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DEVELOPMENT OF MICRO-ENTERPRISES IN RURAL AREAS OF THE WARMIŃSKO-MAZURSKIE VOIVODSHIP

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JEL Classification: R11, Q10.

K e y w o r d s: micro-enterprise, development, rural areas.

A b s t r a c t

This study identified changes in the number and growth rates of micro-enterprises in the rural areas of individual districts in the Warmińsko-Mazurskie Voivodship in the years 2010-2017. An analysis of secondary GUS data was conducted as part of the study. The Warmińsko-Mazurskie Voivodship data was compared to the nation-wide data. The micro-entrepreneurship index and absolute increases were used in the study, which revealed an increase in the number of micro-enterprises over the period under analysis in all districts of the Warmińsko-Mazurskie Voivodship. However, the non-agricultural micro-entrepreneurship index in the region was lower in all of the years under study than the average in Poland. No increased concentration of micro-enterprises was found in the districts neighbouring the largest cities in the voivodship, except in the district of Olsztyn, where the largest absolute increase in the micro-entrepreneurship index was noted in the successive years covered by the analysis.

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ROZWÓJ MIKROPRZEDSIĘBIORSTW NA OBSZARACH WIEJSKICH NA PRZYKŁADZIE WOJEWÓDZTWA WARMIŃSKO-MAZURSKIEGO

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Kody JEL: R11, Q10.

S ł o w a k l u c z o w e: mikroprzedsiębiorstwo; rozwój, obszary wiejskie, województwo warmińsko-mazurskie.

A b s t r a k t

Celem badań była identyfikacja zmian w liczbie oraz dynamice przyrostu mikroprzedsiębiorstw na obszarach wiejskich w poszczególnych powiatach województwa warmińsko-mazurskiego, w latach 2010-2017. W ramach prowadzonych badań przeanalizowano dane wtórne GUS. Zastawione dane z województwa warmińsko-mazurskiego odniesiono do danych dla kraju. W badaniach wykorzystano wskaźnik mikroprzedsiębiorczości oraz przyrosty absolutne. Badania wykazały, że w analizowanym okresie wzrosła liczba mikroprzedsiębiorstw na obszarach wiejskich we wszystkich powiatach województwa warmińsko-mazurskiego. Poziom wskaźnika mikroprzedsiebiorczości pozarolniczej w regionie we wszystkich analizowanych latach był jednak niższy niż średnio w Polsce. Nie stwierdzono wyższego poziomu koncentracji mikroprzedsiebiorstw w powiatach sąsiadujących z największymi miastami województwa, z wyjątkiem powiatu olsztyńskiego, gdzie odnotowano największe przyrosty absolutne wskaźnika mikroprzedsiebiorczości w kolejnych objętych analizą latach.

Introduction

The political and economic system transformations that have taken place in Poland since 1989 have had a great impact on the lives and economic status of rural populations. Rural areas were not prepared for the system transformation. Their residents were poorly educated and not mobile, either in a professional or a spatial sense (Ostrowski, 1999, p. 1-31).

This was caused by the attitudes of the rural population, who had been brought up in an economy of deficit and who were convinced that the market would absorb all the food that they would produce. People were generally convinced that social packages and state care would guarantee that every family would be able to earn a living by producing food on their own farm, without needing to take up any activities outside of agriculture (Ostrowski, 1999; *Wiejskie obszary kulminacji…*, 2002; *Społeczno-ekonomiczne aspekty…*, 2007; Brodziński *et al*., 2017). Moreover, an increase in the productivity in agriculture was accompanied by a change in the employment structure among the rural population, i.e.

a decrease in the percentage of people working in and earning their living mainly from agriculture (Krzyżanowska, 2009, p. 1-164). Until then, agriculture had been the pillar of the functioning of every village. However, year after year, it shifted towards non-agricultural, consumer or production activities (Brodziński & Borawska, 2012, p. 17-28), which was in line with the concept of multi-functional rural development.

Despite the progressive changes and support for entrepreneurship development in rural areas provided from EU funds, the degree of entrepreneurship development measured, *inter alia* by the entrepreneurship index, was twice as low in rural areas compared to urban areas in 2009 (63 in rural areas, 121 in towns) (Zuzek & Mickiewicz, 2013, p. 41-52). The economic downturn felt particularly in 2008-2009, took place after the economic crisis, which also affected Poland. Although the largest problems were felt by the regions producing for export, the effects of the crisis were visible all over the country (Nazarczuk, 2013, p. 75-89).

Therefore, a question arises, how micro-entrepreneurship changed in rural areas during the period of recovering from the crisis. The study covered the rural areas of the Warmińsko-Mazurskie Voivodship and the period between 2010 and 2017.

According to Nazarczuk (2013, p. 75-89), the crisis was felt the least strongly in rural-urban areas, which was caused by the diversity of their economy. Bański (2015, p. 56-69) points out that cooperation and rivalry have a beneficial effect on the level of competition between companies. Business entities which operate at some distance from major markets and extensive technical infrastructure are not very competitive in general, and the prospects are not too good for them when it comes to stable development. This determines a smaller number of microenterprises which operate in rural areas, located at greater distances from towns.

Considering the assumptions presented by this author, two hypotheses were put forward. According to the first of them, the micro-entrepreneurship index is higher in country districts neighbouring the largest cities in the region. According to the other hypothesis, the absolute growth of the micro-entrepreneurship index in time is determined by the location of rural areas and its growth rate is higher in rural areas neighbouring large cities.

The largest cities in the voivodship in terms of the population size include Olsztyn (172,993 residents), Elbląg (121,191), Ełk (61,074), Ostróda (33,248), Iława (33,108), and Giżycko (29,642)[1].

This study aimed at identifying changes in the number and growth rate with respect to micro-enterprises in the rural areas of individual districts in the Warmińsko-Mazurskie Voivodship in the years 2010-2017.

[1] on 31.12. 2017

Study methodology

A descriptive method was applied in the study, with data from Statistics Poland being the source material (Local Data Bank, 2019). The micro-entrepreneurship index was used, which includes the sum of all business entities registered in the REGON system as micro-enterprises in the country districts of the Warmińsko--Mazurskie Voivodship. The 2010-2017 statistical data were analysed vertically and horizontally using intensity and structure indices. The following were calculated:

– the micro-entrepreneurship index, i.e. intensity, expressed as the number of microenterprises per 10 thousand residents in the Warmińsko-Mazurskie Voivodship and in the country,

– the relative increase in the number of microenterprises in the Warmińsko-Mazurskie Voivodship,

– a relative increase in the number of microenterprises in individual districts in the Warmińsko-Mazurskie Voivodship in the years 2010-2017.

Micro-entrepreneurship and its importance in stimulating rural development

According to the Freedom of Business Activity Act, a micro-entrepreneur is an entrepreneur who achieved an annual turnover on the sale of goods and services, products and from financial operations of under 2 million euros in one of the previous financial years or the total assets of the enterprise balance sheet for the end of a selected year (over these two years) were less than 2 million euros. According to this Act, a micro-entrepreneur is an entrepreneur who employed an annual average of fewer than ten employees in one of the two previous financial years (art. 104 of the Freedom of Business Activity Act of 2 July 2004).

According to a 2018 report by the Polish Agency for Enterprise Development (Report on small and medium enterprises in Poland, 2018), the Polish enterprise sector is dominated by micro-enterprises whose share in the structure of all enterprises is approx. 96.2%. The number of microenterprises has been seen to increase. Currently, there are nearly 1.94 million of them, 13% more than in 2008. A large number of microenterprises have been seen in rural areas since the economic transformations of the early 1990s (Lizińska, 2005, p. 245-252). There were about 185 thousand micro-enterprises conducting non-agricultural activities at the end of the study period, i.e. in 2017 (Local Data Bank, 2019).

It is noteworthy that non-agricultural activity of new enterprises has an impact on rural development and makes the economic structures in such areas more diverse. It creates new jobs and promotes diversification of residents' incomes. As a consequence, the situation for farmers' families (for whom enterprise development created an opportunity for income diversification) improved (Krakowiak-Bal, 2009, p. 209-217).

Sectors of non-agricultural activities in rural areas which enjoyed the most intensive growth included: services, forestry, trade, tourism, housing and small production facilities (Pałka, 2010, p. 163-174). It enables multifunctional rural development. Multifunctional rural development is associated with earning income by village residents from services or production other than the production of food (Mickiewicz & Mickiewicz, 2016, p. 181-185).

