać, jednak Irving Fisher pominął to zagadnienie w swoich pracach. Celem badawczym artykułu jest dokonanie detekcji założeń upraszczających „efektu Fishera" oraz wskazanie zakresu ich wpływu na opisywaną teorię. Rozwój myśli ekonomicznej oraz przemiany w gospodarce światowej, jakie dokonały się w XX wieku, były również podstawą dokonania oceny adekwatności stwierdzonych założeń upraszczających. Przeprowadzona analiza wspiera poglądy o możliwości zakwalifikowania efektu Fishera jako generalizacji historycznej.*

Słowa kluczowe: *efekt Fishera, esencjalizm metodologiczny*

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Cyberterrorism as a Modern Security Threat

Abstract. *The 21st century has ushered in a period of rapid change that can be seen in nearly every aspect of life. In most cases, they have a positive impact on society. However, one cannot help noticing that in an era of tremendous growth there are also a number of challenges and threats. One of them is cyber-terrorism. This is a new, rapidly growing form of terrorism, which takes place in cyberspace, with possibly devastating consequences are for people, states and international organizations.*

Keywords: *terrorism, cyber-terrorism, security, threats, cyberspace, cyberterrorist attacks*

Introduction

In rapidly changing times of the present day, characterised by development in many spheres of life, society is facing numerous challenges and, unfortunately, also threats. It is a crucial problem, which constitutes a major barrier to the development of countries and societies.

More importantly, the world is experiencing the effects of globalisation, as well as a rapid growth of information technology. This raises the question of security associated with the evolution of information systems. Modern society relies on increasingly complex information systems, which are gradually replacing older technologies in various areas. These systems perform many important func-

tions. Above all, they facilitate the process of decision making, help to formulate strategies and improve the effectiveness of performing tasks. Nowadays almost everyone uses all kinds of electronic access cards or uses online banking services. Professional information systems are an important factor in the day-to-day operation of corporations, enable air traffic control, or help to manage transport and logistics. The modern-day world is becoming of a world of information technology. However, despite the numerous conveniences, information technology is also associated with many threats. For one thing, it has become an inseparable part of our daily lives. It is enough to think of ubiquitous video surveillance systems (CCTV), which are used to monitor people and buildings. While these systems offer many benefits, they are also exploited by criminal groups for their own purposes. The virtual world is growing and evolving to ever closely resemble the real world. The virtual reality has also become home to "new terrorists", known as cyberterrorists. Just a few years ago nobody would have thought that educated citizens "armed" with just their laptops could become terrorists in cyberspace.

In view of the above, the present article aims to present the key facts about cyberterrorism and its main characteristics and to highlight its spread as a tool of modern-day activities that pose a threat to national security. The article also discusses different methods of attacks used by cyberterrorists. To achieve this goal, the following research methods will be used: analysis, synthesis, generalization and inference.

1. The nature of cyberterrorism

One of the increasingly common threats in cyberspace is cyberterrorism. In information society it is viewed as the main threat to telecommunication security of countries and international organisations. It is both a national and international threat. Judging by recent events, it can be said that cyberterrorism is constantly evolving.

Although terrorist activities as such have existed for many years, it is only since the September 11, 2001 attack on the World Trade Centre that the world has started paying attention to it. Following a wave of recent terrorist attacks, the phenomenon has become a household name and one of the major threats of the 21st century. Although cyberterrorism seems to be a relatively recent development, it has already reached an unprecedented scale.

Like terrorism, cyberterrorism is difficult to define. The literature provides a number of different definitions. This diversity is due to the following factors:

– the lack of one commonly accepted definition of cyberterrorism,

– the lack of one definition of terrorism, which leads to various ways of defining cyberterrorism,

– unclear relationships between concepts of cyberterrorism and information warfare,

– a tendency to negate the need for the term "cyberterrorism."

Let us start from reviewing different definitions of cyberterrorism. The term was originally coined in 1980s by Barry Collin of the Institute for Security and Intelligence. DE defined cyberterrorism as "intentional abuse of an information digital system, a computer network or component, with the intention of supporting or facilitating a terrorist action" [Bógdał-Brzezińska & Gawrycki 2003: 64].

A different definition of cyberterrorism was proposed by Dorothy Denning, who described it as „unlawful attacks and threats of attack against computers, networks, and the information stored therein when done to intimidate or coerce a government or its people in furtherance of political or social objectives" [Bógdał-Brzezińska & Gawrycki 2003: 64]. Moreover, according to Denning, a cyber-attack is committed when it causes immediate damage to person or property or is sufficiently significant as to cause fear, death, injury, an explosion, plane crash or financial loss. Otherwise, it will not be regarded as a cyber-attack. Many scientists disagree with this definition arguing that it disregards the phenomenon of what is known as soft terrorism, i.e. the use of online propaganda, communication or recruitment.

In an effort to explain the nature of cyberterrorism, it is worthwhile to quote observations made by Ernest Lichocki, who defines terrorism as "a phenomenon at the interface between different fields, such as:

– telecommunications security,
– information and communications technology,
– personal security,
– physical security,
– national and international regulations,
– personal data" [Lichocki 2008: 2].

Another definition worth citing was formulated by a specialist of the US Department of Defence, Rod Stark, who defines cyber terrorism as "a premeditated and unlawful use of politically, socially, economically or religiously motivated cyber warfare or cyber-targeted violence, conducted by non-state agents or state-sponsored groups for the purposes of creating fear, anxiety and panic in the targeted population and the disruption of military and civilian assets. It is an attack aimed at digital information systems, regardless of whether it is conducted by means of a computer or not" [Bógdał-Brzezińska & Gawrycki 2003: 65].

According to the US Federal Bureau of Investigation (FBI), cyberterrorism is an premeditated, politically motivated attack against information, computer systems, computer programs, and data which results in violence against non-combatant targets by sub-national groups or clandestine agent [Bógdał-Brzezińska & Gawrycki 2003: 65].

In Poland, the responsibility for counteracting cyber terrorist attack rests with the Internal Security Agency (ISA). According to the Department of Telecommunications Security, cyberterrorism is defined as "activities intended to block, destroy or distort information processed, stored and transmitted through telecommunications systems as part of information or psychological warfare" [Biaoskórski 2011: 256]. The definition was already formulated in 2002, when cyber-attacks were still rare. According to a more recent definition, created by ISA in 2010, cyberterrorism is "the use of information technology in order to cause harm."[1] Based on its knowledge and experience, ISA recognises that cyberterrorism is an increasingly common tool of political and ideological struggle.

Analysing attacks that occur in cyberspace, ISA believes that a new type of conflict is emerging, known as Internet wars. They are waged in the virtual reality of cyberspace by hackers with specialist knowledge. Their actions can disrupt or paralyse the functioning of a country or its crucial elements. According to ISA, a high level of technological development is constantly contributing to improving the way various aspects of political, social and economic life are managed. However, at the same time, this development makes the state dependent on the efficiency and security of the critical infrastructure. An attack against one element of this system can disrupt the operation of the others since they are all interrelated.

Typically, cyber-attacks can be directed against systems that support the functioning of:

– state administration,
– internal security,
– national defence,
– telecommunications,
– energy supply,
– water supply,
– financial networks,
– rescue services.

Apart from faults and shortcomings of technical solutions, among the possible sources of threats for telecommunications networks, ISA has identified the following deliberate activities:

– disruption of systems,
– unauthorised data input or copying,
– breaking security measures to take control over particular infrastructural components.

A rather general definition of cyberterrorism is also included in "The Cyberspace Protection Policy of the Republic of Poland." According to the updated

[1] www.abw.gov.pl/portal/pl/88/306/Cyberterroryzm.html [access: 10.08.2016].

version of the document from 2013, cyberterrorism is defined as "an offence of a terrorist nature committed in cyberspace". Cybercrime is defined as "an offence committed in cyberspace" [The Cyberspace Protection Policy 2013: 5].

Summing up the above definitions and based on the Polish criminal law, it can be concluded that cyberterrorism is a crime which:

– involves serious intimidation of many people,

– involves actions that force a government agency of the Republic of Poland or another state or an agency of an international organisation to undertake or cease particular activities,

– causes serious disruption to the political system or economy of the country.

Given the above definition, cyberterrorism involves different kinds of politically and/or ideologically motivated terrorist actions which are conducted or planned in cyberspace by individuals or terrorist groups. These actions are directed against states, international organisations or transnational entities, and cause or can cause directly or indirectly damage to person or critical infrastructural elements.

2. Characteristics of cyberterrorism as a threat to national

According to experts on telecommunications and national security, cyberterrorism should be treated as one of the most important threats and challenges of the 21st century. It is therefore necessary to identify the cause of this phenomenon and explain why terrorists choose to operate in cyberspace. The most obvious reasons for the greater popularity of cyberterrorism compared to traditional forms of terrorism include:

– a wider impact,

– low costs,

– the disappearance of borders (states are losing their sovereignty and attacks can be launched from any place in the world provided it has access to the Internet),

– minimal risk of a planned attack being discovered,

– the possibility of conducting sudden and unpredictable actions against completely unaware and unprepared victims,

– complete anonymity, which enables the spread of misinformation,

– lower risk of terrorists themselves being affected by the attacks,

– counteracting terrorism requires improved coordination,

– a difficulty to distinguish between real and virtual threats,

– minimal risk of retaliation on the part of the state,

– the possibility of a parallel attack against selected targets, without the need to travel to or stay in the target location,

– avoidance of collateral damage, which can be exploited as part of propaganda to influence public opinion
– growing access to the Internet.

As can be seen, there are many "benefits" of a terrorist attack. Computer software turns out to be a very good tool of collecting and exchanging information as well as maintaining communications. Thanks to the use of cyberspace, cyberterrorists remain anonymous, can encode or conceal information in text or graphics files, which do not raise suspicions. Unauthorised access to systems makes it possible to intercept relevant information and can help terrorists to conduct conventional attacks. As it turns out, cyberterrorist actions are a perfect tool that enables terrorists to achieve their objectives at low cost and without being detected.[2] Unfortunately, for terrorists it is a very safe way of operating, since it does not require the use of life-threatening resources, such as weapons, explosives or chemicals. Moreover, in order to launch an attack terrorists do not have to change their location and, even if it is necessary, all they need to do is find a place with Internet access. The availability of tools required to conduct cyber-attacks enables terrorist attacks because:

– the ownership and use of a computer is legal,
– software used by cyberterrorist groups is available in the Internet,
– terrorist groups which do not have the necessary IT skills can easily employ specialists,
– it is not feasible for a state to register all civilian IT specialists.

Another advantage of cyber-attacks over conventional terrorist attacks is the fact that they often go undetected; thus, the relevant counter-terrorist agencies cannot be informed.

3. Classification of cyberterrorist activities

An almost unlimited development of civilization and technology creates new possibilities that are exploited by cyberterrorism. Scientists from The Naval Postgraduate School in Monterey identified three levels of cyberterrorism capability:

– simple, unstructured – cyberterrorists perform simple hacking attacks into information systems using Internet tools developed by others. A terrorist organisation has a very limited capability of analysing targets which are being attacked, commanding, controlling and learning new methods of attacks in cyberspace,
– advanced, structured – cyberterrorists conduct more sophisticated attacks against computer systems and networks. In addition, they are capable of modifying or creating their own tools required to launch an attack in cyberspace. Moreover, unlike cyberterrorists at the previous level, they can analyse their targets,

[2] M. Narojek, *Cyberterroryzm*, http://sbn.republika.pl/cyber.html [access: 20.08.2016].

– complex, coordinated – cyberterrorists conduct complicated attacks with an aim of causing mass disruption against integrated heterogeneous defences. They are also capable of creating sophisticated tools designed to attack targets in cyberspace and analyse them, they can maintain effective command and control and are capable of self-improvement [Bógdał-Brzezińska & Gawrycki 2003: 87].

As can be expected, the threat of first level cyberterrorism is the most likely, owing to its simplicity and relatively minimal resources required to conduct such actions. Very often, because of their small scale, effects of such attacks are not serious and do not attract much attention, partly because hackers have limited capabilities of analysing their targets.

Attacks representing the second level of cyberterrorism are more sophisticated. What makes them potentially very dangerous is the fact that this category of cyberterrorists can develop their own software to conduct hacking attacks.

Third level cyberterrorism is the most dangerous variety, since it usually leads to a complete disruption of a system, as well as other targets.

In addition to the three levels of cyberterrorist capabilities and the associated level of risk, electronic attacks can be classified into two brad categories"

– electronic warfare,
– cyber warfare.

Electronic warfare involves the use of physical properties of electronic systems. Typical examples include radio jamming or electromagnetic pulse attacks (EMP), which consist in generating short bursts of electromagnetic energy, which can destroy electric or electronic circuits.

Cyber warfare consists in attacks against the logical layer of electronic and information systems with the intention of disrupting the flow of information or taking control over it. Typical targets include operating systems, software, communication protocols, network infrastructure, as well as user accounts or any other digital targets.

Cyberterrorist attacks are closely connected with cyber warfare, as they rely on the same tools and mechanisms of operation. Their distinguishing feature is the motivation for the attack. Of course, cyberterrorism has a lot in common with cybercrime – both rely on the same set of tools. However, as in the case of cyber warfare, the difference lies in the motivation. Cybercrime is not concerned with ideology or has no interest in influencing governments or society. Their attacks are intended to bring profit from criminal activity, such as identity theft, credit card fraud, extortion or commercial blackmailing.

A perfect example illustrating this new kind of threat is the activity of the group called Anonymous. It is an anonymous, international group of Internet activists and hackers. Membership in the group is based on self-identification with their values and goals. The organisation does not have an internal hierarchy or one strictly defined philosophy. Its members identify with anarchist tendencies, op-

pose Internet censorship and control, or the political *status quo*. The Anonymous Group is responsible for many politically and ideologically motivated attacks, which were conducted in response to events incompatible with values shared by its members. Among their targets were governments of many countries, child pornography sites, The Church of Scientology or media companies or websites of various organisations.

One of the most commonly used method of attack in cyberspace is a distributed denial-of-service (DDoS), which is carried out using a network stress testing application called Low Orbit Ion Cannon (LOIC).

Cyber-attacks can be divided into two categories: attacks targeted at computer systems (syntactic attacks) and attacks against users (semantic attacks)

Syntactic attacks exploit the characteristics of the system itself, i.e. loopholes or vulnerabilities of operating systems, software, network protocols and network traffic management systems in order to take control over a computer system or disrupt its operation. This category of attacks include hacks exploiting loopholes in operating systems or Internet browsers in order to infect a computer, self-spreading viruses, worms as well as DoS attacks. For example:

– **zero-day attac**k is an attack in which exploits a undisclosed computer software vulnerability to hack computer running this software and gain unauthorized access,

– **SQL injection** is an attack against data-driven applications or databases, in which nefarious SQL statements are inserted into an entry field for execution.

Semantic attacks involve actions aimed at damaging the credibility of target resources or deceiving users. One example of this type of attack is 'pump and dump' (P&D), in which false and misleading positive statements from an allegedly credible source is used to encourage investors to buy stocks whose price is being artificially inflated. Semantic attacks can also include different techniques intended to obtain sensitive information by disguising as a trustworthy entity. In fact, this category provides most opportunities for criminals to show their creativity to continue producing new techniques of attacks.

4. Methods of attacks in cyberspace

In addition to the methods described in the previous section, one list the following techniques of cyber-attacks:

– **email spoofing** is an attack which exploits a vulnerability of email protocols – the lack of authentication mechanisms – and involves sending emails with a forged sender address to disguise as another person;

– **phishing** is an attempt to obtain sensitive information, such as usernames, passwords, PIN codes, by disguising as a trustworthy person or institution. The

phishing website imitates the real website and asks for the required confidential information. The unsuspecting user enters their login information which is sent to the criminals, who can now access the victim's online accounts or use their credit card to make unauthorised purchases;

– **spear phishing** is a form of phishing, which is a personalised attack directed against a specific individual or company, which relies on personal information gathered by attackers about their targets, their friends or professional contacts. The purpose of spear phishing is to make the communications appear legitimate and deceive the victim, who could become suspicious when confronted with more impersonal methods of deception;

– **pharming** is a cyber-attack in which the user's browser is redirected to a different IP address with a fake version of the original website in order to obtain access credentials to the authentic website.

The list above includes just a handful of techniques used to carry out cyber-attacks and there are many more. The most common ones include Trojan horses, logic bombs, hardware backdoors, sniffing backdoors, DoS attacks or Van Eck Phreaking.

As can be seen, there are many techniques of conducting cyber-attacks. In most cases, they go unnoticed, cause damage and disruption to many systems, institutions, states and international organisations. It can be expected that innovative technology combined with expert skills can pose a serious threat and a real danger to the way the modern world functions. Man has always been known to be the weakest link in all kinds of processes, and human errors are part and parcel of our lives. Unfortunately, this is just what terrorists are waiting to exploit.

Summary

In summary, it should be concluded that in the course of time, with the development of digitisation and the spread of information technology in society, the threats of cyberterrorism are bound to escalate. According to predictions, they may become the most serious non-military instrument of soft power in the world. Unfortunately, this threat can become increasingly widespread, since cyberterrorists are constantly looking for new solutions and improving their IT skills.

The above considerations imply that each day increases the risk of a security threat that could disrupt public order. Consequently, there is a need for closer cooperation between agencies and institutions responsible for security in every aspect. People involved in the protection of cyberspace, particularly with respect to the exchange and use of information, should receive specialist training. Since cyber-attacks are a new threat, effective preventive measures that can predict a potential attack have not yet been developed. It is also necessary to improve leg-

islation, procedures and increase competencies of specialists dealing with counteracting and combating cyberterrorism.

It should also be pointed out that it is developed and most technologically advanced countries that are mainly prone to these types of attacks. Among the countries that are particularly attractive targets for cyberterrorists are the USA, Russia, China, Japan or all European countries. The reason for this is the high level of information technology in these societies.

In the 1991 report published by the US National Research Council entitled "Computers at Risk: Save computing in the information Age," the authors write: "Tomorrow's terrorist may be able to do more damage with a keyboard than with a bomb." One of the most famous hackers, Kevin Mitnick, said: "I broke people, not passwords." He also believed that „the human factor is truly security's weakest link". Using his excellent IT skills, Mitnick was managed to steal confidential information and hack the most protected IT systems in the world. After spending five years in prison, he became a computer security consultant.

Nowadays, despite huge technological developments, there are no measures that would enable a complete control over cyberspace. Unfortunately, the virtual world does not have any borders, is not governed by any law, which is why everybody can remain largely anonymous. It turns out that every country can become the target of cyber-attacks and suffer as a result; potential damage will be the more severe, the more computerized its economy is. On the other hand, every country can carry out a cyber-attack if only there are professional hackers, able and willing to conduct it. The world is undergoing dramatic changes, technology is constantly advancing – no wonder, the same is happening to threats and challenges. Phenomena taking place in cyberspace go far beyond the technical dimension – they are affecting the social sphere of life. It has become banal to observe that that the 21st century is an age of the development of information technology. The traditional methods of communication are more and more frequently being replaced by new, more advanced information technologies. In the face of the progress of globalization and the development of technology and civilization, the scope of public security has expanded to include new aspects, such as information security or cyber security. Today, information security is identified with cyberspace, information space or telecommunications infrastructure. Therefore, one has to agree with the observation that "cybercrime, cyberterrorism, cyber warfare are no longer threats that one can read about in science fiction literature, but are real phenomena that we are witnessing more and more often" [Kwećka 2010: 209].

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Cyberterroryzm jako współczesna forma zagrożenia bezpieczeństwa

Streszczenie. *XXI wiek niesie za sobą ciągłe zmiany, które w dodatku następują bardzo dynamicznie. Zmiany te można dostrzec niemal w każdej dziedzinie życia. W większości przypadków mają one pozytywny wpływ na funkcjonowanie społeczeństw. Jednak należy mieć świadomość, iż w dobie ogromnego rozwoju powstaje również wiele wyzwań oraz zagrożeń. Jednym z nich jest cyberterroryzm. Jest to nowa, prężnie rozwijająca się odmiana terroryzmu, która odbywa się w cyberprzestrzeni, a jej skutki mogą być katastrofalne dla człowieka, państwa, a także organizacji międzynarodowych.*

Słowa kluczowe: *terroryzm, cyberterroryzm, bezpieczeństwo, zagrożenia, cyberprzestrzeń, ataki cyberterrorystyczne*

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Contemporary Public Space – Views and Discussions

Abstract. *The purpose of the following paper is to present a few significant aspects concerning contemporary public space. This study pinpoints how important public space is and that it requires a very specific attention on the part of authorities. Its value for local communities, as its availability and quality cannot be overestimated in terms of life quality, is stressed in the paper. The study deals also with the public space "conflict-rising" nature, taking into consideration interests of various users and groups of users and their involvement in the so-called "space game." Nowadays non-governmental organizations together with city movements are beginning to play a more and more important role in shaping the public space. It is mostly their activity that has brought about changes in the policy towards public space, the result of which was the government's announcement of National Urban Policy. The following study is based on the articles published in scientific journals, reliable Internet sources and government documents.*

Keywords: *public space, public goods, planning and spatial development, local communities, non-governmental organizations, city movements, third sector, placemaking*

Introduction

Nowadays the role of public space is becoming more and more appreciated and recognized. This space accessible to everybody is considered a determinant of life quality of individuals and local communities. With that respect public space determines social and economic development. However, space is limited and whatever is limited is subject to competition between subjects for whom this resource is

useful. This leads to conflicts between the stakeholders of space, among whom are public authorities, entrepreneurs and local communities. While referring to the public space competition, one should consider the fact that non-governmental organizations, including city movements are becoming more and more important. This process is especially noticeable in highly developed countries [Harvey 2012], and is becoming important in less developed countries, including Poland. The representatives of so called third sector participate in administrative proceedings concerning planning and spatial development in order to keep spatial order and create tourist attractiveness by so-called placemaking.[1] They also initiate or support grass-roots initiatives realized by inhabitants in public space. Therefore, one can assume that organizations dealing with public space play a very important role form the point of view of public interest.

1. Space as strategic good for local communities

According to Anna Cudny the notion of public space has become very popular and even fashionable in recent years. The author notices that: "[...] mentioning the term in various contexts makes the conversation smooth and is used as the evidence of egalitarianism." It turns out, that as a result – according to the author – the notion of public space is becoming too ambiguous. For a sociologist or social activist it means social space, for a journalist it is a media space while for politicians it is an equivalent of society. Anna Cudny strongly rejects such broad understanding of the notion in question. She calls for treating the notion as purely urban again. [Cudny 2014: 39], which is in accordance with what is expressed in Spatial Planning and Land Development Act of 2003. According to this definition, public space is "[...] area of particular significance to satisfy the needs of inhabitants, their life improvement and fostering social contacts due to its location and functional and spatial features. It needs to be determined and referred to in the study of conditions and directions of spatial development of a particular municipality."[2]

A much more significant role of public space is referred to in the Charter of Public Space adopted at the Third Congress of Polish Urbanism: „Public space is not only a good characterized by a set of particular useful features, but also a place of transmission of multiple material and nonmaterial goods which satisfy various needs. Therefore, public space should be considered a strategic good for local communities" [Charter of Public Space 2009: 1].

[1] www.pps.org/reference/what_is_placemaking/ [access: 11.08.2016].

[2] Ustawa z dnia 27 marca 2003 r. o planowaniu i zagospodarowaniu przestrzennym, Dz.U. nr 80, poz. 717, ze zm. [Act on Planning and Spatial Development of 27 March 2003, Journal of Laws no. 80 item 717, as amended], http://isap.sejm.gov.pl/DetailsServlet?id=WDU20030800717 [access: 12.08.2016].

A relatively broad understanding of public space is due to its definition by Elena Madison, vice-chairman of American organization Project for Public Places (PPS) – a world leader in shaping and revitalization of public space. According to her: „Any space that is not your home or your workplace (in most cases), is public space. Public buildings, such as: town halls, libraries, schools, hospitals, university campuses, museums, theatres, markets and social centers together with the land they are built on should be considered public spaces" [Madison 2013] According to PPS, such broad view of space is necessary in order to understand the value of public space.

The definition by Mariusz Czepczyński, on the other hand, emphasizes its egalitarian aspect: „Public space [...] is a common good that is supposed to serve local community and is used by all the inhabitants in the egalitarian way, which means that no one is excluded and it is financed by public funds and available free of charge" [Czepczyński 2012: 12].

From the presented above short overview of definitions of public space one can infer explicitly that various authors present different opinions on the proper scope of the meaning of this notion. However, one cannot notice discrepancies concerning the extremely significant or even strategic role that public space plays for local communities.

According to quoted above Czepczyński, it is those public spaces which due to their rank and function become „material and nonmaterial representatives of local communities" that are of particular significance. A good example is the city center that fulfils multiple functions exhibiting in that way the power of a particular square or street. The central square is often identified with different historic contexts indicating the advantage of a particular historic central or city-forming function:

– agora, that is the place of political disputes and manifestations,

– piazza, the meeting place for inhabitants and visitors designed to exchange information and cultural life,

– market, the place of commercial exchange, being for most cities the basic factor of location,

– street, dominated by transportation functions, but also used as traffic intersection and center of city transport,

– place used for representative function, where local communities visualize their images and needs of urbanity [Czepczyński 2012: 10],

Other experts pinpoint that public space consists not only of prestigious places, but also streets, alleys, parking lots, pavements and paths. Specialists assume that in the face of strong influence of the surroundings onto people "it is important to create such spaces that would have positive and stimulating impact onto the people who are there" [Wantuch-Matla 2009: 374].

The aspect of health benefits resulting from the access to proper public spaces has been developed by Alojzy Kiziniewicz [Kiziniewicz 2013: 1-3]. He presents, among others, the example of Japan. According to Japanese findings the above average life span in this country results to a large extent from people's contact with nature, especially the access to parks and public greenery. The Japanese estimate that such access prolongs the life span by at least 10 years, which is approximately 10%. Simultaneously, the lack of the access to public space together with the change in the lifestyle (computer, TV, the world of virtual meetings) results in obesity and problems connected with insufficient movement. This mainly concerns the young generation.

The same author presents also significant economic consequences stemming directly from either proper or improper access to public space. He mentions that high quality public space fosters to a large extent local development. Well-designed parks and squares attract both well-off owners and companies and workers and customers. Nice surroundings influence the development and profitability of commercial units and the development of local tourist products. Therefore, attractive open spaces located in the direct neighborhood of existing or future building complexes are becoming more and more often parts of marketing strategy adopted by the local authorities. As a result, adjacent locations gain in value, which, in turn, makes local authorities even more interested in "revitalization and proper management of public spaces [...]. It becomes quite obvious that the adjacent pond or park can lead to at least 10% increase in the property value. It is only the view or neighborhood of such spaces that can positively influence the value of nearby premises. On the other hand, the lack of such attributes can result in the decrease in the property value by 10% or even more. Therefore, one can argue that the minimal accumulated influence of the public space quality onto the property value is about 20% [...]. This is confirmed by the empirical research on the basis of transactions, the object of which are premises located in the direct neighborhood of well managed public spaces" [Kiziniewicz 2013: 2].

The essence of the role of public space (public places) for local communities is presented in the book *How to Turn a Place Around* published by PPS. Therefore, it is worthwhile to present here a passage from this book: "Public spaces are the arena of our public life. These are parks where we celebrate, where marathons finish and where children acquire their first sports skills, where we see seasons turn and where cultures get mixed. These are streets and pavements near apartment buildings and companies, where people meet for social and economic purposes. These are the gateways of public institutions – town halls, libraries and post offices – where we get into relations with other people and offices. When cities and housing estates take care of the quality of public space, inhabitants have a strong sense of community. On the contrary, when these spaces are scarce, inhabitants are more loosely related to each other" [*Jak przetworzyć Miejsce* 2009: 19-20].

2. Space as multilevel area of contradictory interests

The quoted above Charter of Public Space emphasizes that "The large number and the meaning of various functions of public space leads to a lot of developmental pressure and its appropriation. Space is subject to a global market game. Due to unregulated competition between territorial units the appropriation of public space is accepted and it is the local communities that are encumbered with social costs" [Charter of Public Space 2009: 1]. The phenomenon of intensification of public space privatization has been widely discussed by Łukasz Pancewicz. [Pancewicz 2010: 80-91] In the conclusion of his article on the genesis, forms and consequences of this phenomenon he states that space privatization is the expression of the global influence of liberal ideology. He also stresses the weakened involvement and inefficiency of local authorities when it comes to satisfying the needs of inhabitants, which, in turn, results in strengthening private subjects interested in public space for their commercial purposes. Private sector, being more efficient, entrepreneurial and swift in its actions is even invited to realize ventures in public space. However, this leads to intensified commercialization and "loss of primary features that form egalitarian space of streets and squares: social diversity, public control, free access for everybody regardless of their wealth" [Pancewicz 2010: 90].

The significant element that makes it possible to understand the essence of public space as the area of contradictory interests is identification of stakeholders and the ways and motives of their actions. A few years ago, during a seminar on public space in Poznań an experiment called "space game" was conducted [cf. Kaźmierczak & Pazder 2009]. The purpose of the game was to investigate the intentions of various players with respect to decision concerning space that they took. The game was played in three teams: "social team" – inhabitants, associations, foundations; "authorities" – councilors, public officers; "investors" – developers, estate agencies, designers. All teams worked in separate rooms and could not observe other teams working. The results of the experiment were very interesting in each of the teams. The "social team," which was the largest, presented the point of view that "nobody wants to talk to us". They were frustrated which resulted from the distrust towards the other groups of stakeholders together with the lack of faith in real opportunities to decide on public space. The interesting thing was that this team viewed the authority representatives as major opponents. Moreover, the decisions taken by the "social team" did not result from objective discussion, but were opinions presented by some leaders who dominated the discussion by imposing their own points of view. The decisions regarding suggested activities concerning public space were based on particular interests of particular

individuals. The team did not attempt to create one common concept based on the opinions of all the members of the team. The "authorities" team expressed the opinion of the impotence in the decision making process that resulted from the binding legal regulations. This team expressed their conviction of their self-righteousness regarding the decisions which were often taken in an arbitrary way. Suggested solutions were usually supposed to satisfy the immediate needs and did not take into account the long-term horizon and a broader scale. This team concentrated on solutions referring to residential and service functions and they often neglected the open space areas – greenery and recreation areas. The members of the "investors" team presented a very professional attitude towards the game taking into consideration mainly economic aspects. The decisions that they took resulted from informed discussions, exchanging different opinions and experiences among the members. The willingness to cooperate with other members of the game could be observed. Generally speaking, it could be concluded that this team acted in the way totally opposite to the actions of "social team". In most cases they decided to use the most attractive areas for residential development leaving, however, a considerable share of open, recreational areas. Open spaces with a lot of traffic were designed for investment connected with public functions as they were not within the area of interests of developers.

The conclusions of the "space game" comprised the expectations of particular groups of stakeholders. It turned out that the members of the "social team" depended upon the support from the authorities in the pursuit for their needs to be satisfied, the "authorities" team did not take the role of a mediator or a partner in the game, although that was expected of them by other groups of stakeholders; and, finally, the "investors" team noticed social problems but mostly in terms of costs in the investment process.

Psychologists stress that conflicts are natural in the social life [Chełpa & Witkowski 1999]. Conflicts in public space result from what is the essence of the value of this space. According to Izabel Mironowicz this value is commonality understood as "the lack of individual right to the place together with the everybody's right to use this space" [Mironowicz 2010: 41]. The author further discusses what this right to use the space really means. She presents three possible interpretations of the right in question" "the right to use", "the right to make decisions on the use" and "the right to decide on space development" [Mironowicz 2010: 42-45].

In the case of "the right to use" the users of the public space realize the right resulting from the common access to public space. The author, however, stresses that this right is limited to certain extent, by, for example the system of civilization values. "The right to use" does not indicate total freedom, but only the freedom limited by legal regulations and customs. Although the issue of legal norms is quite clear, when it comes to "custom" some doubts are expressed. Mironowicz gives the example of incomplete outfit of sunbathers walking down public places.

In Poland, it seems totally acceptable and is connected with the holiday character of the space. However, in France, whose inhabitants are very strict in terms of customs, such behavior would not be accepted. What is interesting, the French accept much more freedom of sunbathing in the places designed for that, that is the beach itself [Mironowicz 2010: 42].

"The right to make decisions on the use" of public space is the right to conduct particular activity there. Here more questions arise. Can the person use the place just as it is? (for example, taking a bath in the fountain)? Does he or she have the right to "change the structure of the space (for example by putting a stall, a deck-chair or setting up a garden)?"[3] Who is to decide whether a singer can perform in the public but the old lady cannot sell parsley? And finally, the most important question concerning human right to freedom, do the restrictions to the use of space not infringe these rights?. All these dilemmas concerning „the right to decide upon the use" are undoubtedly connected with the fact that „the conflict of interests in public space is its immanent part and its integrated component" [Mironowicz 2010: 43].

Development of democracy, including democracy foundations reinforcement, increases the involvement of individuals in the public life. People are no longer satisfied with their role of voters once every four years. They want to participate in management, including public space management. And this is how „the right to decide on space development", the right that gives ordinary people the power to decide upon the space development is fulfilled. Mironowicz simultaneously warns against treating the space as the request show and encourages to refer to it as the area for negotiations. The number of conflicts concerning public space is enormous. Competing groups view their arguments as the most conclusive and want to take over the space for their own purposes [Mironowicz 2010: 43-45].

3. Non-governmental organizations and urban movements actions concerning public space

Although the significance of public space is becoming noticeable also in Poland, the perception of this space by the public is still not sufficient. This is quite straightforwardly expressed by Michał Beim, Bogusz Modrzewski and Adam Radzimski in the article under a provocative title *Do we still need public space?* [Beim, Modrzewski & Radzimski 2010]. At the very beginning the authors claim that "The analysis of cultural patterns, information in the press, scientific journals or conversations makes it possible to capture the "ideal" public space of Polish middle class – the customer that has the greatest influence upon the shaping and

[3] In the latter case „the right to decide upon the use" may become „the right to take over the place."

functioning of the city as a product. For the vast majority of young single, well-off people the perfect place to live is a gated and guarded community. For those having families – it is a house in the suburbs with a dog in the garden. And this is the only difference between those who have families and those who are single". Further in their article Beim, Modrzewski and Radzimski mention other features that describe current "ideal" spaces – the car as the only means of transportation in the city, shopping malls as the substitute of public space, underground garages or parking lots as calling cards of modern office buildings, and the means of satisfying the higher needs. Such an approach has a negative effect not only onto our surroundings and public space but it also leads to unfavorable social behavior. Beim, Modrzewski and Radzimski claim: "On one hand isolation in the place of living together with the use of the car as the chief means of transportation, on the other hand, the very existence of this substitute of public space result in the fact that people no longer feel the urge to go out and have coffee downtown, to walk in the park, to go round small shops; they have forgotten of the old-fashioned custom of exploring the city and subconsciously reading its code. Extreme questions arise: Why should I go for a walk or go running in the park if I can take the car and go to the gym?" [Beim, Modrzewski i Radzimski 2010]. While taking into account formulated in this way expectations toward public space the authors state that a few "strong" questions should be asked: What do current elites want to leave for the next generations? Are steel shopping malls and monotonous and substandard architecture the peak of their aspirations? Beim, Modrzewski and Radzimski are worried about such a change as this may result in the change in "people's consciousness – the generation of children who have grown in this substandard substitute of "disposable" space.