Notably, non-agricultural activities have an impact on social, demographic and (primarily) economic stabilisation of rural areas, which cover a considerable portion of each country (Błąd, 2010, p. 165-180).

Sieczko and Parzonko (2017, p. 45-55) define the multi-functional nature of rural areas as fitting an increasing number of innovative non-agricultural functions into the rural area. This process results in diversification of rural areas. Making rural entrepreneurship more dynamic is a necessary element of effecting multifunctional rural development. Viswanath (2017, p. 1-25) points out that entrepreneurship development, particularly among relatively poorer social groups, e.g. rural populations, is less attractive to investors, with the consequent lower availability of investment funds. It is mainly microenterprises who can develop under such conditions.

This group of entities brings numerous benefits to their owners and the economy, including (Jasińska-Bilczak 2015, p. 75-80):

– income diversification;

– flexibility in entrepreneur-customer relations as a consequence of the local market nature;

– offsetting the impact of large companies;

– effective use of local resources;

– binding economic objectives with social ones;

– innovative nature of actions.

With the defined benefits in mind, rural residents take up actions which change the purely agricultural nature of rural areas.

It is also noteworthy that external funds are engaged with a view to stimulating the development of local microenterprises. Practically all developed economies use public funds to ensure free or subsidised aid to microenterprises, the self-employed and potential owners of small businesses. Such activities provide an additional stimulus for continuous entrepreneurship development, regardless of the previous level of competition (Saarela *et al.*, 2016, p. 299-313). As Marks-Bielska stresses (2017, p. 1179-1183), socio-economic and spatial conditions in rural areas differ from those in the urban environment. They are sometimes sufficiently beneficial to encourage entrepreneurs to take up business activities outside urban areas. Additionally, one must note institutional actions based on the sustainable development concept. An advantageous position in the acquisition of funds from local development supporting programmes is occupied by entities located in rural areas and ones which are economically weaker than those operating in agglomerations (Shahidullah & Haque, 2014, p. 3232-3251).

Changes in the activity of non-agricultural microenterprises

An analysis of the total number of microenterprises in rural areas per 10 thousand residents shows a gradual increase in the Warmińsko-Mazurskie Voivodship and Poland (Fig. 1). It was observed that this index was much lower in the Voivodship in all the years under analysis. The number of microenterprises in the Warmińsko-Mazurskie Voivodship increased by 19.08 percentage points and by 18.34 percentage points in Poland between 2010 and 2017. The microenterprise index in the voivodship was lower by 124 than in the rest of the country in 2010 and by 143 in 2017. This shows the disadvantageous, persistent disproportions between the region and the rest of the country.

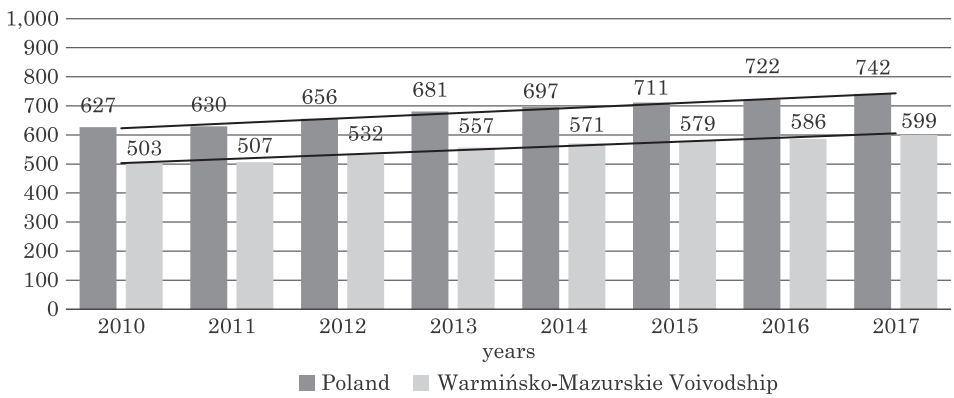

Fig. 1. The number of all microenterprises in rural areas per 10 thousand residents
Source: based on data from Statistics Poland.

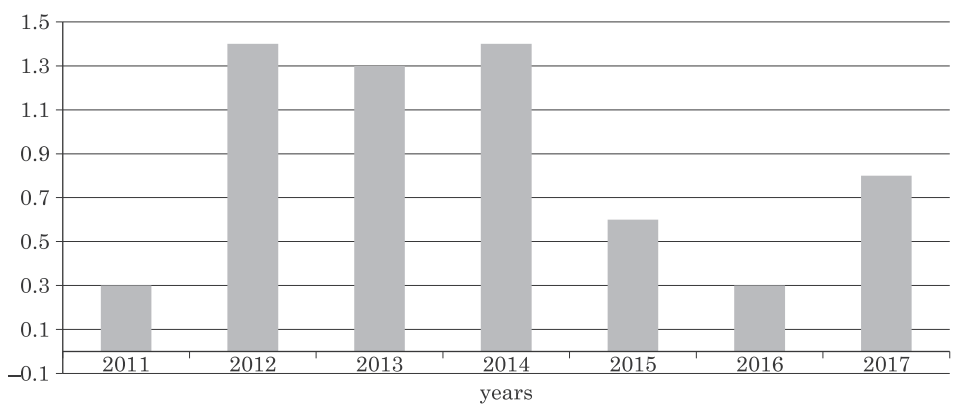

Fig. 2. The absolute increase in non-agricultural microenterprises in successive years in rural areas of the Warmińsko-Mazurskie Voivodship
Source: based on data from Statistics Poland.

An analysis of the absolute increase in the number of microenterprises in the Warmińsko-Mazurskie Voivodship shows a marked decrease in the growth rate following the exhaustion of the aid funds from the EU, after the financing period of 2007-2013 ended (Fig. 2).

An analysis of the non-agricultural entrepreneurship index in individual districts reveals its considerable diversity – both from year to year and in space. The highest index in 2017 was noted in the following country districts: Olsztyn (822), Giżycko (685), and Mrągowo (649), whereas the smallest number of entities was recorded in the districts of Bartoszyce (372), Braniewo (385) and Kętrzyn (430). The data show that microenterprises are concentrated in touristically attractive rural areas. As one can see – except in the District of Olsztyn – microenterprises are not concentrated in rural areas in the vicinity of the largest cities in the region. A comparison of the absolute increase in the entrepreneurship index between 2010 and 2017 shows the highest growth rate in the districts of: Giżycko (160), Olsztyn (159), Elbląg (139), Ełk (124) and Lidzbark Warmiński (115), with the lowest growth rate in the districts of: Gołdap (42), Kętrzyn (46) and Działdowo (60) (Fig. 3).

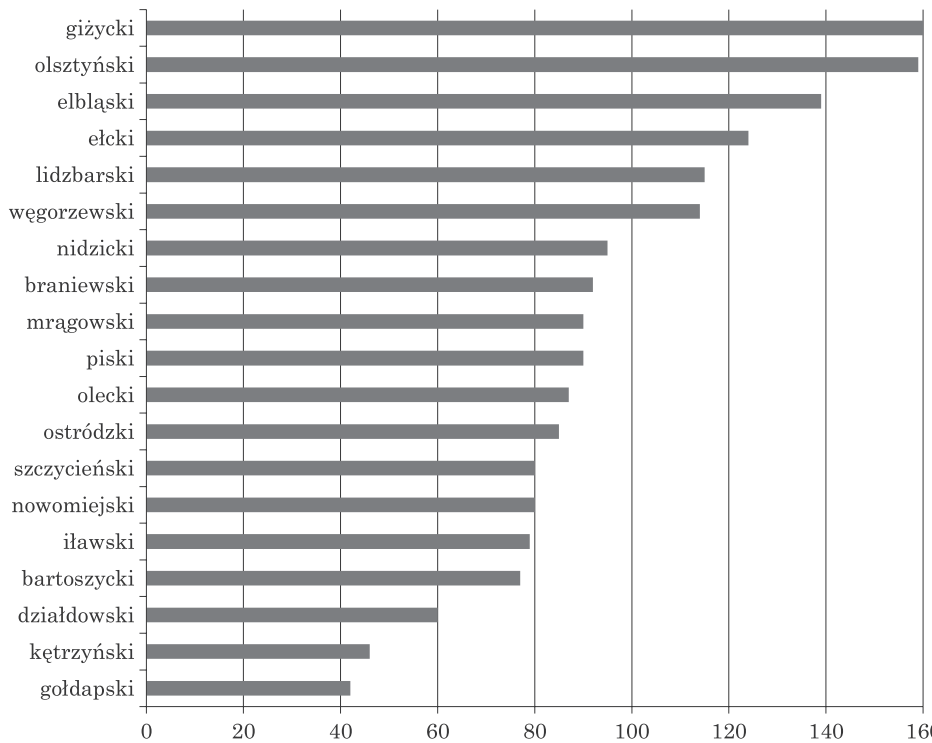

Fig. 3. Increase in the number of non-agricultural micro-enterprises in rural areas per 10 thousand residents in 2010-2017

Source: based on data from Statistics Poland.