In the quoted above article Beim, Modrzewski and Radzimski [2010] also mention the significant role of non-governmental organizations: "inhabitants of Polish cities (especially the largest ones) have ceased to be their landlords but have become passive space consumers. Nowadays the need to shape the space, as it does not come from the public, private or professional sectors, is usually expressed by so-called third sector, that is various organizations, associations and societies. They are trying to take the role of local landlords, and although their voice is still quite often neglected, it is the only voice calling for the return to human urbanization" [Beim, Modrzewski & Radzimski 2010].

It seems, however, that in recent years[4] there has been a change in the balance of power which results in a better climate for public space and which, in the long run, might indicate a change in aspirations and expectations of broadly

[4] Groups of citizens have become active recently in Polish cities. Their main activities are concentrating on taking a significant part in city creation. Despite being relatively new they have already become a significant participant in local public debate. It has turned out, however, that discussions on a local scale are not sufficient to solve urban problems. Thus, some of these movements have

understood public, including the middle class. The key factors are the city movements whose dynamic development has been observed in Poland recently.[5] It was the First Congress of City Movements in Poznań in 2011 that turned out to be a real breakthrough, as a result of which 9 theses were formulated, pinned to the doors of City Halls in 9 cities and handed over to the local authorities.[6] Among the theses were those concerning directly or indirectly public space.[7] As a result the Ministry of Regional Development prepared Assumptions of National Urban Policy until 2020 [Ministry of Regional Development 2012]. According to the formulated in the mentioned above document definition „National urban policy is targeted territorially action of the state for the sake of sustainable development of cities and their functional areas together with the exploitation of city potential in the national developmental processes. This policy is formulated at the national level and realized by means of investment activities of various public and non-public subjects and also by means of creating optimum legal and financial conditions for the development of cities". What needs to be stressed is that: „restoring and consolidating spatial order in urban areas and limiting unfavorable effects of sub-urbanization and uncontrolled city overflowing" should be considered key challenges for this policy. Two years later the Ministry of Development published National Urban Policy 2023 [Ministry of Development 2015] which described the issues that have the most significant influence onto the quality of life, including shaping the public space. It was stated, among other things, that „Polish cities have been facing a number of challenges related to the quality and accessibility of public space, which results from, among other things, appropriating the space by, for example, gating large communities, which, in turn makes it impossible for

decided to cooperate on a national level. In this way the idea of Urban Movement Congress has been created. See http://kongresruchowmiejskich.pl/o-nas/ [access: 11.08.2016].

[5] See more on city movements, their genesis, global democracy, urban citizenship, right to the city: Mergler, Pobłocki & Wudarski 2013. Article by Beim, Modrzewski & Radzimski was written in 2010.

[6] http://kongresruchowmiejskich.pl/tezy-miejskie/ [access: 20.08.2016].

[7] Theses of I Urban Movements Congress: 1. Inhabitants possess an inalienable right to the city. 2. Participatory budget means that inhabitants prepare budget for the whole city. These are not just procedures but an important social movement. 3. Social justice and preventing poverty and social exclusion are the obligation of urban community. 4. Restoration of historical areas supports urban identity and is the prerequisite of urban development. It cannot be confined to simple renovation but it needs to be an integrated activity that is worked upon with inhabitants. 5. No more chaos and disorder! Spatial culture guaranteed by legal order will result in increased qualify of life. 6. Democracy is not just elections. Inhabitants have the right, based on reciprocal respect, to participate in the decision making process in the city. 7. Cities and metropolitan areas should be managed according to the principles of sustainable development and preventing suburbanization processes. 8. Locating national institutions in various cities supports national development. 9. Polish cities and metropolitan areas need support in integrating transportation systems: railway, road, public, bicycle transport and walking in order to attain the goals of The White Paper on Transport and Leipzeig Charter on Sustainable European Cities.

others to use the public space, greenery or transport. This leads to spatial segregation, social disintegration and has an unfavorable effect onto communication behavior – using one's car becomes a must – and onto the security of the inhabitants making the access for emergency services impaired" [Krajowa Polityka Miejska 2015: 18].

Conclusion

There has been much discussion on public space recently conducted not only by experts but also by politicians. It has also become the subject matter of the discussions carried out by average inhabitants and it has become fashionable to participate in such discussions. Bearing in mind how important public space is this process can only be regarded as positive. As the notion of public space has started to make the front pages of newspapers and magazines the degree of public awareness has been rising. People start to realize that the way in which the space is developed influences not only the environmental aesthetics, but also determines, in a broader sense, the quality of their lives. They begin to understand that space influences their health, real estate prices and the overall attractiveness of the place of living or a place of work. Due to a rising activity of non-governmental organizations and city movements people realize that they do not need to remain passive recipients of spatial development but that they are entitled to take part in these processes. Recent years have also brought about significant changes in the national policy concerning public space making it more significant and valuable. Therefore, there are growing chances that this "fashion" for public space will continue and will last for a longer period of time.

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Współczesna przestrzeń publiczna – poglądy i dyskusje

Streszczenie. *Celem artykułu jest przedstawienie aspektów związanych ze współczesną przestrzenią publiczną. Przestrzeń dla wszystkich wymaga szczególnej uwagi ze strony władz publicznych. Jest to dobro o wielkim znaczeniu dla społeczności lokalnych, ponieważ jej dostępność i jakość ma istotny wpływ na kształtowanie jakości życia ludzi. Artykuł wskazuje także na „konfliktogenną naturę" przestrzeni, przy czym „gra o przestrzeń" toczy się w wielu wymiarach oraz pomiędzy różnymi użytkownikami i grupami użytkowników. Coraz istotniejszą rolę w kształtowaniu przestrzeni w Polsce odgrywają dziś organizacje pozarządowe, szczególnie ruchy miejskie. To w znacznej mierze dzięki ich aktywności zaczyna zmieniać się polityka względem przestrzeni, o czym świadczy niedawne ogłoszenie przez rząd Krajowej Polityki Miejskiej. Badanie przeprowadzono, opierając się na artykułach w czasopismach naukowych, wiarygodnych źródłach internetowech i dokumentach rządowych.*

Słowa kluczowe: *przestrzeń publiczna, dobra publiczne, planowanie i zagospodarowanie przestrzenne, społeczności lokalne, organizacje pozarządowe, ruchy miejskie, trzeci sektor, działania miejscotwórcze*

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The Contribution of Destination Management Organizations to Regional Development in Slovakia and Poland: A Comparative Analysis

Abstract. *Tourism is one of the fastest growing sectors of the economy both in the European Union and in the world. Slovakia and Poland are unique countries with a similar history and conditions for tourism development. Slovakia, however, is a smaller country in comparison with Poland, but destination management organisations have also started to exist and are useful for regional development. The aim of this paper is to evaluate the contribution of destination management organizations to the regional development in Slovakia and Poland.*

Keywords: *Destination Management Organization, tourism*

Introduction

In the twenty-first century, the tourism stage presents profound challenges to all members involved in the tourism industry. Consumers of tourism are demanding tourist destination with a common product and a common strategy. The main focus presently, is on the quality of tourism products [Edgell 2016]. The tourist market has not just globalized geographically, but it is also the subject of rather fundamental changes. The general shift in the advanced economies from mass-consumption to segmented and customized consumption, due to a great variety of societal processes of change, can also be seen in tourist behaviour. Furthermore, the intermediaries in the tourism market have been the subject, for quite some time now, of rapid tendencies of concentration. Hotels, tour operator, ca-

tering firms, and destination management organisations have merged into ever larger multinational corporate business firms and chains [Giaoutzi & Nijkamp 2006].

The tourist destination is the elementary unit of investigation and one of the most complex entities in tourism, especially in terms of planning, management, and financing. Its complexity derives mainly from the complexity of the relationships between the tourism stakeholders involved in the development of tourism in the destination. Defining the issue of destinations is based on the knowledge of key authors such as Buhalis [2000], Flagestad [2001], Ritchie and Crouch [2003], Beritelli [2009] and Pechlaner [2010]. Features of destination management by Bieger [1996] [after Holešinská 2012] include: a dual function of destination management organization (where they run their own institutions and operation of the destination); poorly measurable objectives; limited opportunities to influence tourism stakeholders; and a huge influence of interest groups and the need for legitimacy in the social and political environment. Destination management is presented as an intra-organizational phenomena [Mariläinen & Lemmetyinen 2011, after Holešinská 2013]. A destination is a geographically defined area where the interaction between service providers, visitors, and the local population occurs. The geographic approach is not sufficient and therefore it is important to talk about the economics, marketing, social, and political aspects of the destination. Due to the many subjects involved in tourism development, cooperation and partnership-building is necessary. The arrangement of a target location is created by the network of local subjects in the location, which is supervised by the organization of management with regards to the management of individual elements, which encourages the subjects to mutually cooperate [Holešinská 2013]. The tool for the coordination of activities in tourist destinations between all tourism stakeholders is the creation of a destination management organization, applying the concept of destination management [Gajdošík, Gajdošíková & Kučerová 2015].

With an increasing globalization impact, competition in the international tourism market, and the need of coordinated regional development, the importance of the application of destination management in Slovakia and Poland is growing. Although the history of tourism in Slovakia and Poland is not as long as in other European countries with developed tourism (like Switzerland, Germany, France, etc.), destination management has been developing, although with a significant time delay after the most competitive countries in international tourism. The main representatives of destination management in Slovakia are regional and local tourist organisations and in Poland, destination management organizations are at a regional and local level. These organisations have positive impact on the regional development of an area.

1. Material and methods

The aim of the paper is to evaluate contribution of destination management organizations to the regional development in Slovakia and in Poland. The data that was processed, was gained from primary and secondary sources. For secondary sources, we used the information provided by the Ministry of Transport, Construction and Regional Development of the Slovak Republic in 2014, as well as, annual reports of selected regional and local destination management organizations in Slovakia and in Poland. The primary survey was done through the sociological method, using the questionnaire technique in the period between October to December of 2015. The first questionnaire was distributed to all local tourist organizations in Slovakia (in October 2015, there were 32) and the return rate was 53% (17 completed questionnaires); uestionnaires were also distributed to all Polish local destination management organizations (in October 2015, there were 124), the return rate was 53.2% (66 completed questionnaires). A basic file was created by all local tourist organizations in Slovakia and all local destination management organizations in Poland. The sample was all organizations which completed the questionnaire. To complement the results, we conducted controlled interviews with representatives of these organizations. The questionnaires were distributed in person or electronically. As an electronic form we used the program Google Docs with an email marketing toll Mailchimp, so that we achieved a higher return rate. For data processing we utilized the statistical program SPSS, the spreadsheets of Microsoft Office Excel, and statistical methods like mean values (mean, mode, median), methods for the measure of variability (variance), the Friedman test, the McNemar test (significant difference between a sequence of variables), and statistical generalization (an extension for survey results in relation to the whole). The result were processed at a significance level of $\alpha = 0.1$ and with a 90% confidence value, results were applied to the research sample.

2. Tourism in Slovakia

Slovakia is administratively divided to eight regions. The position of Slovakia in the heart of Europe at the intersection of trade routes, its cultural and historical wealth, and the favourable climatic conditions all create the potential for the development of the tourism industry in our country. The tourism potential of Slovakia is vast, covering almost all key forms and types of tourism. According to the Regionalization of Tourism in the Slovak Republic, northern Slovakia has features suited to mountain activities and winter hiking, while southern Slovakia offers waterside holidays and the opportunity to take advantage of thermal waters. Throughout most of Slovakia there is a wealth of cultural, historical, and

natural attractions which may be utilized for tourism. In addition, a great deal of accommodation, catering, and supplementary service capacity already exists in Slovakia. On the other hand, what is offered does not match the possibilities and its potential. Slovakia's historic towns and numerous mountain ski resorts are its most popular tourist destinations. The demographic makeup of visitors shows that the Slovak Republic is a target country for middle class and less-demanding visitors for whom price is a critical factor. Slovakia's tourism industry has grown remarkably since the country became independent. The number of tourists has been growing steadily over the years, and there is also a higher number of overnight stays in the country [Sario 2007].

The Slovak Ministry of Transport, Construction and Regional Development serves as the regulatory and decision making body for the tourism industry. The Slovak Tourist Board is responsible for the promotion and marketing of Slovakia. It cooperates on a contractual basis with the Slovak Association of Travel Agents, the Slovak Association of Hotels and Restaurants, the Association of Information Centres in Slovakia, LAVEX (the Slovak association of funiculars and ski lifts), the Slovak Association of Towns and Villages, and the Faculty of Economics of the University of Matej Bel. It develops activities on a non-contractual basis with other professional organizations and institutions involved in tourism, e.g. the Slovak Association of Spas and Springs, the Slovak Association for Rural Tourism and Agrotourism, the Slovak Cycle Club, with regional and local offices, regional development sections, and other related areas etc. At present there are more than 100 tourism associations in Slovakia, and the STB cooperates actively with around 30 of these associations. The STB's main activities in this area of cooperation lie in mutual purposeful communication and marketing support for subjects involved in tourism [Ministry of Transport 2016].

In the year 2011, regional and local tourist organizations started to exist in Slovakia which was usefull for regional development in slovak regions. These organizations were officially registered at The Ministry of Transport, Construction and Regional Development of the Slovak republic under Act no. 91/2010 on tourism support, followed by Act no. 386/2011 on the support of tourism propagation and the creation of appropriate conditions for tourism development on its and members' area, with the aim of continuous development on its and members's area, with the aim of continuous sustainable development of tourism and the protection of members´ interests in that particular area. Due to the big influence of these organizations on regional development in Slovakia, we explored their activities.

The subjects of destination management in Slovakia are defined by Act no. 91/2010 in support of tourism. This law financially motivates subjects to set up regional and local tourist organizations, namely tourist organizations at the regional and local level, which with their activities fulfil the concept of destination management. This system in Slovakia has been stimulated down-top as an

initiative of the creation of partnerships of public and private sectors in tourism, but supported by the public sector through financial subsidies. Regional and local tourist organizations are non-profit organizations whose mission is to carry out the destination management in Slovakia. As these are subsidized organizations, they are subsidized from the state budge. Utilization of subsidies is regulated by law. These organizations, however, cannot be engaged in profitable activities.

The main activities and the importance of regional and local tourism organization is:

– to develop and promote all types of tourism and support their presentation in the principles of regional and sustainable development of tourism;

– to create a platform for the cooperation of the private and public sectors in the area of tourism;

– to manage, initiate, and coordinate the development of tourism in specific areas and regions;

– to provide all the information services concerning the needs of tourist;

– to organise informational trips for tour operators and journalists;

– to provide suggestions for hotels, conference venues, social programmes, as well as, pre and post conference tours, DMC and PCO organisations;

– to prepare presentations, documents, and promo materials;

– to support members of the organizations, and many others.

Regional tourist organizations in Slovakia encourage and create conditions for the development of tourism at the regional level, as well as, protect and represent the interests of its members. The members of these regional organizations are stimulated by self-government units and, among their members, they need to include at least one local organization of tourism. The boundary between the competences and activities carried out by the regional and local organizations is thin.

Regional organizations should supervise the region and assist the organizations under their domain, yet this cooperation is weak. A subsidy from the state for regional or local organizations is not a legally binding source of financing, but is a key instrument for financing activities, products, and the marketing of an organization. The Tourism support act created a framework for the development of regional organizations, but at the same time, it does not ensure the efficient co-operation of the tourism stakeholders and puts an emphasis on promotional activities of tourist destinations. At present, there are five regional tourist organizations, meaning that in the area of three self-government units, the regional tourist organizations have not been created yet.

In Slovakia, organizations are financed mainly from membership fees and public funds – government subsidies which they receive almost every year on the basis of their application and the projects. Rate subsidies and the tax charged by accommodation are approximately 1:2 (Table 1).

Table 1. Evolution of accommodation tax, the amount of state subsidies, and number of overnight stays during the years 2012-2014

Year	Accomodation tax (in Euro)	Number of overnight stays	Subsidies (in Euro)
2012	8 359 375	10 908 200	3 281 302
2013	9 491 389	11 486 571	3 392 752
2014	9 812 225	10 900 434	3 707 589

Source: Processed by the Financial Administration of the Slovak Republic, 2015.

This increases their dependence on public resources and reduces flexibility in decision-making and their activities (like public procurement, etc.). Regional tourist organizations in Slovakia are also financed by membership fees (local tourist organizations, regional government), and in a minority, from their own incomes.

Local tourist organizations originated on the basis of common conditions for tourism development. In a few tourist regions, there were more local tourist organization created, and in a few tourist regions there are not any or only one. Local tourist organizations do not copy their border of tourist regions from the Regionalization of tourism in Slovakia (2005).

To promote the tourism development in one area, a local tourist organization can be established with at least five municipalities with stakeholders from the private sector if accommodation facilities in this area recorded at least 50,000 overnight stays in the previous year. Membership in the organization is voluntary. If the local organization does not gather at least 5 municipalities in one area, it is possible to establish a local tourist organization with fewer municipalities, but the number of overnight stays must be at least 150,000 in the previous year.

Local tourist organizations in Slovakia, according to the Tourism support act, were established in 2012 and many of them were motivated by financial incentives. The second most frequent reason was the need of cooperation between and the promotion of the tourist destination. An important reason was the creation of common financial resources, since funding is the key issue in destination management organizations.

This biggest part of membership in local tourist destinations are tourism enterprises (accommodation, food and beverage, tour operators, and agencies) and local government of the town or village. The next biggest are cultural and educational institutions as cultural centres, exhibitions, concert halls, galleries, museums, theatres, cinemas, and event organizers (cultural, social, sports, business, exhibition, hunting, gastronomic, etc.). Specific members of local tourist organizations in Slovakia are tourism clusters, civil associations, etc.

Local tourist organization are representing the interests of its members in public, processing and implementing destination marketing strategy, and in charge of processing and submitting applications for subsidies, mainly from state budget.

For searching and motivating potential members, organizations are using personal interviews as communication with stakeholders in tourist destinations. However, the aim is not to find too many new members, but rather, have less members, but of better quality, who will have sufficient knowledge or experience to understand the importance of destination management. An important point is the personality requirements of representatives of local destination organizations and the members.

Table 2. Financial resources in local tourist organizations in Slovakia (in %)

Degree of priority	Financial resources	Lowest share	Highest share	Average share
1.	Membership fees	10	50	37.7
2.	State subsidies	10	70	44.7
3.	Voluntary contributions	0	20	7.0
4.	Subsidy/grant from municipality	0	20	4.1
5.	Own income	0	20	3.5
6.	Intermediation commission	0	10	1.2
6.	Irretrievable financial contributions	0	10	1.2
7.	Donations or sponsorship	0	10	0.6

Source: own research, 2015.

Membership fees and the own income of local destination management organizations should form a major part of their funding. The reality in Slovakia is different however, since there is a law that allows them to receive financial subsidies from the state budget. They are dependent on subsidies. Local destination organizations should become more independent and state subsidies should only be a complementary form of funding. However, this is also limited by law, which does not allow organizations to conduct their own business (Table 2).

For most local tourist organizations in Slovakia, membership fees and revenues from its own activities cover operating expenses (which cannot be financed from state subsidies) and partly their costs of doing business.

The use of financial resources from state subsidies is particular to destination management marketing (the creation and management of web pages, creation and distribution of information and promotional materials, designing and installation of information panels, etc.). In addition, local destination organizations build the brand of their destination that uniformly covers the destination, they make small tourism infrastructure (construction and maintenance of hiking and biking trails, etc.), they create a strategic plan for tourism development, implement event management, and participate in congresses, fairs, and exhibitions in Slovakia and abroad, where they present their tourist destination (Table 3).

Table 3. Utilization of financial resources in local tourism organizations in Slovakia

Degree of priority (Friedman)	Utilization of financial resources	*p*-value (Friedman test)
1.	Marketing management	9.32
1.	Branding of tourist destination	9.32
2.	Building tourism infrastructure	8.56
2.	Strategic planning	8.56
2.	Event management	8.56
2.	Participation in congresses, exhibitions, fairs	8.56
3.	Creation and distribution of destination product	8.18
4.	Visitors services	7.41
5.	Statistics, analysis, research	6.65
7.	Education and transfer of experiences	3.59
7.	Internal marketing	3.59

Source: own research, 2015.

Local tourist organizations in Slovakia have a problem with internal marketing in the organization (transmission of information to the members about membership, development, etc.) and surveys made in the tourist destinations (due to an absence of enough employees in the organization).

Problems in local destination organizations are connected with funding from private resources, involvement of more potential members from the private sector, and from ignorance and lack of information about the benefits of destination management.

The private sector does not see, in many cases, the real benefits of joining the local destination organization. A problematic part of activities in tourist destinations at the local level in Slovakia is the realization of profitable activities in the local destination organizations. The most problematic area is definitely the mentality and individualism of stakeholders in the tourist destination, especially from the private sector, administrative barriers, and legislative restrictions. On the one hand, there is a problem with the tourism stakeholders and with their mentality, and on the other hand, Law no. 91/2010 created conditions for regional and local tourist organizations.

Directors of surveyed organizations agree with the controversy of the law in Slovakia. On one hand, they are happy that the law was created, on the other, they see a lot of mistakes. For example, tourist destinations with more developed tourism receive more money from the government in comparison with regions or tourist destinations that are less developed.

The problem is in poor management of organizations, where success and effective cooperation is not possible. Likewise, being passive on the part of members creates problems in tourism development. In addition, in the case of local

destination organization, the biggest problem is the human factor. The human factor is the one that most often fails. The essence of the law is good, but the vision of public subsidies in the case of tourism development needs some work. Without the existence of Act no. 91/2010 Coll. on tourism promotion destination management would not be implemented, however, it is not done to the required level.

Only time and practice will reveal gaps that have already been identified. The problem was that there was only a year after the approval that putting the adjustments into practice took place and it was a very short time for any correction to happen. Thus, changes are necessary. Changing will require the income of some stakeholders and that willmismatch applications and the allocation of subsidies, enabling preventable activities for tourist organizations, in Slovakia.

The law only weakly supported the creation of a tourism product in tourist destinations and weakly evaluates the quality of tourist destinations.

The law makes no provisions for the educational level of the founders and employees in tourist organizations.

3. Tourism in Poland

Poland is located in the central part of the European continent whose geometrical centre is situated near Warsaw. In the north, Poland is washed by the Baltic Sea. The terrain of Poland cannot be called monotonous. If, in the northern part of the country, as well as inits center, Poland is dominated by lowlands and broad sandy beaches on the Baltic coast, then the southern part is home to the towering mountain ranges of Sudetenland and the Carpathians. Numerous forests and thousands of lakes and rivers are attached to the special charm of the Polish highland and lowland landscapes. Poland is characterized by a mild climate, which is provided by ocean air masses. The west winds bring cool and rainy days in the summer and heavy snowfalls in the winter, while in the east, there are hot summers and frosty winter. The weather is very unstable, rainy and overcast days often give way to sunny and clear skies. Poland has areas of outstanding natural value, both from the prespective of Europe and worldwide. There are still places hardly touched by civilization, like the wild and desolate Bieszczady Mountains with their spectacular pastures known as „poloniny", and the inaccessible flood plains along the Biebrza River, home to many rare bird species, sometimes found nowhere else in Europe. The most valuable gems of Poland's flora include the several hundred ancient oak trees in the Rogalin forest near Poznan. Social and cultural life, and above all, night life is thriving here, particularly in the big commercial, scientific, and cultural centres likethe coastal Triple City (Gdańsk, Gdynia, Sopot), Warsaw, Łódź, Poznań, Toruń, Wrocław and Cracow. Tourists also have the opportunity to take part in events of European repute [Piotrowski et al. 2010].

Tourism is an independent section of governmental administration covering tourist infrastructure development, mechanisms of market regulation, and recognition of qualifications of regulated professions (such as tour guides). Since 2007, tourism is within the scope of competence of the Minister of Sport and Tourism. The Minister of Sport and Tourism is responsible for: the preparation of system solutions that stimulate tourism development and an increase of national tourist products; the elaboration of and monitoring of programmes in terms of tourism implementation; conducting affairs related to the country land management in terms of tourism and recreation; conducting affairs connected with the act on tourism services 'implementation'; conducting the Central Register of Tour Operators and Tourism Retailers; assessment of the sector of tourist services functioning; taking up activities aimed at increasing the Polish tourist offer competition; taking up activities aiming to protect tourist services' consumers; running affairs connected with statistics reporting in tourism; running affairs connected with gaining foreign and national financial means dedicated to tourism development; and the running of affairs resulting from the Minister's supervision over the Polish Tourist Organization. In Poland, the primary role in tourism development is played by the local self-government (commune, district, marshals). Their competences include two different groups of tasks: all public affairs of a local or regional level which are not reserved by the law for other entities (the so called „own tasks"); And the performance of tasks ordered in the framework of governmental administration (the so called „commissioned tasks"). Competencies of a commune (*gmina*), as a local self-government unit „cover all public affairs of a local importance, not reserved by the law for other entities." In particular, tasks of commune include fulfilling the collective needs of a community. There are also the so called "own" tasks of a commune, to which belong matters such as: infrastructure development, ensuring safety, or environmental matters. The second function of a commune is the performance of tasks ordered in the framework of governmental administration (the so called „commissioned tasks"). Communes receive financial means from the state budget for their implementation. The promotion of tourism in Poland was conducted:

– at the central level by the Polish Tourist Organization (PTO);
– at the regional level by Regional Tourist Organizations (RTOs);
– at the local level by Local Tourist Organizations (LTOs) (Annual tourism reporting, 2010).

When we made a survey of the organizing and financing of destination management organizations at the regional and local level in Poland, we started from the current number of these organizations in country itself. Poland is, at the regional level, divided into 16 provinces, each responsible for the development of tourism in their own region. Regional destination management organizations are under the framework of regional policies, but from the national level, and work

closely with local organizations. Local organizations are analogous to the region and the number is currently 124 (as of January 12, 2015).

Regional tourism organizations operate under the management of provinces, therefore, would be analogous to higher territorial units (or regions) in Slovakia. Regional organizations were created as a result of the transformation undertaken in the field of tourism management and in accordance with the standards of the European Union. Based on these requirements, public administration reform took place and new structures of local government were created, which took over the tasks related to the strategy of regional development and tourism in accordance to the aforementioned laws that were established in Poland. The regional tourism organizations started to be established from 1999; the youngest of these organizations was established in 2006.

Membership of these organizations was made up of all cities and towns located in the province; within the local destination management organizations are other associations and associations of tourism, all education and educational institutions (secondary technical schools, universities) with a focus on tourism, cultural institutions, sports and recreational facilities, strong tourism operators from the private sector, individuals, etc. The average number of members is 94 and the average number of employees is 8. With regard to staffing, local tourism organizations employ an average of two employees, but in most organizations there would be regularly working volunteers. They are particularly helpful with administrative activities in the development of products and ancillary works. Volunteers come from secondary schools and universities and are even found among enthusiasts of tourism.

Local organizations have a similar functions as a regional ones, but with some different specifics. In the establishment of local organizations both the public and private sectors participated, as an initiative of public sector initiatives. Local organizations have begun only since 2001, unlike the regional ones, and are gradually emerging today.

Emerging partnerships emerged mainly because of the need for the cooperation in regions where there is no entity that would straddle the existing stakeholders in tourism development in the destination. The second reason was more attractive destinations in relation to other competing destinations.

The highest representation in local organizations are held by tourism businesses. In addition, cultural and educational institutions, sports and recreational facilities, public-legal institutions, and event organizers also have a place of important representation in local organizations.

The responsibilities of local organizations in Poland is to represent its members in public, process and implement marketing strategies of the destination, and hold information activities with regard to visitors along with consultancy activities in relation to members and the public. At least the local destination management

Table 4. Financial resources in local destination management organizations in Poland (in %)

Degree of priority	Financial resources	Lowest share	Highest share	Average share
1.	Membership fees	30	70	51
2.	Subsidy/grant from city/town/village	20	30	24
3.	Own income	0	20	7.2
3.	Irretrievable financial contributions	0	20	7.2
4.	Voluntary contribution	0	10	4.4
5.	Donations or sponsorship	0	10	3.6
6.	Intermediation commission	0	20	2.6
–	State subsidies	0	0	0.0

Source: own research, 2015.

organizations in Poland is responsible for dealing with the planning of tourism development at the tourist destination and statistical surveys, etc. All local destination management organizations collaborate with other tourist organizations.

The highest share of funding is from membership fees, which make up, on average, 51% of the total resources of the organization. The second largest share of funding is from grants and contributions from the village or city (at 24%). Local destination management organizations in Poland are not funded from the state budget. The lowest share of funding is from donations and/or sponsorships, which are rather complementary (Table 4).

Local destination management organizations use financial resources in branding a destination. A strong link with the brand marketing includes creating and

Table 5. Utilization of financial resources in local destination management organizations in Poland

Degree of priority (Friedman)	Utilization of financial resources	*p*-value (Friedman test)
1.	Branding of tourist destination	9.91
2.	Marketing management	8.82
3.	Participation in congresses, exhibitions, fairs	8.27
4.	Visitors services	7.18
5.	Creation and distribution of destination product	6.64
6.	Event management	6.09
7.	Strategic planning	5.55
7.	Internal marketing	5.55
8.	Education and transfer of experiences	5.00
8.	Building tourism infrastructure	5.00
9.	Statistics, analysis, research	4.45

Source: own research, 2015.

managing a website, promotional materials, and many other marketing activities. Another purpose for which the funds are spent is participation in congresses, exhibitions, and fairs, where organizations are promote their products and present their strengths in public. At least the activities undertaken in the Polish local organizations are the implementation of statistics, research, and analysis (Table 5).

Among the problem areas with the most frequent occurrence in our survey, we included the funding of organizations and the amount of funding that is insufficient in most cases. In second place was individual tourism operators. This may be because of a large number of stakeholders, which all have different interests, goals, and opinions. The least problematic area appears to be a lack of experience, skills, and knowledge of workers in the organization which may be due to a longer history of operation of local organizations in Poland compared to the Slovakia.

Conclusion

Tourism is one of the fastest growing sectors of the economy in both Slovakia and Poland. The interdisciplinary and regional character of tourism has a big impact on regional development of regions which are also tourist destinations. The concept under framework of sustainable development of each region is called destination management. The representatives of destination management are destination management organizations. Destination management organizations started to exist in Slovakia and Poland at regional and local level as well. It is important that, there have been changes in the law in order to create more competitive and less numerous destinations, to be managed by a strong management organization. The organization's activities are thus shifted from current marketing communication, towards the creation of tourism in the destination, and then, to quality management at the target site, where the visitor gets a comprehensive product in one place at one time with the required quality.

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Znaczenie ośrodków zarządzania organizacjami na Słowacji oraz w Polsce dla rozwoju regionalnego – analiza porównawcza

Streszczenie. *Turystyka jest jednym z najszybciej rozwijających się sektorów gospodarki zarówno w Unii Europejskiej, jak i na świecie. Słowacja i Polska są krajami o podobnej historii i warunkach dla rozwoju turystyki. Słowacja jest krajem mniejszym w porównaniu z Polską, ale i tu zaczęły powstawać ośrodki zarządzania organizacjami, które miały wpływ na rozwój regionalny. Celem niniejszej pracy jest ocena znaczenia ośrodków zarządzania organizacjami na Słowacji i w Polsce dla rozwoju regionalnego.*

Słowa kluczowe: *Destination Management Organization, turystyka*

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The Impact of Migration-Related Threats on the Security of European Countries

Abstract. *The article is a reflection on the impact of European migration processes on the level of socio-political security of the state and its citizens. This problem stirs strong emotions, because for one part of society the presence of immigrants raises concerns about the fate of their families, security and national identity. The article explains the threats posed by migration, describes the scale of the influx of foreigners to EU countries and identifies the main migration routes into Europe. The following categories of migration-related threats are discussed: social, economic, military and terrorist threats.*

Keywords: *migration, migrants, threats, Islam*

Introduction

As a result of phenomena such as globalisation, military conflicts, environmental degradation, hunger etc., humanity is experiencing a particularly turbulent and dynamic period in history. From a historical perspective, periods of this kind, known as transition periods, have always been characterised by a wide range of challenges for the security of societies, nations and the stability of international relations. The present transition period is the result of violent cultural changes transforming the entire human race. Rapid changes affecting modern civilisation, the volatile international situation and the political and economic co-dependence of states all contribute to making the world an unusually dynamic and complex

environment. There is no single, definitive initiative reflecting one trend of utmost importance for the existence and development of humanity, such as globalisation, the war against terrorism, unipolarity or multipolarity, or the doctrine of the legal state (Rechtsstaat). The lack of one definitive answer to the question about the dominant future trend does not imply that one should not look for and analyse the so-called megatrends, or changes concerning the key aspects of the global environment, which affect the modern world. One of such megatrends today is, no doubt, human migration.

The term "migration," derived from the Latin word "migratio," meaning "a change of dwelling," refers to the movement of people; "an element and the basic (in addition to circulation) form of spatial mobility; denotes territorial relocation associated with a relatively permanent change of residence" [PWN Encyclopaedia].

Migration involves a permanent or temporary (periodical) departure by individuals or larger groups of people or even entire societies from places of permanent (previous) residence and relocating to another place [Kraszewski 2003: 11]. According to another definition, migration is a relatively permanent relocation of a group of people, known as migrants, from one place of geographical space to another one, preceded by migrants making decisions based on a hierarchical system of values and goals [Mach 1998: 14]. Determinants of migration can be divided into three categories.

The first one includes economic factors, such as poverty, unemployment, low wages and globalisation. The second category comprises social factors including high rate of natural increase, lack of appropriate social care programmes, lack of basic health care and shortages in the education system, discrimination based on ethnicity, religion, national origin or race. The last category includes political factors, such as the disintegration of multinational states, ethnic and religious conflicts. As a result of the influx of a large number of emigrants, countries face new threats associated with national security and the security of their citizens.

The main purpose of this article is to identify the key migration-related threats to Europe's security. In order to reach this goal, it was necessary to undertake a number of various research steps. The main part of the study consisted of theoretical research (analysis, synthesis, comparison and generalisation). Information obtained from fragmentary empirical research (solicitation of expert opinion) and participation in scientific meetings was used to verify the theoretical findings.

1. Migration threats – the underlying theory

In order to identify and interpret phenomena in the surrounding reality, it is necessary to define basic terms, one of which is the concept of "threat." The con-

cept of "threat" refers to a confluence of undesirable phenomena which can even lead to annihilation. B. Zdrodowski defines "threat" as "an antithesis of security, which results from a certain development of a situation, a coincidence of events or adverse phenomena that have given rise to that situation, which are perceived subjectively as a threat" [Zdrodowski 1996: 39]. According to the lexicon of military knowledge, "threat" is defined as a "situation in which there is a higher likelihood of the loss of life, health, freedom or material goods. A threat induces anxiety and fear of varying intensity, ranging from fright or petrification to an impulse or action to counteract. A threat can arise from natural causes (e.g. natural hazards) or be posed by another person (e.g. an enemy)" [Laprus 1979: 510]. Most commonly, however, a threat is understood to refer to a situation associated with a probability of a state of danger to the surrounding environment [Radomyski & Dobija 2010: 57]. It is defined as an indirect or direct destructive impact on the subject [Huzarski 2009: 12]. In fact, identification of threats involves answering the following questions:

– What can possibly "be or go wrong" in a given situation?
– What are the possible causes of such a development?
– What things may prevent us from reaching our goals or performing planned tasks?
– What specific situations, decisions, events etc. can disrupt the functioning of the state?
– What potential irregularities or losses can happen as a result?