An analysis of the total number of micro-enterprises operating in the rural areas of the Warmińsko-Mazurskie Voivodship between 2010 and 2017 shows that the majority of them conducted non-agricultural activities (Fig. 4). The largest share of non-agricultural activities in the total number of microenterprises in 2017 was noted in the districts of: Olsztyn (95.3%), Ełk (93.5%) and Giżycko (92.8%). Their share in 2017 was higher compared to 2010 by 3.6 pp on average and was the highest in the district of Węgorzewo (7.8%), Gołdap (6.7%) and Pisz (6.5%), whereas it was the lowest in the districts of: Nowe Miasto (0.2%), Nidzica (0.5%) and Kętrzyn (1.0%) (Fig. 4).

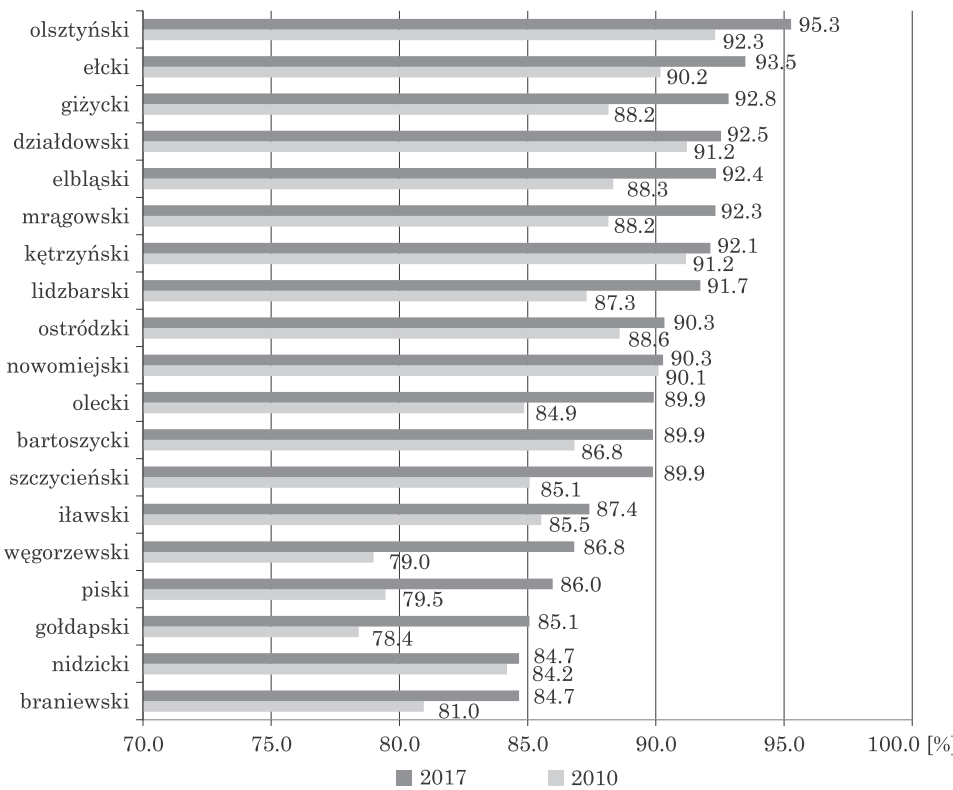

Fig. 4. Percentage of non-agricultural microenterprises in the total number of microenterprises in rural areas of the Warmińsko-Mazurskie Voivodship in 2010 and 2017

Source: based on data from Statistics Poland.

Analysis of the change rate for the number of business entities, particularly microenterprises, provides important insight into the conditions of local economic development. Lizińska points out (2005, p. 245-252) that EU aid has certainly contributed to creating new jobs and to decreasing unemployment through incentives for investors, restructuring the industry in an area and the

gradual replacement of agricultural functions with other types of activities. The development of micro-entrepreneurship should be seen as a major stimulant for rural development, which especially applies to the areas outside the sphere of influence of large cities.

Summary

One can conclude that non-agricultural activities conducted in rural areas play an increasingly important role in the stimulation of local development. New (especially micro-) enterprises give jobs to the rural population and former workers of state-owned agricultural farms who suffered exclusion for years. The number of microenterprises in rural areas is increasing both all over Poland and in the Warmińsko-Mazurskie Voivodship. The study shows that the increase in the micro-enterprise index per 10 thousand rural residents is lower in the Warmińsko-Mazurskie Voivodship than the average index for rural areas in Poland. The increase in the absolute number of micro-enterprises was seen to slow down after the EU funds from the programming period of 2007-2013 were used up and before the operational programmes of 2014-2020 started. Therefore, one can claim that the entrepreneurship growth rate in rural areas is affected by external funds.

This study disproved the hypothesis that the concentration of microenterprises would be found in the districts bordering on the largest cities in the region. This was true for Olsztyn – the capital of the voivodship – and the country district of Olsztyn. However, the next districts in the ranking, those of Giżycko and Mrągowo, are some distance from large cities, with well-developed tourist functions being their common feature.

As for the second hypothesis, the higher growth rate of the number of microenterprises in rural areas neighbouring on large cities was confirmed. The largest increase in the micro-entrepreneurship index for non-agricultural activity in rural areas was found in four out of six country districts of the region (Ełk, Olsztyn, Giżycko, Elbląg) with the largest cities. The index was in the middle range in the other two, i.e. in the districts of Iława and Ostróda.

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FOREIGN TRADE OF THE DEMOCRATIC REPUBLIC OF THE CONGO AND THE SHARE OF AGRICULTURAL PRODUCTS FOR EXPORT

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JEL Classification: F13, F31, F35.

K e y w o r d s: foreign trade, exports of agricultural products, Democratic Republic of the Congo.

A b s t r a c t

Despite its numerous resources, the Democratic Republic of the Congo is one of the poorest countries in the world. The DRC also has underutilised resources of arable land and good conditions for agricultural production. This study analysed changes in the volume of foreign trade in the DRC and assessed the share of its agricultural exports in the years 2015-2019. The analysis covered the volume of total imports and exports, as well as imports and exports by sector. The foreign trade balance and the dynamics of change in the years under analysis were calculated. Structural indicators as well as fixed and variable-based dynamic indices were used. As a result of the conducted research, fluctuations in the export of all goods were found along with a decrease in the export of numerous significant agriculturally produced goods: rubber, palm oil and medicinal plants.

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HANDEL ZAGRANICZNY DEMOKRATYCZNEJ REPUBLIKI KONGA I ZNACZENIE PRODUKTÓW ROLNICZYCH W EKSPORCIE

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Abstrakt

Demokratyczna Republika Konga, mimo licznych zasobów, jest jednym z najbiedniejszych krajów na świecie. DRK ma również niewykorzystane zasoby ziemi uprawnej i dobre warunki do produkcji rolnej. Celem badań była identyfikacja zmian w wielkości handlu zagranicznego w DRK oraz określenie udziału w eksporcie produktów rolniczych w latach 2015-2019. Przeanalizowano wielkość eksportu oraz importu ogółem oraz według sektorów. Obliczono saldo obrotu zagranicznego oraz dynamikę zmian w badanych latach. Posłużono się wskaźnikami struktury oraz indeksami dynamiki o podstawie stałej i zmiennej. W wyniku przeprowadzonych badań stwierdzono wahania w eksporcie wszystkich towarów i spadek eksportu wielu znaczących towarów produkcji rolniczej: kauczuku, oleju palmowego, roślin leczniczych.