Security threats are largely determined by the modern security environment and are consequences of challenges and unused political, economic, military, social, ecological cultural and ideological opportunities. A general description of security threats facing EU member states and interests of the European Union is provided in the European security strategy entitled "A secure Europe in a better world," adopted in December 2003 [A secure Europe 2003]. Among the key security threats to the EU, the document mentions terrorism, the proliferation of weapons of mass destruction, regional conflicts, state failure and organised crime. However, nowadays it is also recognised that the influx of population, including economic migrants and refugees, is posing a new threat to the security of individual EU countries. This is particularly relevant considering the fact that, in addition to legal migration, there is a dangerous upward trend in people smuggling into EU, controlled by organised crime groups and terrorist organisations. According to statistics, only in the first quarter of 2016 as many as 284,000 migrants entered the European Union (see Table 1). It is over five times the number of new arrivals in 2015. Over 60% of immigrants to the EU are refugees from war-torn regions of Syria, Eritrea and Afghanistan. Others come from Libya, Sudan, Pakistan, Nigeria, Somalia or Iraq.

Table 1. The number of illegal immigrants

	2014	2015				2016	2016 Q1		
							% change on		% of total
	Q4	Q1	Q2	Q3	Q4	Q1	year ago	prev. Qtr	
All Borders									
Not specified	98	102	232	91 119	464 981	102 343	100 236	–78	36.0
Syria	22 274	12 329	52 920	306 413	222 397	76 048	517	–66	27.0
Afghanistan	9 308	6 862	31 022	92 216	137 385	39 941	482	–71	14.0
Iraq	1 270	1 559	5 321	23 798	70 597	25 403	1 529	–64	8.9
Pakistan	902	1 062	8 046	21 463	12 739	5 956	555	–45	2.4
Iran	158	251	737	3 536	20 147	4 903	1 853	–76	1.7
Nigeria	2 178	1 087	8 044	10 188	4 286	3 502	222	–18	1.2
Gambia	2 571	1 512	2 478	2 746	2 138	2 487	64	16	0.9
Guinea	670	568	1 117	1 433	2 056	2 264	299	10	0.8
Somalia	2 191	1 664	6 477	5 092	4 461	2 179	31	–51	0.8
Others	38 270	33 562	51 598	57 458	36 978	18 499	–45	–50	6.5
Total All Borders	79 890	60 558	167 992	615 462	978 165	284 525	370	–71	100.0

Source: FRAN Quarterly, Frontex, Warsaw, August 2016: 19.

There are six major entry routes for migrants (see Figure 1). The first one, through Murmansk, is used mainly by Syrians travelling to Norway via Russia. The second, East-European one, crosses the Eastern border of the UE (mainly via Poland) and is used by the Vietnamese, Afghans and Syrians. The third one is the Western Balkans route, leading via Balkans to Croatia, Slovenia and Hungary, most frequently chosen by immigrants from Syria and Afghanistan. The Eastern Mediterranean route, by sea to the Greek islands, is used by Syrians, Afghans and Iraqis. The Central Mediterranean route, leading across the sea to Italy, is used by Eritreans and Nigerians. The Western African route, across the sea to the Canary Islands, is used by Guineans, Ivorians and Gambians. The last route, the Western Mediterranean route, taken by Syrians, Guineans and Algerians to the Spanish enclaves of Ceuta and Melilla or by sea to Spain. For inhabitants of the Middle East – Syrians, Iraqis and Iranians – the meeting point is Istanbul in Turkey. From there they go by land to Bulgaria or Greece, or by sea to Greece. Sometimes they travel by air to Cairo (Egypt), Tripoli (Libya) or Khartoum (Sudan). Migrants and refugees from Sub-Saharan Africa (mainly Eritreans) and Asia (mainly Afghans) use the sea route through Libya, where all the migration routes from the Eastern and Western part of the continent meet. In addition, increasingly many Afghans can choose the route via Turkey, using a dense network of flight connections in Africa to join migrants travelling along the route through Greece and the Balkans.

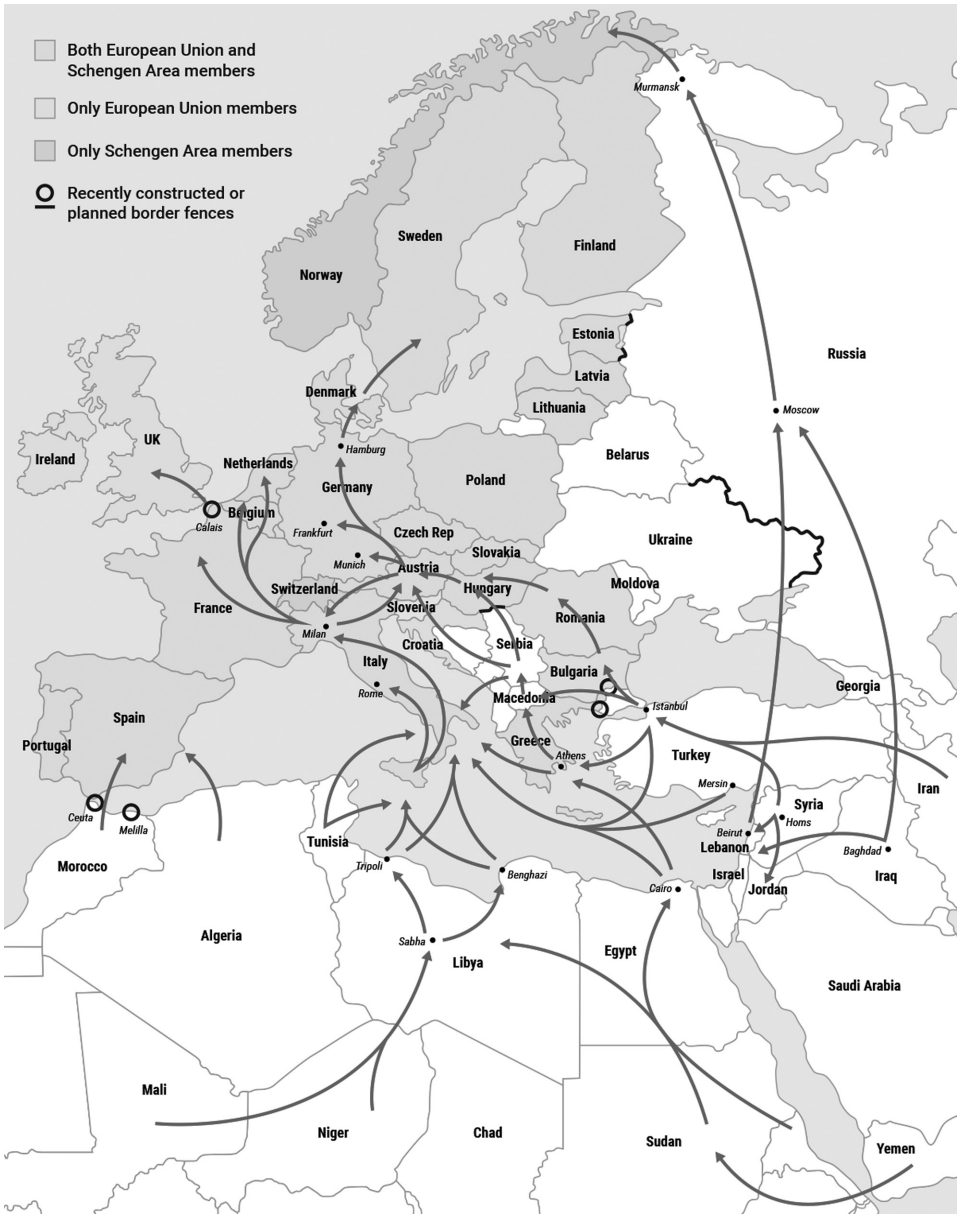

Figure 1. Migration routes into Europe

Source: www.businessinsider.com/map-of-europe-refugee-crisis [access: 15.09.2016].

2. Social threats

Social threats refer to all situations that pose a life or health hazard or threaten cultural, national or ethnic identity, social and public security. In 1993 Samuel P. Huntington put forward a hypothesis that in the modern world it is not ideologies or the economy that will be the primary sources of conflict but rather people's cultural and religious identities. Conflicts will occur between nations and groups representing different civilisations. Many civilisations are showing symptoms of a cultural identity crisis, which can manifest itself in socio-political relations between civilisations [Konstanty 2007: 417-418].

The phenomenon of migration results in a weakening of tradition, local customs and a weaker sense of independence of particular countries. This situation poses threats to national cultures resulting from a clash of different cultures and identities. For instance, it will be hard for Catholics to accept Sharia law[1], honour killings, same-sex partnerships, etc. There is also the problem of cultural integration of immigrants and the need for governments to pursue a policy of equal rights, which necessitates changes in the cultural identity of a host society. The influx of a large number of immigrants generates strong social tension, frequently finding an outlet in protests and outbursts of unrest, causing serious disruption to public order. Such cases have happened many times in multi-ethnic, multi-religious and multinational countries.

Large and unlimited migration increases the possibility of infection with diseases, especially infectious diseases imported from pandemic or epidemic hotspots. Uncontrolled outbreaks of diseases and failure to follow safety procedures can have a negative direct impact on a country's inhabitants, and indirectly, on its economy and other areas of life. Migration gives rise to ethnic ghettos or enclaves, which causes tension and decreases the sense of security in the native population within their own country. The present rise in the number of offenses in Europe, including cases of rape, sexual and physical harassment, robberies, burglaries and illegal drug trade coincided with a record influx of refugees from Africa, Asia, the Middle East, and the Western Balkans. There are more and more clashes involving large numbers of immigrants that take place in the streets and refugee centres. In some EU countries many immigrants are involved in illegal activities, such as drug trafficking, human trafficking, money laundering and other international offenses. In some cities, Arab crime clans control the activity of organised

[1] Sharia law regulates religious duties and everyday etiquette, modesty and morality, private and trade contracts, marriage and divorce, family, inheritance, politics, economy, rights of indiduals. Sharia does not recognise the separation of religion and state and regulates all activities of everyday life, e.g. ways of preparing food or dressing source (in Polish): www.se.pl/wiadomosci/ciekawostki/szariat-co-jest-szariat [access: 18.09.2016].

crime; they get involved in illegal drug trade, break into shopping centres, while at the same time, introducing a "parallel system of justice" and resolving conflicts through mediators from other crime families. When the country's authorities get involved, the clans bribe or threaten witnesses to change their testimonies.

Another consequence for host countries is connected with the demographic problem. Since 1997, when the population of today's EU countries reached its highest level, the number of Europeans has been declining. According to the current UN projections, the population of Europe is going to decrease by 30 million by 2050. It is generally assumed that the replacement level fertility is 2.1, which is the minimum required to ensure that the subsequent generation is large enough to ensure social and economic stability. At present, the mean fertility rate is 1.6 children per woman; in France it is at the level of 2.1 children. This increased fertility rate is due to a large number of immigrants, particularly from Islamic countries, where women have very high fertility.

According to estimates of Pew Research Center, an American fact tank, European countries are currently inhabited by 44.1 million Muslims. Most Muslims live in Germany (4 million out of the population of 80.7 million), in France (3.5 million out of 65.5 million) and in the UK (1.6 million out of 63 million).[2] In the European Union the total fertility rate of Muslim women is higher than that of European women. Muslim families are bigger, frequently living in extended households, and usually with a strong sense of entitlement. The current fertility rate of Muslim women is 2.2, while the mean fertility rate of European women – 1.6. At this rate, given the continued mass influx of Muslims into Europe, there is a risk of a fundamental change in Europe's population structure. According to projections for 2030, in some countries the Muslim share will exceed 10% of the total population (see Table 2). However, these changes will be local and mostly associated with large urban agglomerations, since this is where Muslim enclaves are currently most numerous. Even today Muslims Against Crusades, a UK-based radical Islamist group, demands that English towns of Bradford and Dewsbury and some districts of London should be designated as Sharia zones and be governed by rules of "intercultural integration," which is not a unique case – similar demands have been voiced by imams (spiritual leaders) in other countries. These tendencies pose a threat because it is big cities that set cultural and political trends in a country.

Migration-related problems have divided the European Union, especially when it comes to the obligatory programme of relocation of illegal Islamic immigrants. The idea is supposed to be a remedy aimed at stopping alleged refugees from leaving poor host countries, where they have no hope of obtaining a flat or social benefits, which are many times lower than those in Germany or Sweden.

[2] Based on data published by Pew Research Center: www.pewresearch.org [access: 16.09.2016].

Table 2. The growth of the Muslim population in selected European countries

Countries	Estimated muslim population	Estimated percentage of population that is muslim	Projected muslim population	Projected percentage of population that is muslim
	2010		2030	
Austria	475,000	5.7	799,000	9.3
Belgium	638,000	6.0	1,149,000	10.2
Denmark	226,000	4.1	317,000	5.6
Finland	42,000	0.8	105,000	1.9
France	4,704,000	7.5	6,860,000	10.3
Germany	4,119,000	5.0	5,545,000	7.1
Greece	527,000	4.7	772,000	6.9
Ireland	43,000	0.9	125,000	2.2
Italy	1,583,000	2.6	3,199,000	5.4
Luxembourg	11,000	2.3	14,000	2.3
Netherlands	914,000	5.5	1,365,000	7.8
Norway	144,000	3.0	359,000	6.5
Portugal	65,000	0.6	65,000	0.6
Spain	1,021,000	2.3	1,859,000	3.7
Sweden	451,000	4.9	993,000	9.9
Switzerland	433,000	5.7	663,000	8.1
United Kingdom	2,869,000	4.6	5,567,000	8.2
Total for these countries	18,267,000	4.5	29,759,000	7.1

Source: Pew Research Centre.

In response to immigrants' reluctance to move to less affluent EU countries, EU politicians are planning to introducing obligatory migrant quota for these member states. The fact is, however, that over half of EU member states is against the quota programme, arguing that the idea of the European Commission undermines their sovereignty. Resistance from nationally homogeneous countries of Eastern Europe, which refuse to accept Muslim migrants, is a source of internal tension and division within the EU.

3. Economic threats

The impact of immigration on the tax system and the system of social benefits, coupled with the overall consequences for the state budget are the most important economic problem in the context of migration-related threats. The influx of a large number of people into a country or a region causes economic problems, such as deteriorating standards of living for the native population, a rise in unemployment

and high inflation. Immigrants find it difficult to find employment in the local labour market. Every second one is unemployed, not only because of the language barrier, but mainly because of the lack of elementary occupational training. For this reason most immigrants rely on the system of social benefits. Migration motivated only by the desire to profit from social benefits is particularly popular in the rich countries of the European Union. It should be noted that current regulations in some countries actually encourage immigrants to depend exclusively on this form of financial support. Recently, for example, in the UK, in spite of the legal ban on polygamy, Muslim men in polygamous marriages have been granted the right to claim social benefits for all their wives. In Germany every foreigner who has been seeking a job for longer than 6 months is entitled to receive social assistance. The burden placed on the state budget is increased by expenditures associated with supporting migrant centres, anti-migration measures, which results in higher spending on health care, public security and environmental protection, etc. Countries, such as Hungary, Greece and Austria, spend millions of euros to secure their borders and verify immigrants entering the EU. Moreover, the migration crisis has increased the costs of transport throughout Europe, as a result of the situation at the borders. Controversies surrounding immigrants discourage potential tourists, which generates losses for the tourist industry and local governments, while terrorist attacks in Brussels and Paris have shown that the EU needs additional funds for anti-terrorist operations and the protection of public buildings. An additional 1.5 billion euro in the EU budget for 2016 was allocated (by mobilising the Flexibility Instrument) to finance some migration-related measures. This made it possible to support the Asylum, Migration and Integration Fund and the Internal Security Fund, and increase the funds for Frontex, the European Asylum Support Office (EASO) and Europol. The scale of the migration and refugee crisis leads one to expect additional needs that will need to be addressed in the coming years, with considerable consequences for the EU budget. Additional funds may also be required to counteract internal security threats and terrorism.

4. Terrorist threats

Wacław Kopaliński in his dictionary of foreign words and phrases defines terrorism as organising assassinations (by armed assassins or using explosives) of government members or people in positions of power, political opponents, people of different religion or race, foreigners or passers-by, kidnappings, hijackings in order to take over power, spread fear, chaos, instigate social unrest, derive benefits for groups or cabals, including acts of violence without clear motivation [Kopaliński 2014: 78]. Terrorism is also defined as an act or a threat of violence committed by non-state actors and intended to cause fear in a wider group beyond

the one immediately targeted in an attempt to achieve specific political goals, e.g. the overthrow of the current political order [Oleksiewicz 2011: 633-634].

In the EU security strategy the threat of terrorism is treated as a global threat of strategic importance to the whole of Europe. It is estimated that terrorist organisations have enough resources to conduct global activities and are ready to use violence to inflict massive property damage *and* civilian casualties. In the EU security strategy terrorist organisations are identified with radical movements motivated by religious extremism, social, cultural and political crises, and the alienation of the young generation living in culturally foreign societies.

In view of the fact that a number of terrorist organisations are operating in the EU countries, the strategic assessments formulated in 2003 perceive terrorism as an external and internal threat to the security of the EU[3].

In the Report on the Implementation of the European Security Strategy – Providing Security in a Changing World, published in 2008, terrorism is still assessed as a major threat to societies of the EU. However, the document focuses on the internal dimension of terrorism, which manifests itself in activities of home-grown groups involved in recruiting new members among EU citizens born in EU member states.

The document emphasizes threats associated with the growing scale of terrorism as a result of radicalisation, extremist ideology and discrimination [Report on the Implementation... 2008: 4]. Extremism and Islamic terrorism constitute a new factor which is emerging as a threat to the security and stability of EU member states. The radical vision of Islam, with an openly anti-Western rhetoric promoted by extremist Sunni Muslim groups, which resort to terrorism as their main method of struggle. It is a relatively new threat, which does not have a typical military character and cannot be easily grasped in terms of classic geopolitics, since it is posed by non-state actors that operate independently of activities of particular countries. More importantly, the threat comes not only from outside the EU (mainly from the Middle East, South Asia or North Africa), but also from within: in the form of increasingly active and aggressive communities of Muslim immigrants and their descendants (especially in Western Europe). In 2015 there were reports about the growth of Daeash (the Arabic acronym of the Islamic State) in Bosnia and Herzegovina, which is where most Muslim terrorists are recruited to fight in the Middle East. The progressive radicalization of Muslims in Albania, Bosnia and Herzegovina, and Kosovo and in other countries is a problem which will have to be addressed, as much as gradual state failure. According to Magdalena Adamczuk, the current problem of Islamic terrorism in Europe comprises:

[3] According to the strategy, logistical bases for Al Qaeda cells have been uncovered in the UK, Italy, Germany, Spain and Belgium.

– Islamic terrorist groups with headquarters and training camps located in Muslim countries and committing acts of terrorism in European countries;

– The "export" of European Islamists who commit terrorist attacks in such countries as the USA, Israel or Afghanistan (people born and raised in Western countries get involved in jihad and commit terrorist acts in non-European countries);

– Radicalisation of European Islamists who took part in conflicts in Afghanistan, Bosnia or Iraq and are returning from conflict zones to commit terrorist acts in the name of Al-Qaeda – the phenomenon is known as *blowback* and is particularly dangerous since terrorist fighters looking for new targets in their countries of residence can rely on their experience of using weapons and explosives;

– Radicalised European Muslims, born and raised in Europe, enjoying their rights as citizens of the world, who commit terrorist acts in their countries of origin [Adamczyk 2011: 63].

All the above categories of Islamic terrorists are involved in migration processes. In the first case, we deal with the movement of terrorists between countries in order to carry out terrorist plans (using instruments of temporary migration – student, business or tourist visas). The other cases are mainly associated with activities of immigrants or descendants of immigrants in the second or third generation.

5. Military threats

Immigrants arriving in Europe bring along their social conflicts. In addition to the ethnic conflict between Turks and Kurds, Europe is witnessing the division between Sunnis and Shiites, which is the underlying cause of many present conflicts in that region. However, it is not the conflicts occurring in Muslim countries that pose a threat to Europe but rather the clash of two civilisations: Islam and the Western world. These conflicts have existed for centuries, and the last one in the Balkans demonstrated that religious wars can arise again in the future. It is noteworthy to quote an opinion expressed by one of the most known contemporary politologists, Samuel P. Huntington: "The fundamental problem for the West is not Islamic fundamentalism. It is Islam, a different civilization whose people are convinced of the superiority of their culture and are obsessed with the inferiority of their power. The problem for Islam is [...] is the West, a different civilisation whose people are convinced of the universality of their culture and believe that their superior, if declining, power imposes on them the obligation to extend that culture throughout the world. These are the basic ingredients that fuel conflict between Islam and the West" [Huntington 1996: 217]. According to Huntington, cultural contrasts determine the course of future events and global politics. At

a local level cross-border wars, mainly between Muslims and non-Muslims, can easily escalate. The quasi war triggered by the revival of Islam was initiated by Islamic extremists. Their main goal is to subordinate all religions to Islam, destroy America and enable Islam and Muslims to take control over societies of the world. Islamic extremists believe that the Western civilisation is waging a war on the civilisation of Islam in order to destroy its culture, customs and religion. According to the spiritual leader of Iran, Ayatollah Ali Khamenei (aged 73), a big conflict will soon break out, which will be perceived as a war of two worlds – the world of Islam and "the world of Western culture". In his opinion, this is how the war will unfold: it will start with a war between Islam and the West, which will be followed by the coming of the Imam Mahdi, who will save the world and establish the eternal Islamic rule and destroy the culture of unbelievers.

The disconcerting fact is that more and more people with an immigrant background are joining the ranks of different uniformed services. In countries like the UK, Belgium or the Netherlands immigrants are encouraged to join police forces in order to improve public security and counteract crime in areas inhabited mainly by immigrants. In some European armies the ethnic background of army candidates is not taken into account: for example it is enough to have a German passport to serve in the Bundeswehr. This is why the ranks of the German army, numbering about 167,000 soldiers, are joined by increasingly many immigrants. While most of them are privates (26% of all soldiers), some are high ranking officers, from a major upwards, who account for 7% of the armed forces. It is hard to assess if all those who decide to pursue the career of a police officer, soldier or a border guard, are interested in a good wage or perhaps are motivated by other patriotic or ideological reasons. The fact remains that such people become familiar with the security systems of military bases, receive general and specialist professional military training and get access to weapons, all of which enables them to practise skills that can be used not only by crime organisations but also by terrorist groups or help them commit individual terrorist acts as servants of Allah.

Migration also has a negative effect on defence budgets of European countries. In Belgium it is expected that the rate of defence spending as a percentage of GDP may decline by 0.5%. In Germany expenditure on migrants of 50 billion euro already exceeds the budget of the Ministry of Defence, which in 2016 amounted to 35 billion euro. A decision to no longer maintain particular defence capabilities entails a risk in the event of an unexpected threat.

Summary

Migration movements can pose both indirect and direct threats to many security aspects of particular countries or entire regions. As can be seen from numerous

historical examples, migrations often triggered major social, cultural, economic and political transformations, paving the way for new or bringing down existing forms of social organisation, such as states, nations or societies. In the past migrations sometimes took the form of military conquests and led to the extermination of entire nations. In the context of contemporary migration flows, among the major threats facing European countries are: terrorism, organised crime, political extremism, crises that can lead to the weakening or destruction of social bonds, and illegal migration. Terrorist attacks, unrest and mounting social tensions between native inhabitants of Europe and Muslims, fuelled by nationalist sentiments, lead to a growing social resistance to further immigration. Europeans are becoming increasingly concerned about the strategy of peaceful coexistence with largely Muslim immigrants, believing that it is not realistic, which is why many simply reject it. There are growing concerns about the security and future of Europe and nothing will change it, at least in the short term. For this reason, migration cannot be treated as a marginal problem, even if its effects do not resemble those known from the past.

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Wpływ zagrożeń migracyjnych na bezpieczeństwo państw europejskich

Streszczenie. *Niniejszy artykuł zawiera rozważania na temat wpływu procesów migracyjnych w Europie na poziom bezpieczeństwa społeczno-politycznego państw i jego obywateli. Jest to pro-*

blem, który budzi wiele emocji, ponieważ wśród części społeczeństwa obecność imigrantów wywołuje niepokój i obawy o dalsze losy ich rodzin, bezpieczeństwo i tożsamość narodową. W artykule wyjaśniono istotę zagrożeń migracyjnych, zidentyfikowano skalę napływu cudzoziemców do krajów Unii oraz wskazano główne ich drogi przemieszczania. Następnie odniesiono się do poszczególnych zagrożeń związanych z procesami migracyjnymi. Zaliczono do nich: zagrożenia społeczne, ekonomiczne, terrorystyczne oraz militarne.

Słowa kluczowe: *migracja, emigranci, zagrożenia, islam*

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The Corporate Sustainability Concept as an Instrument of a Firm's Development

Abstract. *The objective of the article is to propose a possible way of implementing the concept of sustainability into the corporate strategy through the example of a particular company. It is based on primary research and on the Epstein model of corporate sustainability. We looked at the issue from the perspective of inputs, processes, measurement, and implementation. This model can lead enterprises in developing tools for better concepts in routing and management of corporate sustainability. In the case that the company wants to propose a concrete complex system, each component of the framework should be linked to specific performance indicators to ensure control over the implementation and assessment of the state of the researched areas.*

Keywords: *development, Corporate Sustainability Concept*

Introduction

This article deals with the issue of sustainable development through the example of a selected company. For this issue we use the term corporate sustainability. Corporate sustainability is a concept which is focused on long-term viability of the company, as well as, managing the environmental and social aspects at the company level. This fact is now considered important and, for this reason, we decided to tackle this subject. For the concept of corporate sustainability, we will take a look from the perspective of corporate performance.

The scientific objective of the article is to propose a possible way of implementing the concept of sustainability into the corporate strategy by means of using an example of a particular company.

The article is based on primary research and analyzes the dimensions of corporate sustainability through the example of a particular enterprise. The proposal of creating and implementing the concept in corporate strategy is based on individual interviews with representatives of the selected industrial enterprise, compilation of an index of sustainable development, the analysis of enterprise resource utilization, and the use of the corporate sustainability model.

For this contribution we consider the identification of individual opportunities of using the concept. The formation and implementation of the design of the corporate sustainability concept into the business strategy was inspired by the Epstein model of corporate sustainability, while we looked at the issue from the perspectives of inputs, processes, measurement, and implementation.

1. The current state of the solved issue

Based on a literature study, of mainly foreign sources, it is evident that the terminology of the subject is indicated by a number of terms: Corporate Sustainable Development, Corporate Sustainability, Sustainable Enterprise, a Firm Promoting Sustainability, and so on. In connection with this fact, it is necessary to distinguish, as J. Hyršlová [2009] shows the "sustainable" companies and companies which adopt the concept of sustainable development and try to make business activities consistent with this concept. In the case of this sustainable movement, companies are required to undertake many changes in all business processes, objectives, and target values. Therefore, it is necessary to implement a number of measures and practices that can reduce the negative impacts and enhance positive effects within the business practice itself. This means that the company is on the path towards sustainability and sustainability is the ultimate goal that the company aspires to. In our viewpoint, we are closer to the opinion of the author and consider it correct. In the terminology related to sustainability it is important to clarify what this term represents. In general, the terms of sustainability can be understood in the sense of the effort to maintain status quo. Different understanding of this term implies the achievement of sustainability by balanced economic, environmental, and social factors in the course of further development. On the basis of foreign and domestic literature we consider the concept of "corporate sustainability" adequate to encompass the notion of the sustainable development of enterprises and in this dissertation for the purpose of this paper we use the term corporate sustainability.

1.1. The essence of the concept of corporate sustainability

The concept of corporate sustainability is based on the need to ensure a more sustainable model, saving natural resources, respecting and supporting human beings, not only in close surroundings to the business enterprise, but also, on a wider scale. Corporate sustainability has three dimensions (economic, environmental, and social) whereby an integral part of it is the institutional framework for its implementation. M. Wilson [2003] defines the term of the corporate sustainability concept as an alternative to the traditional model of growth and profit maximization. This concept, on the one hand, is recognized as an important factor in business growth and profit, on the other hand, also requires the implementation of social objectives in terms of sustainable development. According to J. Zelený [2007: 257] the concept represents "policies and practices ensuring the current requirements of stakeholders so that their satisfaction was in accordance with the principles of sustainable development, therefore that the existing activities allow to meet the needs of future generations, especially in terms of sufficiency and range of natural resources, and in view of environmental protection". It primarily affects business and industry, seeing that these fields have synchronized such an important role in the context of the implementation of rules and principles of sustainable development. In summary, it is mainly about the companies that bring broad social value, including the promotion of health and human rights, regional development, and fair internalization, respect for the environment by promoting technologies to reduce emissions and greenhouse gases, and implementing effective environmental risk management into their organization [CSR Quest 2011]. The current industry practice is applying the concept of sustainable development supported through a series of voluntary tools, methods, and standards to ensure quality and improve business performance. Examples of this are the quality management systems, environmental management systems, guidance on social responsibility, clean production, the method of product life cycle, eco-labeling, and so on.

The concept of sustainable development is mainly linked with the concept of corporate social responsibility. The European Commission defines the term of corporate social responsibility in the Green Paper as „the voluntary integration of social and environmental concerns into everyday business activities and interaction with business stakeholders" [Green Paper 2001]. V. Marková [2012; 2014] under the term of corporate social responsibility understands it as „such business activity, within which the company behaves responsibly beyond the legal standards, while such behavior is not rare but permanent, is a natural part of its strategic direction." In the examination of the literature we have identified three

basic approaches to the interplay of these concepts. The first approach: many scientific studies based on the conviction that sustainable development and corporate social responsibility can be used as synonyms [Baumgartner & Ebner 2008]. The second approach: some authors [Marasová 2008; Čierna 2008] understand the social responsibility concept as a contribution to sustainable development. The third approach: based on the research of D. Ebner and R.J. Baumgartner [2008] claim that the supporters of the term sustainability identify with the social responsibility concept, respectively, they argue that sustainable development is the basis for social responsibility, mixes these terms and changes their original meaning. They understand the term of corporate social responsibility as part of the social concept of sustainable development. In our view, the sustainability concept speaks of the long-term viability of the company in a sense of sustainable development, corporate social responsibility, and monitors the consequences of corporate activity on the environment, so we consider corporate social responsibility as part of the sustainability of the business.

Despite the fact that many foreign companies, in particular, have embraced sustainable business practices, there still exists apprehension about the benefits of implementing this concept. In regard to the objectives of the entrepreneurship, it is clear that the enterprise accepts the concept of sustainable development when it will be aware of the economic benefits of the responsible attitude to the environment and the compliance with the principles of social responsibility to contribute to the economic prosperity of the enterprise [Hyršlová 2009: 10]. On the other hand, the promotion of activities geared towards sustainable development involves the creation of costs [Lourenço et al. 2011]. Different opinions exist on the motives of accepted corporate sustainability practices. In the long term they can bring an increasing competitive advantage [Clark, Feiner & Viehs 2014; Fleming et al. 2005; Lourenco et al. 2011], improved business performance [Adams, Thornton & Sepehri 2012], and long-term success [Goldsmith & Samson 2005; Eccles 2012].

The application of the corporate sustainability concept means an endeavor to run the business development in a way that will bring the company long-term success through synergies arising from its focus on three dimensions: economic, environmental, and socio-social [Marková & Lesníková 2015: 631].

In addition to several motives which are leading to the implementation of the concept of corporate sustainability, various barriers appear that make it difficult to implement the concept in the meaning of the principles of sustainable development. Enterprises are inherently more and more focused on short-term economic performance, as a long-term vision for environmental and social sustainability. This results primarily from the anthropocentric character and values, manifested by a lack of a holistic view of the business [Setthasakko 2007; Ionescu-Somers 2012]. Most enterprises struggle with the pressure of making a quick profit through

its performance as a barrier leading to value creation. Other barriers to classify are the lack of incentives, leading to the implementation of activities for sustainable development. They misuse key sustainability indicators, have a lack of support from company management, and a lack of data and information to implement sustainable initiatives. In some companies, the issue of sustainability is set as too low of a priority, or the undertaking has a lack of administrative capacity or skills [Bonini 2012].

1.2. The strategic dimension of the corporate sustainability concept

Success of the strategic managers when leading a business towards sustainable management depends on their ability to create and implement processes that can integrate economic, social, and environmental commitments of the company. These procedures are referred to as sustainable strategic management [Stead & Stead 2012].

According to the authors G. Hrdinová, K. Drieniková, T. Naňo, and P. Sakál [2011] the strategy of the sustainable development of enterprises is inherently a complex, main strategy of the company. This strategy is based on the principles of the sustainable development concept. We agree with this thought and, in our view, at the same time highlight that a key issue for management is to determine the method, as well as, the necessary tools for the creation and implementation of the strategy itself. If the company has an interest to implement the principles of sustainable development into their business activities, it is necessary to follow several steps: to perform a stakeholder analysis, and to set sustainable development policies and objectives. To take into practice, it is important to design and execute an implementation plan, develop a supportive corporate culture, and develop measures and standards of performance as well. Finally, the management should prepare reports of the corporate sustainability state and enhance internal monitoring processes (Business Strategies for Sustainable Development).

In the context of recent trends and approaches to strategic management, resource-based approaches (resource-based view) appear, which mainly focus on the analysis of enterprise capabilities and resources. For this purpose, it is possible to use methods of internal analysis VRIO (value, rareness, imitability, and organization), which examine the internal environment in terms of four criteria: usefulness, rarity, imitation, and organization [Slávik 2005: 133]. The understanding of sustainable competitive advantage sources is becoming a major area of interest for businesses within the scope of strategic management [Barney 1991].

In addition, it is necessary to recognize the company`s own source of competitive advantage and use tools supporting the creationg and implemention of corporate sustainability strategies (for example, the Balanced Scorecard or model

of corporate sustainability). Corporate sustainability brings out the „sustainable" BSC which is the enlargement of classic dimensions (financial, customer, internal business process perspective, and the perspective of learning and growth) by perspective on the environment and society perspective (Bieker). Another example of tools used in the process of strategy implementation in conjunction with the corporate sustainability concept is the corporate sustainability model proposed by M.J. Epstein. The sustainability strategy implementation is an important challenge for managers who are often confronted with how to manage the paradox of improving social, environmental, and financial performance all at the same time. For the implementation of the sustainability strategy it is critical for managers to understand the causal relationships between the different activities that are carried out and their impact on performance, understand the potential and actual impacts on financial performance, as well as, to integrate sustainability into the operational decisions, strategic decisions, and decisions in connection with sources [Epstein 2008; 2010].

2. The objective, data collection and methodology

The objective of the article is based on the example of a particular company in order to propose a possible way of implementing the concept of sustainability into the corporate strategy.

We focused on the analysis of corporate sustainability in terms of a specific industrial enterprise, and we relied on interviews with selected representatives of the company, from the current situation in different areas (economic, environmental, and social), their assessment through the creation of an integrated index of sustainable development and the methods of internal analysis, VRIO. The conclusion of this phase was the proposal of incorporating the concept into the corporate strategic levels of the enterprise. Our goal, through the research questions, was to find out what were the possibilities for the creation and implementation of the corporate strategy of sustainability to the company:

1. Research question Q1: What are the specific parameters of the examined company in all three areas of the concept of corporate sustainability, as well as, part of its strategic plane?

2. Research question Q2: What would be the motive, or reason, may the enterprise have at the inclusion of the concept in the strategy?

3. Research question Q3: Does a studied enterprise have conditions for the formation of the corporate sustainability strategy?