Introduction

International trade is undoubtedly an important factor in the economic development of countries. Its importance has been repeatedly discussed and is described by numerous economic theories starting with mercantilists (A. de Montchrestien, J.B. Colbert, Th. Mun, W. Petty). Klimiuk (2016, p. 7-25) writes about it in depth. According to mercantilists, the most important thing was for a given country to achieve a surplus of exports over imports, so that it could receive gold from abroad, because in the accumulation of bullion they saw the wealth of nations. This theory was criticized by the classical D representatives: Hum, A. Smith and D. Ricardo. They emphasized not the accumulation of gold resources but the volume of production. Ricardo (1957, p. 141-167) denied the possibility that there could be a serious crisis of overproduction and long-term unemployment in the economy. At that time such problems did not yet occur on a large scale. Mill even denied any need to develop export expansion in order to create a market for production,

which allegedly could not find a market in the country (Mill, 1865). The classics also did not consider carefully the relationship between the pace of changes in foreign trade and the long-term economic development of the country. Only after the economic crisis of 1929-1933 (Machlup, 1943; Meade, 1951; Johnson, 1958) were the problems of international trade linked to income. After the Second World War, the relationship between foreign trade and the long-term economic development of the country began to be addressed (Klimiuk, 2016, p. 7-25). The Democratic Republic of the Congo (DRC) is a parliamentary republic with a semi-presidential system[1]. Situated in Central Africa, this country was given a new name in 1997 (as a result of the first Congo war). In the colonial period, the DRC was referred to as Congo Free State (until 1908) and then Belgian Congo (until 1960). After regaining independence in 1971-1997, the DRC was referred to as Zaire. The monetary unit is the Congolese franc. At the beginning of 2019, its population was estimated at around 92 million and the area of the country was 2,345,409 km^2, making the DRC the largest country in the region. This territory is only slightly smaller than Algeria, ranking second on the continent and fourth after Nigeria, Ethiopia and Egypt in terms of population. Its capital city is Kinshasa. The country has the world's largest reserves of cobalt, germanium, tantalum, diamonds, uranium, tungsten, copper, zinc, tin, beryllium, lithium, and niobium; as well as significant deposits of oil, coal, iron ore, manganese, gold, silver and bauxite. It is a leader in the supply of natural malachite. The country has large hydropower capacities[2], forest resources[3] and a well-developed network of waterways[4] (Ushakova, 1974, p. 46-47).

However, despite its numerous resources it is one of the poorest countries in the world. According to purchasing power parity, in 2017 it amounted to 68.45 billion dollars. This ranked Congo 185th in the world (with about 800 dollars per capita) (Sidorova, 2014, p. 296-297), even though after the end of the civil wars, the economic situation of the country started to improve. In 2002, the DRC authorities renewed their relations with international financial organisations and support providers. The restructuring of the mining sector, the main source of export earnings, led to GDP growth in 2006-2008. Nevertheless, since the end of 2008, the fall in demand and prices for key export goods of the DRC has led to a new stagnation in the economy of this country. The question arises as to how, after years of wars and economic reorganization and almost 15 years after the adoption of the new constitution, the foreign trade of the DRC is developing. Given the production capacity of farming land, what is the place of agricultural products in exports?

[1] The form of government in-between the parliamentary and presidential systems, functioning today e.g. in France.

[2] The complex of two hydroelectric power plants, Inga, which supplies the southern, industrial part of the country through the Inga-Shaba HVDC power transmission system.

[3] 60% area of the country.

[4] Eighth in the world in terms of length, network of waterways, amounting to 15,000 km.

This study aimed to identify changes in the foreign trade volume in the DRC and to assess the share of agricultural export.

Research methodology

The study concerned the area of the Democratic Republic of the Congo between 2015 and 2019. The research covered the area of the Democratic Republic of Congo in the years 2015-2019. The decision on the choice of the temporal scope was dictated by a rather long period of time since the political and economic changes (the new constitution approved in a referendum on December 18-19, 2005 and announced on February 18, 2006) and at least five years of analysis. The analysis covered the volume of total export and import, as well as imports and exports by sectors. All calculations were based on trade value data (USD). The foreign trade balance and the dynamics of changes in the analysed years were calculated. Structural indicators as well as fixed and variable-based dynamic indices were used. Information collected from the FAO and Trade Maps; while international trade statistics provided the data sources.

The agricultural economy of the DRC

The Democratic Republic of the Congo is a member of the World Trade Organisation (WTO), which means that it is obliged to adjust its internal legislation to the standards of organisation and to grant trade concessions to foreign entities. It is also a member of the Southern African Development Community (SADC[5]).

The economy of the DRC is mostly based on the mining industry (diamonds, gold, copper, cobalt, zinc). Production primarily includes consumer goods (textiles, footwear, cigarettes, food products and beverages) and wood. Despite the existing waterways, there is no developed internal transport system, which makes it impossible to effectively supply food to cities. Almost half of the country's population (2/3 of the village inhabitants) have access only to improvised or natural drinking water tanks. Only 29% of inhabitants have access to toilets with a sewerage system or a septic tank. Despite the fact that the DRC is an electricity exporter, around 69 million people have no access to electricity. Electrification of urban areas in 2016 amounted to 47%, and of rural areas to only 0.4%. A comparison of the Democratic Republic of the Congo with other sub-Saharan African countries shows that this country, along with a significant part of the African continent, continues to be marginalised also in terms of attracting foreign direct investments. The absence of satisfactory economic impact from

[5] SADC, Réalisation des critères de convergence macroéconomique SADC en R.D. Congo 2009.

foreign business investments is caused by various reasons, and is described in more detail in Ambukita (2014, p. 36-47).

Agriculture is another important sector of the economy, yet it is not sufficiently developed, although the agricultural sector in the country employs two-thirds of the population. Agricultural land used for cultivation of arable crops represents only 3.5% of the total land area. There are two main directions of agriculture in the country: subsistence agriculture, which employs the vast majority of the labour force, and commercial, export-oriented, production-based agriculture, on plantations. There are over 4 million farms in the DRC with an average area of 1.6 hectares. These lands are mainly situated in the savannah zone, and less frequently in the tropical forests. The main crops include cassava, sweet potatoes, bananas, rice, sorghum and maize. Average yields in the country are as follows: cassava – 14.95 million tonnes, sugar cane – 1.787 million tonnes, maize – 1.155 million tonnes, peanuts – 0.364 million tonnes, rice – 0.315 million tonnes, bananas – 0.313 million tonnes, sweet potatoes – 224.5 thousand tonnes, yams – 84 thousand tonnes, and pineapples – 193 thousand tonnes. However, domestic production of food crops is insufficient to meet the country's needs, which is why many basic food products must be imported (Musala, p. 615-618). Summing up, the structure of the economy is based on industry – 43.5%, agriculture – 20% and services – 37%. Globalisation can help to increase the role of agriculture as a driver of economic growth in countries with low levels of national income by ensuring that agricultural production is more dynamic than domestic consumption and can contribute to an improvement of their food security (Mellor, 2003, p. 99). The DRC adopted the concept[6] underlying the agricultural financial support mechanism with two main categories: support that has no or minimal impact on production and trade and support that limits production and trade. Consequently, all support measures are divided into so-called "amber", "green" and "blue" categories (Abramova, p. 160). The national support measures for agriculture in the "amber category" include: compensation of expenditure on the purchase of energy carriers, mineral fertilizers, seeds, mixed feeds and plant protection products, as well as on the repair and purchase of machinery, including leasing. These actions are most often subject to restrictions imposed by the WTO on countries applying for membership. State agricultural support activities related to the "green category" include improvement of soil fertility, land management, improvement of the natural environment, construction of roads, housing, health facilities, schools in rural areas, agricultural development, etc. These measures do not significantly affect the volume and cost of the agricultural products produced. State support measures for agriculture related to the "blue category" are budget subsidies in the form of direct payments under programmes

[6] The General Agreement on Tariffs and Trade (GATT) signed in Geneva in 1947 and the Agreement Establishing the World Trade Organisation (WTO) signed in Marrakesh in 1994 (OJ L 336 of 23.12.1994).

designed to reduce agricultural production. Like the "green category" measures, they fall outside the scope of the WTO Member State's obligation to limit domestic support to domestic producers.

The rules and mechanisms governing foreign trade in agricultural products and food are also regulated by other GATT/WTO instruments. Currently, there exists a set of principles based on which trade negotiations are conducted and their implementation is monitored.