4. Research question Q4: What are the most important factors influencing the development and implementation of the strategy?

5. Research question Q5: What could be the procedure in creating and implementing corporate strategy in the enterprise, and what tools would have to be used?

6. Research question Q6: Is there a difference between enterprises of different size categories and from different industries throughout the development and implementation of corporate sustainability into a strategy?

In order to ensure compliance with the objective of the article, we used a number of theoretical methods of investigation, in particular, the method of description, analysis, synthesis, induction, deduction, abstraction, comparison, analogy, historical and logical method, and/or the method of generalization.

3. Results of the analysis of corporate sustainability in the surveyed enterprise

In this last part of the article we focused on the analysis of the three areas of corporate sustainability in a particular company, concretely on strategic documents in conjunction with sustainable development, its dimensions and the tools used to promote the concept. It is an enterprise with foreign capital participation, which has been producing components for the automotive industry. The studied enterprise is a middle level pollutant, which means that the environmental focus lies primarily on the issue of waste. In terms of social and social areas, it is a company that provides its employees with certain advantages, but this area still has some reservations. In the context of corporate sustainability issues, we focused on a partial analysis (analysis of the current state of the research area, creating an aggregated index of sustainable development, an analysis of internal resources of the company, VRIO), which we then used in the design of the integration of the concept of strategy. In this part, we have formulated a number of research questions (part 3 Objective, data collection, and methodology).

The creation of an aggregated index of sustainable development can be helpful in providing information about the developing trend of the business owners of the company or it can be used in management and decision-making. In the case of the analyzed industrial company, we have focused on the selection of necessary data from relevant areas, and through them, convert the sub-indices into a single aggregated index. Specifically, the data was obtained through interviews with the company, from annual reports, and internal documents (wage documentation, waste management, management of production, accounting programs). The data obtained for the given enterprise ranged between the years 2009 to 2014. The data was divided into three areas based on the GRI guidelines. Our chosen data entered in the aggregated index of sustainable development are outlined in Table 1.

Table 1. An Index of Individual Areas of the surveyed company

Economic Index (in appropriate units)	Social Index (in appropriate units)	Environmental Index (in appropriate units)
Sales (€)	Donations (€)	Energy consumption (MWh)
Profit (€)	Cost to training (€)	Gas consumption (m3)
Capital expenditure (€)	13. and 14. wages (% from gross earnings)	LPG consumption (t)
Cost to R&D (€)	Zero absence (%)	Diesel consumption (t)
Fines and penalties (€)	Number of injuries (number)	Water consumption (m3)
Average PPM value (number)	Number of days lost due to work accidents (number)	Waste (t)
Cost to reclamation (€)	Gender inequality (%)	Investments for the environment (€)
		Fines and penalties (€)

Source: own elaboration.

After all necessary operations (determination of relevance, impact type, data standardization, etc.) the results of the sub-indices, as well as, the aggregated index are shown in Table 2 and plotted in Chart 1.

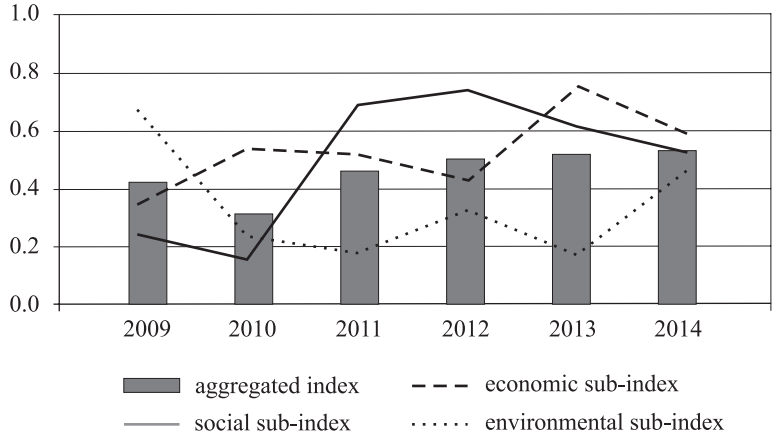
Table 2. The values of the individual sub-indices and aggregated index during the years 2009-2014

Indication	Title	2009	2010	2011	2012	2013	2014
Is,1	Economic sub-index	0.345	0.545	0.510	0.430	0.751	0.592
Is,2	Social sub-index	0.244	0.151	0.689	0.746	0.619	0.527
Is,3	Environmental sub-index	0.681	0.241	0.181	0.331	0.174	0.470
ICSD	Aggregated index	0.424	0.312	0.460	0.503	0.515	0.530

Source: own elaboration.

The aggregated index of sustainable development comprehensively captures the developments in the specific websites indicators of economic, environmental, and socio-social fields. These values can be considered average. These principles can be applied: the higher the value of the aggregated index, the more we consider a greater improvement of the company towards sustainability. With a closer look at these sub-indices, it is evident that the curves indicate greater fluctuations. Our aim was to determine whether there is a link between the calculated aggregated index of sustainable development and the various sub-indices of financial analysis indicators. We have selected the most commonly used indicators. For this purpose we used Spearman‘s rank correlation coefficient with which we looked for a link between the development of individual indices of sustainability and the development of indicators for the company‘s profitability, and return on equity (ROE),

Chart 1. Individual sub-indices and the aggregated index of sustainable development during the years 2009-2014



Source: own elaboration.

Table 3. Correlation between sustainability indices and profitability indicators

Sustainability indices	Without displacement			With a displacement of 1 year		
	ROE	ROA	ROS	ROE	ROA	ROS
Economic sub-index	0.7	0.7	0.9	–0.4	–0.4	–0.8
Social sub-index	0.3	0.3	–0.1	1.0	1.0	0.8
Environmental sub-index	–0.6	–0.6	–0.7	0.0	0.0	0.6
Aggregated index	0.7	0.7	0.4	1.0	1.0	0.8

Source: own elaboration.

return on assets (ROA), and return on sales (ROS). The results are summarized in the table below.

Direct moderate correlation was shown between the economic sub-index and the three indicators of profitability, and a direct moderate correlation was found in the aggregated index and profitability indicators of ROA and ROE. A link between the environmental and social sub-index with the indicators of profitability has not been sufficiently demonstrated. Since we can assume that the measures of the sustainable development strategy (which are captured in various sustainability indices) may have a delayed effect, thus there is a time shift between the adoption of certain measures and economic (financial) results, we performed an analysis and gave a one-year delay (right side of Table 3). It can be seen clearly that there are late changes in profitability indicators, linked to the development of the aggregated index of sustainability. The assumption of a delayed effect was shown in all

sustainability indices, with the exception of the economic index. In this case, we observed a strong to moderately strong direct link between sustainability indices and profitability indicators.

Based on the above summary, the aggregated index reaches an average value, respectively just below average. The sub-index of economic areas represents the smallest fluctuations in a given range of years among all sub-indices. This sub-index can be considered as the most stable; it shows the best average (0.53). The other two sub-indices show more or less important variations in terms of the diameter of the worst environmental sub-index value of 0.35. Based on these trends, it is possible to point out opportunities for improvement and the places where they could be found by optimizing measures.

Within the research questions we were interested in all the facts connected with the possibility of implementation of the approach to the conditions of the enterprise. For the company to devote itself to the concept, it is necessary to have certain prerequisites. In the case of the enterprise, this is our view based on the following assumptions: economic security will lead the company, as well as, be the very focus of the holding. Holding operations in Germany present its focus on sustainability principles, but this not supplemented by the reporting data from different areas and even the leadership of its business units. In order to promote this situation, in our view, important are the factors with regards to: management and strategic framework of the company, and the internal and external factors (Figure 1). From the analysis of the surveyed company, it is indicated that there is an absence of systematic summarization and planning activities within the frame of the sustainable development strategy.

Based on the current state of the research area in the enterprise, aggregated indexes of sustainable development and other tools designed, we propose an enterprise corporate sustainability strategy that will reflect and conform to the company. The compilation and implementation is outlined in Figure 1.

As is clear from the diagram, a comprehensive view of the approach to processing in the enterprise consists of inputs, processes, and measurement and implementation. For inputs which are the prime factors of creating and implementing we consider the management and strategic framework, as well as, internal and external factors. The external factors represent mainly the specificities of the industry in connection with the current trends in the automotive sector. Internal factors consist of the analysis of the current situation in the study areas (economic, environmental, and social) and also a stakeholder analysis. It is important to evaluate outcomes of the investigated areas, for example, in the form of an index of sustainable development and internal resources (VRIO analysis). This is one of the many of possibilities. In the center of the management and policy framework, it is necessary to include the will of company, which is crucial in this process. If it is a company operating within the holding group it is also important to consider

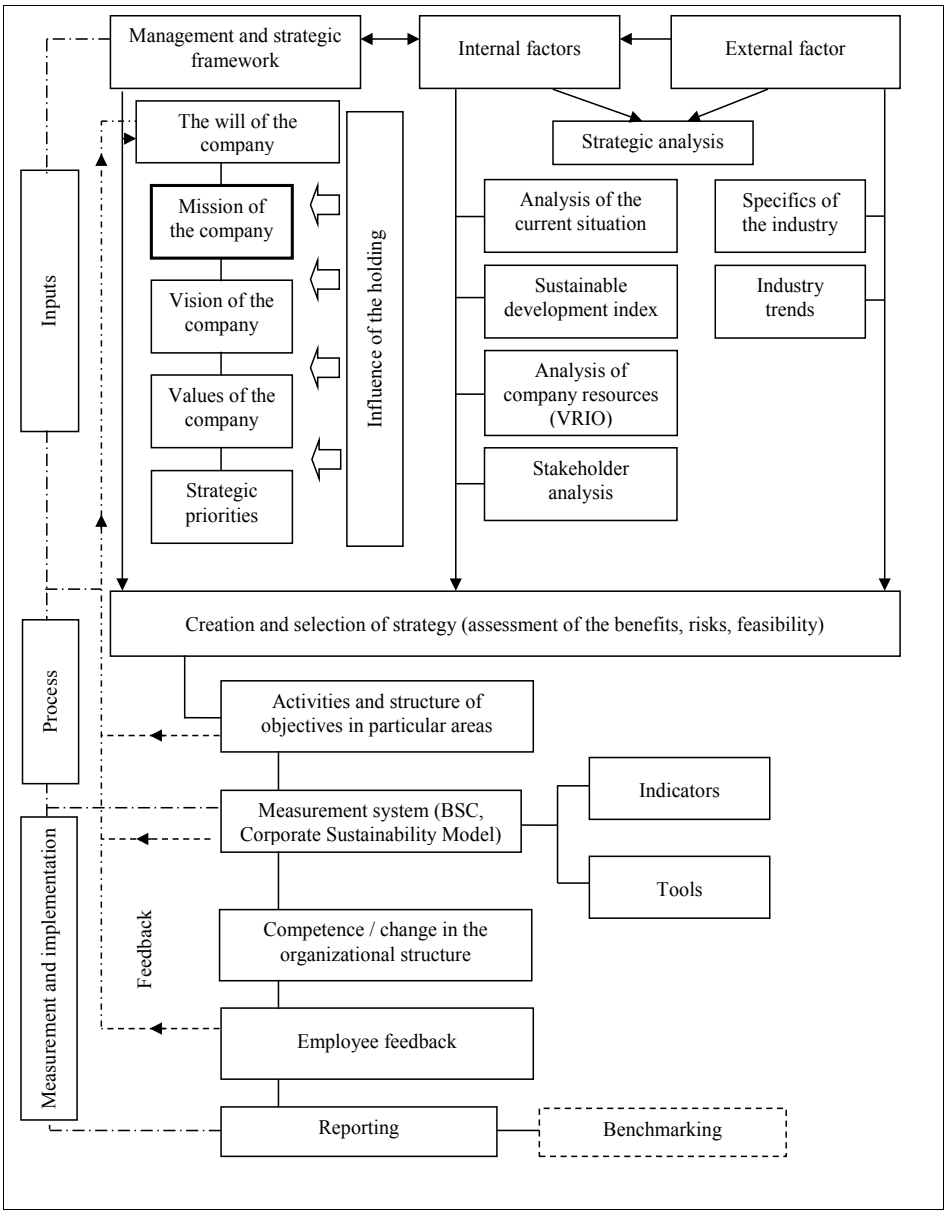


Figure 1. A more comprehensive view of the processing of corporate sustainability in the company

Source: own elaboration.

this impact. After the selection of a strategy from several variants, it is important to determine the measurement system (through the indicators and tools; the possibility of using the BSC and corporate sustainability model, etc.). In the implementation process is necessary to establish the competences and duties, employee information (possible observations), and consider the possibility of reporting or benchmarking. In the final part of the proposal, we state some examples of objectives and the possibility of measuring corporate sustainability performance with concrete tools.

The process of creating and implementing strategy was drawn up on the conditions of the surveyed enterprise, but may also be used in terms of other enterprises, whereby it is necessary to take into account the nature of individual businesses (limitedness of financial resources, currently absent management skills, lack of strategic planning on the corporate level, and so on).

Conclusion

Sustainable development means a possible alternative future development taking into account several factors, among which we can include population growth, scarcity of resources, environmental pollution, patterns of production, consumption, and many others. The fact that this is a global problem does not mean that it does not apply to the behavior of individuals and businesses.

Relationship between the corporate sector and sustainable development is expressed through corporate sustainability and corporate social responsibility. A great amount of literature brings to light different views on the two concepts. Corporate sustainability is understood as a comprehensive concept, tracking the long-term viability of the company in line with the principles of sustainable development. We consider the social responsibility in terms of monitoring the consequences of actions on the surroundings, and we consider it an important part of the sustainability of the company. Implementation of the corporate sustainability concept depends on economic conditions, of undertaking complex business conditions and the company itself. In the case that the company wants to manage their activities in terms of the concept, a transformation is required in its overall business strategy and all its components. An important aspect is the projection of sustainability across all areas and activities of the company, and therefore its strategic nature. It is not enough that the company has processed a sustainability strategy only as a formality, in order to report on sustainable development only formally. It is necessary to do so in the place of business activities.

In our view, the problematic issue is that enterprises do not have a systematic focus on corporate sustainable activities. The assumptions for corporate sustainability are as follows: business conditions that allow and provide space for en-

terprises and their development; further terms of congenital or acquired values and patterns of behavior; and a personal conviction for corporate sustainability is important too.

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Koncepcja zrównoważonego rozwoju jako narzędzie rozwoju przedsiębiorstwa

Streszczenie. *Celem artykułu jest przedstawienie możliwych sposobów realizacji koncepcji zrównoważonego rozwoju w strategii przedsiębiorstwa na przykładzie konkretnej firmy. Jest on oparty na podstawowych badaniach prowadzonych według modelu Epsteina. Analiza obejmuje problem z perspektywy wejścia, procesów, pomiarów i wykonania. Model ten może pomóc przedsiębiorstwom w opracowaniu narzędzi do lepszego kierowania oraz zarządzania koncepcją zrównoważonego rozwoju. W przypadku gdy spółka chce zaproponować konkretny złożony system, każdy komponent powinien być powiązany z określonymi wskaźnikami wydajności w celu zagwarantowania kontroli nad realizacją i oceną stanu obszarów badawczych.*

Słowa kluczowe: *rozwój, zrównoważony rozwój przedsiębiorstwa*

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The Use of Accounting in the Management of the Military Economic Entity

Abstract. *Modern achievements of accounting are increasingly used by commanders of military units to help them make a series of decisions, especially those of an economic nature. They tend to reorient the current approach of the military unit from a statutory obligation towards the possible use of accounting data to make rational management decisions. This article presents the tasks, scope, and organization of accounting in the military economic entity. The content of the article contains general solutions to the accounting of economic entities, taking into account the specificity of these entities in the military economic environment. Presented content will concern military commanders of military economic departments, commanders of security departments, commanders of air bases, commanders of naval bases, heads of military airfield units, commanders of logistics brigades, commanders of regional logistics bases, heads of regional infrastructure management boards, as well as, their associates and subordinates including, in particular, deputies and chief accountants along with their staff.*

Keywords: *defense economics, security economics, budget accounting, public finances, military finances*

Introduction

Accounting, as the oldest business register system, involves both theory and practice. Accounting practitioners look through theory for clues and confirmation of their actions, thereby creating the future of theory, while theorists describe the practice of accounting, form its fundamentals. In balance, accounting is a dynam-

ic area of science in which the development of theory is determined by practice based on the existing theory of the problem.

Accounting can be understood as the numerical measure of the financial and economic activity of the entity. This is a kind of language to transmit information on the economic activity of the person concerned, the reporting entity. It includes a whole set of techniques, methods, terminology, and principles aimed at giving it a coherent meaning and usefulness [Patterson 2015: 377].

Due to the fact that accounting records kept in military units are getting more and more like the accounting system prevailing in the country, the possibility of taking advantage of its achievements appears to be readily available.

In the contemporary military unit, in a unit of economic nature, the subject of accounting is:

- collection and disbursement of cash,
- registry of tangible fixed assets and current assets,
- registry of revenue, income, expenditure, and costs,
- registry of accounts,
- registry of investments.

Therefore, modern achievements of accounting are being increasingly used by commanders of military units to help them make a series of decisions, especially those of an economic nature. They tend to reorient current the approach of the military unit from a statutory obligation towards the possible use of accounting data to make rational management decisions.

Contemporary accounting organization within the units of the Ministry of Defense, from a formal-legal point of view, is based on the general solutions derived from the provisions of statutory regulations[1] subject to the specificity of units and military institutions. Entities functioning in the Ministry of National Defence are created in the organizational-legal forms foreseen for the public finance sector. Thus, with respect to accounting and financial economy, there is no isolation of the principles of functioning of these entities. Until recently, economic functions have been performed by most military units which, as the ones functioning in the form of budgetary units, tend to be called military budget units.