Foreign trade in the DRC in 2015-2019

The DRC foreign trade is mainly linked to the markets in highly developed countries, most of which are EU countries, China and the Southern African Development Community (SADC) (Ambukita, 2019, p. 36-46 after Hugon, 2009, p. 48). In the middle of the period under examination, exports from the DRC amounted to USD 8.3 billion in 2017. The main products exported were copper, cobalt, diamonds, gold, oil, wood and coffee. The major purchasers in 2017 were: China – 39.7%, Belgium – 21.7%, South Korea – 7.2%, and Saudi Arabia – 7.1%. Imports at that time amounted to USD 5.0 billion. Imported products primarily included food, machinery industrial products, means of transport and fuels. The largest suppliers were China with 19.4%, South Africa with 9.9%, Zambia with 10.6%, and Belgium with 9%. The external debt at the time amounted to USD 5.324 billion. Taking into account the changes in the volume of foreign trade in the years under review, there were generally minor changes. Imports remained at similar levels and exports increased by 11.7%. The foreign trade curve is similar to the export curve (Fig. 1), while the import curve has a moderate increase that does not reflect the foreign trade curve.

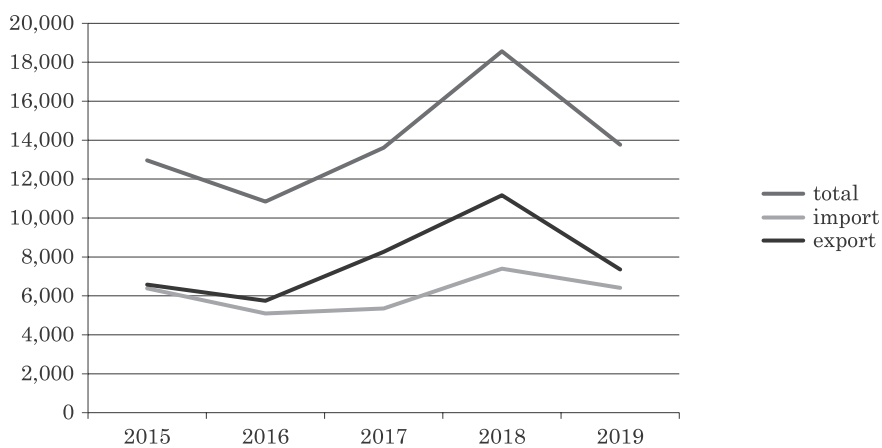

Fig.1. Foreign trade turnover [mln USD]

Source: based on the FAO data.

It follows from the above considerations that the rapid growth of export, observed trade surpluses and the increase in export volumes do not give reasons for satisfaction. For the stable growth of foreign trade turnover, it is necessary to develop and effectively use the country's export potential.

However, fluctuations can be observed when analysing the dynamics of change based on a variable-based index (Tab. 1). There was a clear increase in imports and exports in 2017 and 2018 as compared to the previous year and a very clear decrease in 2019 as compared to 2018.

Table 1

The dynamics of changes in the value of foreign trade [%] in relation to the previous year

Years	Total	Import	Export
2015	–	–	–
2016	83.6	79.8	87.3
2017	125.6	105.0	143.8
2018	136.3	138.3	135.1
2019	74.2	86.7	65.8

Source: based on the FAO data.

Taking into account the structure of foreign trade operations of the DRC (Tab. 2) in import by groups of goods, it should be concluded that industrial goods and equipment prevail in all the years under study.

Table 2

Import volumes by product group, USD '000

Commodity groups	Years				
	2015	2016	2017	2018	2019
Total	2,380,531	1,869,616	2,066,323	2,922,260	2,886,820
Consumer products	922,260	821,590	945,046	1,059,497	1,014,058
Animal production	148,145	120,136	143,657	159,385	179,025
Alcoholic and non-alcoholic beverages	74,541	112,731	145,562	154,501	119,754
Plant production	127,930	95,767	107,286	136,835	118,580
Pharmaceutical products	397,966	358,038	419,403	454,093	463,033
Food preparations	66,051	54,909	60,366	87,383	70,265
Shoes, headgear, bags	107,627	80,009	68,772	67,300	63,401
Industrial goods	1,458,271	1,048,026	1,121,277	1,862,763	1,872,762
Vehicles, trucks	390,803	293,274	271,395	524,219	436,835
Medical equipment, furniture	115,305	75,066	71,099	104,546	109,627
Machinery, appliances, mechanisms, electrical equipment, fittings	832,368	597,309	625,355	1,136,148	1,081,247
Chemical production	119,795	82,377	153,428	97,850	245,053

Source: Trade Map – international trade statistics,
https://www.trademap.org/open_access/Country_SelProductCountry_TS.aspx

This can be observed more clearly when analysing the percentage structure (Tab. 3). An important part of the imports consisted of machinery, equipment and electrical appliances. Thus, in 2015 the share was 35.0% in relation to imports, and in 2019 it increased to 37.5%. Vehicles and trucks also accounted for a relatively large proportion of imports – 17.9% (2018). In 2019, there was a slight decrease in imports of this product group to 15.1%.

Table 3

Import structure by product groups

Commodity groups	Years				
	2015	2016	2017	2018	2019
Total	100.0	100.0	100.0	100.0	100.0
Consumer products	38.7	43.9	45.7	36.3	35.1
Animal production	6.2	6.4	7.0	5.5	6.2
Alcoholic and non-alcoholic beverages	3.1	6.0	7.0	5.3	4.1
Plant production	5.4	5.1	5.2	4.7	4.1
Pharmaceutical products	16.7	19.2	20.3	15.5	16.0
Food preparations	2.8	2.9	2.9	3.0	2.4
Shoes, headgear, bags	4.5	4.3	3.3	2.3	2.2
Industrial goods	61.3	56.1	54.3	63.7	64.9
Vehicles, trucks	16.4	15.7	13.1	17.9	15.1
Medical equipment, furniture	4.8	4.0	3.4	3.6	3.8
Machinery, appliances, electrical equipment, fittings	35.0	31.9	30.3	38.9	37.5
Chemical production	5.0	4.4	7.4	3.3	8.5

Source: Trade Map – international trade statistics,
https://www.trademap.org/open_access/Country_SelProductCountry_TS.aspx

Pharmaceutical products had the largest share in the import of consumer goods (the share of this product group ranged from 15.5% in 2018 to 20.3% in 2017). Food, textile, chemical and metal products were also imported into the DRC.

As regards agricultural products, animal products dominated in the import structure. This is due to the fact that the country's animal farming area is restricted due to the tsetse fly, which is a carrier of coma in humans and nagana in pets. Export production of agricultural products is focused primarily on plantation farms. Large companies specialize in palm oil, rubber, coffee and cocoa products.

Analysing the volume of the DRC exports by product group (Table 4), it becomes evident that the largest revenue from this product group was obtained in 2017-2018. A huge share of the DRC exports consisted of mining products and hydrocarbons.

Table 4

Export volume of the DRC by product group, USD '000

Commodity groups	Years				
	2015	2016	2017	2018	2019
Total	1,919,618	1,708,913	2,468,621	3,133,298	1,502,667
Mining and hydrocarbon industry	1,816,624	1,631,388	2,387,900	3,056,496	1,441,915
Copper	422,863	616,532	990,998	1,241,502	581,030
Cobalt	695,424	296,450	520,546	852,797	205,409
Diamonds	291,625	378,380	393,309	382,494	51,995
Gold	44,303	24,034	27,601	76,397	43,833
Tin	27,579	53,113	56,639	61,409	30,749
Oil	334,830	262,879	398,807	441,897	528,899
Agricultural production	101,515	75,846	75,897	71,922	58,711
Coffee	16,948	13,808	19,370	18,672	19,114
tea	24	7	177	118	1
Rubber	3,583	1,543	937	1,341	1,513
Cocoa beans	24,032	28,384	34,090	20,781	39,346
Palm oil	5,187	6,370	4,612	6,445	54
Sawn wood	38,188	11,104	3,652	12,820	-3,789
Medicinal plants (rosemary and moringa)	13,553	14,630	13,059	11,745	2,472
Industrial and power products	1,479	1,679	4,824	4,880	2,041
Chemical products	1,479	1,679	1,233	857	2,041
Electricity	–	–	3,591	4,023	–

Source: Trade Map – international trade statistics,
https://www.trademap.org/open_access/Country_SelProductCountry_TS.aspx

Agricultural products constituted a marginal share of export, with a downward trend (from USD 1,015,515 thousand to USD 58,711 thousand). As a result, in 2019 it amounted to only 57% of what was exported in 2015 (Tab. 5).

The Democratic Republic of the Congo is primarily an exporter of mining and oil products. The share of these products in the export structure ranged from the lowest (94.6%) in 2015 to the highest (97.5%) in 2018. The main export products were copper and cobalt, whose sale in 2019 brought the state more than half of its export revenues. Diamonds and gold also held an important place on the list of exported goods. The other exports include coffee, cocoa beans, rubber and medicinal plants. However, agricultural exports account for only a few percent. Fluctuations were also observed here. In general, their share decreased by 1.4 percentage points between 2015 and 2019. It was the lowest in 2018 and amounted to only 2.3% of exports. It can, therefore, be noted that

Table 5

Export structure by commodity group

Commodity group	Years				
	2015	2016	2017	2018	2019
Total	100.0	100.0	100.0	100.0	100.0
Mining and hydrocarbon industry	94.6	95.5	96.7	97.5	96.0
Copper	22.2	36.4	40.4	39.8	38.7
Cobalt	36.5	17.5	21.2	27.3	13.7
Diamonds	15.3	22.3	16.0	12.3	3.5
Gold	2.3	1.4	1.1	2.4	2.9
Tin	1.4	3.1	2.3	2.0	2.1
Oil	17.6	15.5	16.2	14.2	35.3
Agricultural production	5.3	4.4	3.1	2.3	3.9
Coffee	0.88	0.81	0.78	0.59	1.27
tea	0.001	0.000	0.007	0.003	0.000
Rubber	0.19	0.09	0.03	0.04	0.1
Cocoa beans	1.25	1.66	1.38	0.66	2.62
Palm oil	0.27	0.37	0.18	0.2	0.003
Sawn wood	1.99	0.65	0.15	0.41	-0.25
Medicinal plants (rosemary and moringa)	0.7	0.85	0.53	0.37	0.16
Industrial and power products	0.1	0.1	0.2	0.2	0.1
Chemical products	0.1	0.1	0.1	0.0	0.1
Electricity	0.0	0.0	0.1	0.1	0.0

Source: Trade Map – international trade statistics,
https://www.trademap.org/open_access/Country_SelProductCountry_TS.aspx

the DRC foreign trade potential has been recognised as significant in two revenue-generating sectors, such as mining and agriculture, which should be developed in the long term. The DRC government is currently developing a strategy to revitalise the agricultural sector in the country and to gain a position in the international agricultural market.

The volume of agricultural production in DRC and opportunities for export development

The government of the DRC has planned an agricultural development programme with an aim to:

– strengthen the contribution of agriculture to economic growth;
– restore food security to the country;

– reduce poverty and uncertainty in rural areas;
– increase food production;
– encourage the substitution of imports.

One of the key crops here is coffee. Among different varieties of coffee grown in the DRC, the two varieties are prevailing, i.e. Robusta and Arabica. Arabica accounts for 10-15%, while the vast majority is Robusta. Arabica coffee is grown on high plantations at an altitude of 1600-2800 m above sea level in eastern villages (Kivu, Ituri). Arabica coffee beans here are of high quality, with high acidity and a rich taste. Robusta coffee is mainly grown in the north-eastern part of the country, in the Congo basin (Isiro, Ubangi, Uele, Kivu, Kasaï) (Dmitrievskiy, 1995, p. 304). About 850,000 families in Congo make their living from the coffee industry. Coffee in Congo is one of the most popular beverages, and more than half of the total yield is consumed in the domestic market. About 40% of all produced coffee is exported mainly to Italy, France, Belgium and the USA. The total coffee yield in the Democratic Republic of the Congo averages just over 100,000 tonnes per year. In 1989, coffee exports reached 119,320 tonnes, but fell significantly between 1994 and 2003, mainly as a result of the civil war between 1997 and 1998. Since signing the peace agreement in December 2002 and ending the civil war, coffee production has increased slightly. In 2011, the government developed the "Strategy Paper for the Revitalization of the Coffee Sector 2011-2015" programme with a budget of USD 100 million. The aim of the programme was to increase production to 120 thousand tonnes by 2015. In 2013, there were already more than 11,000 coffee producers in the DRC. Cooperative associations such as Furaha, Muungano and Sopacdi are important sales and distribution partners for coffee producers. Successes on the international scene are also significant. In 2017, SOPACDI was awarded the title of "Best Coffee of the Year" for its coffee. The company won this award for the second time, the previous award being granted in 2014 (Mocratique du Congo, without a year).

The first cocoa tree plantations were established in the Mayumbe region (Central Congo), with plants originating mainly from São Tomé. The crops then extended to the former provinces of Bandundu, Ecuador and the Eastern Province. The production basins are currently located in central Congo, western and northern provinces, Tschopo and North Kivu. Cocoa cultivation replaced coffee plantations damaged by fungal diseases. The producers, grouped into cooperatives, are committed to quality as well as ecological and fair trading niches. About 8,000 of them have received a double UTZ certificate[7] and an ecological certificate. In the Lower Uele Province, the project to create two nurseries should stimulate the development of crops. Other regions are being investigated by commercial companies such as Cargill, Barry Callebaut and Nestlé, as well as NGOs. Nevertheless, the development of the sector still

[7] In the Mayan language, "utz" means "good inside". Certification in this system focuses on good agricultural practices, rational management and occupational health and safety.

depends on several factors: improvement of the political and business climate, restoration of orchards, opening up communication channels to transport the beans, harmonisation of rules and the implementation of incentive measures[8].

Another important export product is palm oil, which is one of the most frequently produced goods. Over the last 30 years, its demand has increased by 3% per year. 80% of its use is for food products, 19% for non-food products and the remaining 1% for biofuel production. Congolese entrepreneurs have gradually taken over almost the entire sector at the cost of the disappearance of many factories and the direct exploitation of old palm groves in low-production regions. This has also been affected by the armed conflicts of the last two decades, which have dealt a severe blow to transport conditions in the equatorial basin. Oil companies have resigned from managing and even exploiting their plantations, often handing them over to the villagers as shareholders. Production and exports have decreased significantly. This is not only a problem for the DRC, but also for many countries in Europe. More about that can be found in Hrybau, Hryshanava, Witkowska-Dąbrowska and Świdyńska (2019, p. 397-406).

However, it seems that the domestic soap and margarine sector, which requires high-quality oils, will still need agro-industrial plantations. The Congolese authorities are becoming increasingly aware of the fact that these regions represent a huge reservoir of high-quality agricultural land and that they are currently underused[9]. More about the needs of using agricultural production for the country's own needs can be found in Ambukita (2019, p. 36-48). "In a situation of lack of resources to finance imports and where imports of equipment should be increased to a maximum, as their production is not developed in the Democratic Republic of the Congo, a significant proportion of foreign currency is devoted to financing the import of food products that could be produced locally, in the country".

Rubber is the second most important export commodity in the country. Plantation yields are slowly increasing after nationalisation. Some plantations were planted with new trees for the first time in 20 years. As a result of Chinese demand, the international rubber market is now returning to the price of USD 1.62 per kilo. Experts argue that this is a positive development for African producers, although competition from Thailand, Indonesia, Malaysia and Vietnam in the Chinese market is more difficult. It should be noted that the price of African rubber is cheaper than the average price paid by China, regardless of its origin. However, there are numerous problems resulting from past events, such as the discontinuation of production or difficult access for customers. Medicinal plants and their extracts are important export products for many developing countries.

[8] Production mondiale de cacao quelle est la part de lafrique central aujourdhui; access mode https://cacao-info.org / 2019 / 04 /11/production-mondiale-de-cacao-quelle-est-la-part-de-lafrique-centrale-aujourdhui/ (17.05.2020).

[9] Belgeo – access mode https: // journals. openedition. org /belgeo/11772#tocto1n10 (12.05.2020).

In view of population ageing and growing consumer preferences for natural health products, medicinal plants represent a market niche which exporters from many of the least developed countries are trying to develop in order to ensure sustainable production and exports. The quarterly ITC Market News Service (EN) report on herbal medicines and extracts focuses on the lack of available information on international trade in herbal medicines produced and exported by developing and the least developed countries. The production of medicinal plants is not of an industrial nature. Most of them are in the hands of small growers. However, rosemary and moringa are among the main agricultural export commodities and are very promising for the DRC economy.