A wide range of financial economy issues, the complexity of subjects concerning keeping accounting records of these units, the need to possess expertise and experience in this field, time-consuming duties of an economic and accounting nature, have all given rise to the necessity to make changes in the organization of the military economic system. These changes have led to shifting the burden of keeping accounting records and handling financial economy. The commanders of military budget units were somehow liberated from this obligation which has been

[1] Ustawa z dnia 29 września 1994 r. o rachunkowości, Dz.U. nr 121, poz. 591 [The Accounting Act of 29 September 1994, Journal of Laws no. 121, item 591].

transferred to the commanders of the Military Economic Departments. These new entities in the military economic structure – 23 Military Economic Departments – took over the responsibilities in the field of logistics, financial-economic security, and accounting from the rest of the military budget units focusing primarily on performing tasks in the above mentioned fields.

Hence, contemporary issues in accounting will mainly concern military commanders of military economic departments, commanders of security departments, commanders of air bases, commanders of naval bases, heads of military airfield units, commanders of logistics brigades, commanders of regional logistics bases, heads of regional infrastructure management board, as well as, their associates and subordinates including, in particular, deputies and chief accountants along with their staff.

The aim of this paper is to present the tasks, scope, and organization of accounting in military economic entity. The content of the article contains general solutions to the accounting of economic entities, taking into account the specificity of these entities in the military economic environment.

2. The Tasks and Scope of Accounting

Nowadays, activities of a military unit involve numerous ordinary, everyday decisions, as well as, difficult ones having strategic importance. Choosing the right option depends primarily on the relevant economic information, whose source is accounting. Thus, the speed and accuracy of the decision made depend on the efficacy of the accounting system. Frequently, only the effects of the decision force leaders to reflect on and assess the decision-making process. Usually, decisions entail financial consequences (favorable or unfavorable), and therefore managers need to have enough information collected to analyze the decision-making process which ensures effective management [Polak & Telep 2002: 49-50].

The tasks concerning accounting which have to be faced in the military unit, in essence, do not deviate from the principles created by the mutual interpenetration of accounting theory and practice.

The primary task of accounting in military units is the provision of quantitative information about the execution of the budget necessary for control, analysis and planning, as well as, making economic decisions. These are the tasks associated with the transfer of information, control, and reporting:

1. Information tasks of budgetary accounting and reporting on the implementation of budgets provide the authorities of executive power and state administration with information on the implementation of the budget. The organizational structure of budgets is adjusted to the structure of the public authority.

2. Inspection tasks are of help in checking the reliability of public finance units by comparing their accounting situation with the facts. Properly kept accounting records prevent appropriation of property, its destruction, and its improper management.

3. Reporting-analytical tasks involve the preparation of reports based on accounting data and allow for the implementation of the budget.

In a military unit, accounting provides its commander with information on:

– assets and sources of their origin (their financing) and all the changes arising in the course of activities,

– the use of assets in the course of activities,

– exercising economic tasks specified in the plans, e.g. in the financial-economic plan of a given unit (the plan of wages, benefits, supplies, etc.),

– the use of allocated funds in the course of activities.

Accounting also creates the conditions conducive to the protection of the entity's assets. It contributes to the proper use of assets owned by the entity and also provides the numerical data used for the purposes of:

– management of – through the assumption of information coming from records as a starting point when making decisions by the management concerning the use of assets and sources of their financing – the unit's own funds or loans,

– control through records of assets and sources of their origin and their changes [Stańczyk 2004: 11].

From the point of view of managing a military unit, it is essential that the commander is liable for the performance of accounting duties defined by the accounting Act, including, by virtue of supervision, also in the case when the accounting duties – with the exception of liability for conducting an inventory in the form of a physical inventory – are entrusted to someone else with his or her consent. Failure to comply with the provisions of the act is punishable by a fine and/or imprisonment of up to two years [The Accounting Act 1994].

Military units are obligated to keep accounts in accordance with basic rules called "accounting principles". These principles should be applied in the correct manner providing a fair and clear presentation of the entity's financial situation.

The scope of the military unit's accounting involves the following elements:

1. Current, approved by the commander, description of the accounting principles which consists of:

a) **corporate chart of accounts**, including a list of general ledger accounts (synthetic records), adopted principles on the bookkeeping of business transactions, the valuation of assets and liabilities, as well as, the principles of keeping subsidiary ledger accounts (sub-ledger records) and their links to general ledger of accounts,

b) **a list of accounting books used**, and where they are being kept by using a computer – a list of collections which are accounting books on data carri-

ers (magnetic data carriers) including their structure, interrelationships, and their functions in the organization of accounting books and the processes of data processing,

c) **documentation of the data processing system, with the use of a computer***,* and its changes, which, apart from the description of accounts, contains at least:

– a list of programs together with a written statement of consent to use each new or revised program by the business entity,

– a description of the purpose of each program, the way it works (rules of calculation, records, checks, and printouts of data), and its use during data processing,

– the ways of ensuring the proper application and use of the programs,

– data protection principles and record keeping principles for data processing,

2. Keeping books of account which consist of:

a) **a journal**,

b) **a general ledger of accounts** (synthetic records), which comprise of a collections of records on paper kept according to the principle of double-entry bookkeeping – kept in the form of books, registers, or loose cards, or even data transferred from computer storage media,

c) **a subsidiary ledger of accounts** (sub-ledger records)

d) **a trial balance** of general ledger accounts and balance of subsidiary ledger accounts,

e) **a list of assets and liabilities** (inventory),

3. Periodic determination or conducting an inventory of the actual state of assets and liabilities consisting in the physical inventory, determination of balances with contracting parties or data verification of accounting books in comparison with relevant documents,

4. Valuation of assets and liabilities,

5. Preparation of financial statements and others, whose data are derived from the accounting books,

6. Collection and storage of accounting records,

7. Submission of financial statements to study and publication in the cases provided by law.

3. The Organization of Accounting

The proper functioning of accounting and the implementation of its various tasks depends largely on its organization. Organization of a military unit's accounting is a set of ways of linking together various activities and measures in

order to ensure the proper operation of the accounting system and the implementation of its tasks.

In order to properly organize a military unit's accounting one must meet certain requirements and have an adequate knowledge in this field. The commander and chief accountant (command, chief accountant's department) should be familiar with:

– applicable laws defining the principles of keeping accounting records for business and budgetary units, including military budget units,
– tax laws which must be taken into account regarding the creation and operation of the unit's accounting system,
– all unit-related issues (organizational structure, working conditions, number and type of units being supplied),
– the nature, type, and scope of the financial-accounting information necessary to direct the work of individual cells, and the entire unit, along with the units being supplied,
– accounting form and technique, especially the computer technique,
– work organization principles for the chief accountant's department.

For business practices, outlining the organization of accounting is of paramount importance. In the military unit it usually involves:

1. Organization of accounting records (issuing, filling, and controlling the circulation and storage of documents) – which, in units, takes the form of "Instructions for the circulation and control of accounting documents." These instructions establish uniform rules for drawing up, controlling and circulating of documents in the field of financial and economic operations performed in military units. Usually, the instructions cover the following issues:

– accounting books,
– internal control,
– assignment of accounting documents,
– responsibility for assets,
– records of current assets of the military budget unit,
– value records,
– fixed asset records,
– quantity and value records,
– value records,
– registration of new assets to the warehouse,
– disposal of assets from the warehouse,
– monetary economics,
– remuneration and salaries,
– pre-numbered forms,
– investment activity (repair activity).

2. Corporate chart of accounts – including a corresponding list of names and symbols of accounts designed to keep records of all assets, their sources of origin, as well as, the occurring changes and economic processes. It is complemented by a commentary on the content and its linked accounts. In a military unit, this is developed on the basis of the "Uniform corporate chart of accounts for budget units, budgetary establishments and auxiliary facilities subordinate to the Minister of National Defense." The uniform corporate chart of accounts of a military budget entity include the following groups of accounts:

– group 1 – "Cash and bank accounts," used to record business transactions related to cash and value marks,

– group 2 – "Settlements and claims," used to record business transactions related to settlements and claims,

– group 3 – "Materials and goods," used to record business transactions related to the settlement of materials, goods and services, and records of tangible current assets,

– group 4 – "Costs by type and their settlement," used to record expenditure in accordance with the section and line item of analytical classification of budget revenue and expenditure, as well as, other incomes and expenses of the Ministry of National Defense,

– group 7 – "Revenues and costs of revenues," used to record business transactions related to revenues and the cost of revenues,

– group 8 – "Funds, reserves, and financial result," used to record business transactions related to funds and the determination of the financial result and its settlement,

– group 9 – "Budget expenditure," used to record budget expenditure of a current period in accordance with the sections and chapters of the budget.

3. Division of labor and organization of activities within the chief accountant's department – usually defined by the "Work schedule of chief accountant's department," and each employee has a specific "Range of duties in the workplace" which he is obliged to follow.

4. Selection and application of an appropriate accounting technique – individuals use computer techniques and uniform IT accounting systems introduced for use within the entire military economy. Currently in the military budget unit, there are IT fixed assets register systems (MSI SR-TR), off-balance sheet fixed assets systems (MSI EW-PB), and reserves of material systems (MSI MAG MAT). They are so called auxiliary ledgers which are part of the general ledger using the SI KRAB system, which has been replaced by MSI ŚREDNIA-K.

5. Organization of inventory – proper preparation, organization, conduct, and settlement of inventory requires developing, in each entity, specific internal rules devoted to the above mentioned issues. More often than not, these rules are called Inventory instructions. Factual content of such instructions should cover:

a) a description of the types and methods of conducting an inventory, including:

– physical inventory,
– confirmation of balances,
– verification of documents.

b) specificity of inventory, lands, and buildings in a given entity,

c) rules for the preparation of plans and inventory schedules,

d) rules for appointing inventory committees and count teams,

e) tasks of inventory committees and count teams,

f) rules for checking the accuracy of inventory,

g) proper documentation of inventory information,

h) circumstances of the cancellation of inventory, conducting an additional or supplementary inventory,

i) ways of reconciliation and valuation of data included in the inventory sheets,

j) determination and valuation of inventory differences,

k) drafting of inventory protocol and an inventory report [Winiarska & Wołoszyn 2002: 100].

6. Internal financial-accounting control, which according to the "European Union internal control standards" includes the rules and procedures provided and adopted by the management of the entity to obtain an assurance that:

a) the entity achieves its objectives in an economical, efficient, and effective manner,

b) the entity operates in accordance with the law and internal acts, as well as, management guidelines,

c) the entity's physical and information resources are protected,

d) errors and irregularities are prevented and detected,

e) financial and management information is reliable and timely prepared.

The accounting organization of a military unit should provide fast, smooth, and orderly achievement of the objectives faced by this system with the least possible effort and resources. The selection of well qualified staff, professional competence, and proper division of responsibilities in the chief accountant's department facilitate this process [Sawicki 2002: 90]. The manager, and commander of the unit, is responsible for the accounting organization and also determines the structure of the chief accountant's department [Ziętowska 1999: 10].

The manager, and commander, of a military unit entrusts a chief accountant with keeping the accounts. His obligations include:

– keeping accounting records in accordance with the applicable rules and regulations,
– analyzing of the use of public funds,
– conducting control of accounting records,

– directing the work of subordinate employees,

– the preparation of internal regulation projects regarding accounting, e.g. instructions for the circulation of accounting documents [Potoczny 2001: 11].

It is extremely significant that in every military unit, the scope of tasks, powers, and responsibilities is transparent and consistent, has been defined in a written form, and that each employee is presented with the scope of his duties, powers, and responsibilities in a written form as well.

4. Reporting

The system is structured in a way that guarantees making certain commanding decisions only on the basis of credible and reliable information. Undoubtedly, in a military unit, the most formalized sources of data from accounting used for decision-making by commanders are all sorts of figures arising directly from accounting records and calculations.

Nevertheless, the figures themselves are not a sufficient source of information for the command of military units. Only organization of the data, their presentation in the appropriate sections, and their juxtaposition with other figures (e.g. planned, or from previous periods), give a proper view on the financial position and business activity of the unit, creating the basis for its analysis and evaluation, and facilitating decision-making in the future.

Reporting involves numerical data prepared on a one-off basis or periodically for statistical purposes and control of activities, which is disseminated externally in the form of completed reporting forms and reports [Sawicki 2002: 296].

Reporting on a military budget unit consists of a numerical statement prepared in accordance with the division of budgetary classification in sums accruing from the beginning of the year to the end of the reporting period based on data resulting from the accounting of a given unit [Potoczny 2001: 129].

This report is included in the preparation of reports on the implementation of processes concerning:

– collecting and accumulating revenues,
– spending public funds,
– incurring liabilities involving public funds,
– management of public funds.

As far as the management of the military budget unit is concerned, reports showing the course of activities become an instrument of exchanging economic information sent periodically for the use of different levels of management. The information may, and should, also serve to satisfy the internal needs of the military budget unit. It depends on the compliance with rules for the preparation of budget reports which involve:

– reliability,
– completeness,
– detail,
– correctness,
– timeliness.

Reports are prepared in a reliable way if the basis for their preparation was data from the ledgers of a given unit kept in accordance with the applicable accounting principles. The commander of the unit and the chief accountant bear responsibility for the correctness and reliability of the information contained therein. The principle of the completeness of reporting requires the preparation of all the unit's applicable reporting forms. The principle of detail requires drafting the reports following the patterns of forms included in the annexes of applicable legal regulations. The principle of correctness requires the preparation of reports using the appropriate forms in such a way that the information contained in them is legible, indelible, and ensures its comparability. Military budget units are obligated to prepare them in a correct manner with regard to factual, formal, and accounting requirements.

Formal requirements involved include the:

– name and address of the military budget unit,
– reporting event,
– reporting date,
– signatures of the persons responsible for the reliability and correctness of the data which should be put on each separate form in designated spaces,
– name seal of the person signing the report,
– seal with a coat of arms "for financial and economic documents" and a number from the unit's registry office.

The principle of timeliness is connected with compliance to the applicable deadlines for the submission of reports. The foundations for preparing the reports are figures resulting from accounting records. The amounts shown in the reports should be consistent with the data resulting from the accounting records or separate financial statements. The status of current accounts at the end of the reporting period should be confirmed by the bank.

Military budget units are obligated to prepare the following reports [Departament Budżetowy MON 2015]:

– monthly:

Rb – 23 **on the status of funds in bank accounts of state budget units.** This report consists of three pages. The first page shows total revenues and expenses, and information on salaries paid. The second page presents liabilities with the distinction of liabilities falling due on account of: salaries, social security contributions, labor fund contributions, supply of goods and services, and other. The third page of the report contains information on the liabilities regarding total invest-

ment expenditures, including those falling due, and the data concerning the status of funds in the accounts for financing of investments as of January 1st til the end of the reporting period. Liabilities falling due at the end of the period are liabilities whose deadline has passed before the end of the reporting period, but which have not expired or been remitted.

Rb – 25 **on revenues and budget expenditure.** This report is prepared on separate forms that include the data for income and expenditure. Both revenues and expenditure are demonstrated in planned amounts (after changes) and also shown are the amounts incurred since the beginning of the year.

– quarterly:

Rb – 70 **on employment and remuneration.** This report characterizes the employment structure in terms of quantity and amount of remuneration by specific groups of employees, e.g. civil employees, civil service employees, and professional soldiers. Its purpose is the control of expenditure incurred on remuneration (salaries) and its comparison with the limit of expenditure allocated for remuneration as defined in the financial plan.

– half yearly:

Rb – 27 **on budget revenues.** This report is made in a different way for the entity's own revenue resulting from its financial plan, and for revenue from different sources.

Rb – 28 **on budget expenditure.** This report is prepared on the basis of subledger records regarding a sub-account of budgetary expenditure.

– yearly: balance sheet. The balance sheet fulfills essential functions in records, reporting, and the management of a business entity.

In the military unit, it fulfills a two-fold function:

– it is an accounting document that serves as a closing balance of the end of a financial year and as an opening balance for the next reporting year,

– it is a financial statement defining (at the given balance sheet date) assets and sources of their financing (liabilities).

The balance sheet is of great value for the assessment of business activity and decision-making in the unit. It is the most important source for determining the financial situation, and the basis for assessing the correctness of the use of military units' budgetary resources.

Conclusion

To recapitulate, it can be concluded that accounting in military economic entities fulfills informative and controlling functions providing data for the management (the command) of the unit and supervisory organs. Furthermore, it is a basis for verifying the correctness of settlements concerning budgets, since only the

correct classification of assets and sources of their origin in the reports allow for reliable, correct, and timely provision of data necessary for making business decisions at various levels of management and command of the military economy.

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Wykorzystanie rachunkowości w zarządzaniu podmiotem gospodarki wojskowej

***Streszczenie**. Współczesne osiągnięcia rachunkowości wykorzystywane są przez dowódców jednostek wojskowych do podejmowania wielu decyzji, szczególnie tych o charakterze gospodarczym, przeorientowując dotychczasowe podejście w jednostce wojskowej – z ustawowo określonego obowiązku w kierunku możliwości wykorzystania danych księgowych do podejmowania racjonalnych decyzji zarządczych. W artykule przedstawiono zadania i zakres oraz organizację rachunkowości w podmiocie gospodarki wojskowej. Prezentowane treści dotyczą rozwiązań ogólnych z zakresu rachunkowości podmiotów gospodarczych, z uwzględnieniem specyfiki działalności tych podmiotów w środowisku gospodarki wojskowej. Odnoszą się przede wszystkim do komendantów wojskowych oddziałów gospodarczych, dowódców oddziałów zabezpieczenia, dowódców baz lotniczych, komendantów portów wojennych, szefów terenowych oddziałów lotniskowych, dowódców brygad logistycznych, komendantów rejonowych baz logistycznych, szefów rejonowych zarządów infrastruktury oraz ich współpracowników i podwładnych, w tym zastępców i głównych księgowych wraz z personelem.*

***Słowa kluczowe:** ekonomika obronności, ekonomika bezpieczeństwa, rachunkowość budżetowa, finansee publiczne, finanse wojska*

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