Considering the volume of exports of the agricultural production goods in question, it should be concluded that the volume of exports of coffee and cocoa beans has increased (Tab. 6).

Table 6

Export value of basic agricultural export products

Agricultural production commodities, USD '000	Years					2019 vs. 2015
	2015	2016	2017	2018	2019	%
Coffee	16,948	13,808	19,370	18,672	19,114	112.8
Cocoa beans	24,032	28,384	34,090	20,781	39,346	163.7
Palm oil	5,187	6,370	4,612	6,445	54	1.0
Rubber	3,583	1,543	937	1,341	1,513	42.2
Medicinal plants	13,553	14,630	13,059	11,745	2,472	18.2

Source: Trade Map – international trade statistics,
https://www.trademap.org/open_access/Country_SelProductCountry_TS.aspx

Export volumes of rubber and medicinal plants have decreased significantly, while the export of palm oil has almost completely disappeared. The greatest decrease was recorded in 2019 in the case of rubber, down to only 1% as compared to 2015.

In general, dynamic changes in DRC's exports in different directions of the world should be noted (Tab. 7).

To more than 30 countries, the export growth rate in the years under review remains at a level above 2015. The biggest changes in volumes concern Botswana, Burundi, Benin, Senegal and Poland.

Table 7

The dynamics of changes in export value from the DRC [%] vs. 2015

Country	2016	2017	2018	2019	Country	2016	2017	2018	2019
Botswana	322	44	56,822	6,944	France	100	105	142	493
Burundi	7,698	1,974	7,846	5,570	Italy	194	304	278	333
Benin	281	323	190	5,480	Spain	263	261	261	304
Senegal	905	7,132	863	5,132	Brazil	24	23	169	285
Poland	55	656	266	4,341	Australia	88	142	29	230
Singapore	40	1,115	64	3,267	Mauritania	100	200	1,000	200
Madagascar	181	50	225	2,181	Netherlands	73	137	332	176
Burkina Faso	850	100	300	1,750	China	78	122	213	166
Kenya	157	374	976	1,466	Austria	613	318	2,176	166
Portugal	61	60	84	1,453	Canada	39	56	138	161
Thailand	157	200	1,124	882	Malawi	9	14	80	138
Russian Federation	393	428	736	753	Korea, Republic of	159	198	213	136
Zimbabwe	19	709		700	Nigeria	275	120	1,040	130
Egypt	3	12	650	537	Malaysia	183	191	208	123
Morocco	133	350	816	522	Kazakhstan	160	14	50	122
Japan	981	357	276	522	Sweden	86	67	22	109
Hungary	150	0		500	Greece	123	177	108	101
Bosnia and Herzegovina	0	2,700	100	500					

Source: Trade Map – international trade
https://www.trademap.org/open_access/Country_SelProductCountry_TS.aspx

Summary

The Democratic Republic of the Congo is integrating into the world community through active engagement with developed countries. The main export directions are commodity groups such as: mining, oil and agricultural products. The rapid growth of exports, the observation of trade surpluses and the increase in the volume of exports do not give grounds for satisfaction. For the stable growth of foreign trade turnover, it is necessary to develop and effectively use the country's export potential. In the years under study, large fluctuations in both exports and imports were found.

The country has a large amount of unused arable land of good quality and good conditions for the development of agriculture. This can provide a base and an opportunity to develop this branch of the economy. However, the obtained results confirm the hypothesis that the fluctuations in the export of agricultural

products are high. Products such as coffee and cocoa beans are promising. Palm oil, rubber and medicinal plants are also a major part of agricultural exports that have lost their position. It remains to be hoped that the programmes aimed at farmers, which involve an increase in agricultural productivity and an increase in agricultural exports from the DRC, should have a significant positive impact on the economic development of the country. On the other hand, the government should help to create a favourable environment for stimulating entrepreneurship and improving the investment climate for foreign companies.

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DETERMINANTS OF POTENTIAL INVESTMENT ATTRACTIVENESS OF A COMMUNE

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K e y w o r d s: potential attractiveness for investment, infrastructure, development, factors, investment climate.

A b s t r a c t

The aim of the study was to indicate which of the determinants shaping the level of potential investment attractiveness of a commune affects its level to the highest degree. The elements which determine the attractiveness for investment, understood as an area's ability to attract investors, were classified into five sections: labour resources, technical infrastructure, social infrastructure, administration and market. After the data were accumulated, which was necessary to create synthetic indices of the potential attractiveness of communes for investment and individual sections, they were verified statistically according to the two most important criteria: variance and correlation. Ultimately, selected indices were chosen for further analysis out of the original set of 39 indices. The Hellwig development pattern method was used to classify the communes into four classes depending on the level of potential attractiveness for investment and to determine which element had the greatest effect on the level of a commune's potential attractiveness for investment. The average level of potential attractiveness for investment and the sections under analysis prevailed in the Warmińsko-Mazurskie Voivodship communes in 2016. The results showed that the level of a commune's potential attractiveness for investment is affected by the following factors: technical infrastructure, administration, social infrastructure, labour resources and market.

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DETERMINANTY POTENCJALNEJ ATRAKCYJNOŚCI INWESTYCYJNEJ GMIN

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Słowa kluczowe: potencjalna atrakcyjność inwestycyjna, infrastruktura, rozwój, czynniki, klimat inwestycyjny.

Abstrakt

Celem badań było wskazanie, która z determinant kształtujących poziom potencjalnej atrakcyjności inwestycyjnej gminy oddziałuje na jej poziom w najwyższym stopniu. Elementy determinujące potencjalną atrakcyjność inwestycyjną, rozumianą jako zdolność obszaru do przyciągania na jej teren inwestorów, sklasyfikowano w pięciu działach: zasoby pracy, infrastruktura techniczna, infrastruktura społeczna, administracja i rynek. Po określeniu i zgromadzeniu danych niezbędnych do stworzenia syntetycznych wskaźników potencjalnej atrakcyjności inwestycyjnej gmin oraz poszczególnych działów zweryfikowano je statystycznie według dwóch najistotniejszych kryteriów: zmienności oraz korelacji. Ostatecznie z zestawu 39 wskaźników wybrano wskaźniki do dalszej analizy. Metodą wzorca rozwoju Hellwiga analizowane gminy sklasyfikowano w czterech klasach (zależnie od poziomu potencjalnej atrakcyjności inwestycyjnej i każdego z działów) oraz określono, który element w najwyższym stopniu wpływa na poziom potencjalnej atrakcyjności inwestycyjnej gmin. W 2016 r. w gminach województwa warmińsko-mazurskiego przeważał przeciętny poziom potencjalnej atrakcyjności inwestycyjnej oraz analizowanych działów. Na podstawie otrzymanych wyników stwierdzono, że na poziom potencjalnej atrakcyjności inwestycyjnej gmin największy wpływ miały kolejno: infrastruktura techniczna, administracja, infrastruktura społeczna, zasoby pracy i rynek.

Introduction

One of the elements differentiating regions is the development potential present in their area. This potential can be defined as the set of the region's features which determine its opportunities for generating development. The region's development potential depends on the amount, quality and effective usage of the assets present in the area (Reichel, 2003, p. 8; Milczarek, 2005, p. 9; Poniatowska-Jaksch, 2006, p. 9; Nazarczuk, 2013, p. 73).

The term "attractiveness for investment" can be used with reference to a specific area. The meaning of this term is narrower than territorial attractiveness and it considers the advantages of a specific area with respect

to location-related benefits and investment absorption because of the assets present in the area (e.g. infrastructure quality, market size, workers' qualifications, availability of means of production). The literature on the subject defines attractiveness for investment as the ability "to induce investors to choose the region as a place in which to locate their investment" (Gawlikowska-Hueckel & Umiński, 2000, p. 7).

Real and potential attractiveness for investment can be distinguished. The former is "the region's ability to satisfy a client / investor and to generate absorption of financial capital and real capital in the form of investment. It can be measured with the effectiveness of the financial, real, human and natural capital outlay" (Godlewska-Majkowska, 2013, p. 2). The real attractiveness for investment index (RAI) is calculated from the productivity of work, productivity of real assets, profitability of enterprises, self-financing of local government units, investment outlays and natural capital (Godlewska-Majkowska, 2009, p. 28-29). Potential attractiveness for investment is "a set of regional location assets which affect the accomplishment of the investor's objectives" (Godlewska-Majkowska, 2013, p. 2). According to the approach proposed by the Institute of Enterprise from the Warsaw School of Economics, the index of potential attractiveness for investment (PAI) for communes (PAI1) is calculated from five elements: labour resources, market, social infrastructure, technical infrastructure and administration. When calculated for voivodships (PAI2), the index is supplemented with social capital, innovation and sectoral elements (e.g. natural value) (Godlewska-Majkowska, 2010, p. 61). The Institute for Market Economics Research identifies nine determinants of potential attractiveness for investment: economic infrastructure, social infrastructure, transport accessibility, labour resources, market absorbability, level of economic development, condition of natural environment, level of common safety and activity towards investors (Nowicki, 2010, p. 12).

Individual authors mention other elements of potential attractiveness for investment: effectiveness of economic transformation, leisure opportunities (Swianiewicz & Dziemianowicz, 1998, p. 10-13), touristic attractiveness, and the business environment (Gawlikowska-Hueckel, 1999, p. 15-45).

It is important to determine both the elements shaping the potential investment attractiveness of the region and their impact on its final level. Treating each of them equally may lead to a distorted picture of the economic reality. The aim of the study was to indicate which of the determinants shaping the level of potential investment attractiveness of a commune affects its level to the highest degree.

Many authors point to the special role of municipalities in creating location values that contribute to the socio-economic development of the area (Godlewska-Majkowska, 2018, s. 105; De Jesus, 2017, s. 111; Wrona, 1997, s. 31; Szewczuk *et al.*, 2011, s. 21; Leśniewski, 2013, s. 149-153; Stanny, 2010, s. 93, 94).

Measurement of potential attractiveness for investment

Determination of which element has the greatest effect on commune attractiveness for investment, understood as the ability to induce investors to choose a specific area as the location for their investment, was performed using a statistical method. The 2016 data for analysis were obtained from the Local Data Bank at "Statistics Poland" (GUS) and from Google Maps. Communes in the Warmińsko-Mazurskie Voivodship were analysed. 39 indices, with 5 to 10 from each section, were defined and classified as stimulants (31) or destimulants (8) in order to determine which element – labour resources, technical infrastructure, or administration market – has the greatest effect on the potential attractiveness for investment (Tab. 1).

Table 1

Potential commune attractiveness for investment

Partial indices
Labour resources (LR)
Employment per 1,000 people (*S*)*
Percentage of employed people in the working age population [%] (*S*)
Percentage of registered unemployed among people of working age [%] (*D*)*
Balance of home migrations per 1,000 people (person) (*S*)
Balance of foreign migrations per 1,000 people (person) (*S*)
Percentage of working age people in the total population [%] (*S*)
Non-working age people per 100 people of the working age (person) (*D*)
Post-working age people per 100 people of the pre-working age (person) (*D*)
Post-working age people per 100 people of the working age (person) (*D*)
Technical infrastructure (TI)
People using the water supply system in the total commune population [%] (*S*)
People using the sewerage system in the total commune population [%] (*S*)
People using the gas supply in the total commune population [%] (*S*)
Length of the water supply distribution network per 100 km^2 [km] (*S*)
Length of the sewerage network per 100 km^2 [km] (*S*)
Length of the gas distribution network per 100 km^2 [km] (*S*)
Expenditure for transport and communication per person [PLN/person] (*S*)
Synthetic index of transport base (*S*): – synthetic index of internal accessibility: • percentage of roads in the geodetic structure of the commune area [%] • percentage of railways in the geodetic structure of the commune area [%] • length of bike lanes per 10,000 km^2 of the commune area [km] – synthetic index of accessibility of transport infrastructure facilities* – a synthetic index of real (road) distance from the adopted points of reference [km]**
Social infrastructure (SI)
Average floor area in houses and flats [m^2] (*S*)
Average floor area in houses and flats per person [m^2] (*S*)

cont. Table 1

Partial indices
Number of flats per 1,000 people (*S*)
Children aged 3-5 years per one place in a kindergarten (*D*)
Net scholarisation index, primary schools [%] (*S*)
Number of books in libraries per 1,000 people (*S*)
Number of people per one library (*D*)
Distance from a hospital [km] (D)***
Proportion of leisure land and recreation in the commune area [%] (*S*)
Synthetic index of access to tourist attractions (*S*): – accommodation facilities offering SPA treatment per 1,000 people – accommodation facilities offering instructor-run activities per 1,000 people – accommodation facilities having tourist equipment rental per 1,000 people – accommodation facilities with a swimming pool per 1,000 people – golf courses per 1,000 people – length of bike lanes per 1,000 people – accommodation facilities with sauna per 1,000 people – accommodation facilities having sailing equipment rental per 1,000 people – accommodation facilities with a hippodrome/stud at the site per 1,000 people – accommodation facilities with a conference hall per 1,000 people – expenditures from the commune budget for tourism in section 630 [PLN/person]
Administration (A)
Proportion of the commune's own revenue in total revenue [%] (*S*)
Proportion of the commune area covered by the local plan to the total commune area [%] (*S*)
EU funds for financing community programmes and projects per person [PLN/person] (*S*)
Funds for financing the commune's own tasks obtained from other sources per person [PLN/person] (*S*)
Expenditure for education per person [PLN/person] (*S*)
Expenditure for culture and national heritage protection per person [PLN/person] (*S*)
Expenditure for healthcare per person [PLN/person] (*S*)
Market (R)
Population density [people/km^2] (*S*)
Proportion of special economic zones in the commune area [%] (*S*)
Proportion of personal income tax in taxes being state budget income [%] (*S*)
Proportion of corporate income tax per an employee in taxes being state budget income [%] (*S*)
Proportion of legally protected areas in the commune area [%] (*D*)

S – stimulant, *D* – destimulant.

* Synthetic index of accessibility of transport infrastructure facilities was calculated by assigning weights to individual transport infrastructure facilities in the commune. The weight coefficients were multiplied by a number corresponding to the number of the transport infrastructure facilities in the specific commune. The weight coefficients were assigned depending on the category of roads in a commune: 3 – international or express road, 2 – trunk road, 1 – regional road; depending on the airports rank: 5 – international airport, 2 – other airport (sport, recreation, post-military); depending on the type of a border crossing point: 2 – road, 1 – railway; depending on the presence of a railway station or stop and a marine harbour: 3 – railway station, 2 – railway stop, 1 – marine harbour.

** This index was calculated as the sum of the distance from the capital town/village of the commune to the capital city of the voivodship and the capital cities of the neighbouring voivodships.

*** Distance from the commune capital town/village to the nearest hospital.

Source: own elaboration based on Godlewska-Majkowska (2012, 2013) and Nowicki (2014).

In order to eliminate excessive correlation between individual indicators, the coefficient of variation was calculated and the reversed matrix method was applied. The results of statistical verification were used as the basis for selecting for further analysis only those with a high coefficient of variance ($V>20$) and uncorrelated with each other ($\tilde{r}_0<10$).

Due to the multidimensionality and comprehensiveness of the concept of investment attractiveness, it was necessary to include many elements in the analysis. A multidimensional comparative analysis proved useful (Pawlas, 2013, p. 163). The research was conducted using the method of taxonomic measure of development Z. Hellwig (Świdyńska, 2018, p. 74), which allowed for a hierarchy of communes in Warmińsko-Mazurskie Voivodship due to their potential investment attractiveness. A higher value of this indicator means higher potential investment attractiveness.

Synthetic indices characterising the five sections of attractiveness for investment were calculated for all the communes in the Warmińsko-Mazurskie Voivodship.

Based on the study findings, the communes were ranked from the highest potential attractiveness for investment (in general and in each of the five sections) to the least attractive and classified into four classes (Wysocki, 2010)[1].

The stepwise regression method was applied to determine which element had the greatest effect on the commune potential attractiveness for investment. The calculations were performed using the Statistica software package.

Potential investment attractiveness of communes in the Warmińsko-Mazurskie Voivodship

All of the communes in the Warmińsko-Mazurskie Voivodship (N=116) were analysed to identify the element with the greatest effect on the potential attractiveness for investment. The results of statistical verification were used as the basis for selecting for further analysis only those with a high coefficient of variance and non-correlation with each other. The following indices were left out based on the statistical verification: the employed per 1,000 people, percentage of employed people in the population of the working age, balance of foreign migrations per 1,000 people, percentage of people of working age in the total population, people of a non-working age per 100 people of the working age, people of post-working age per 100 people of the pre-working age, people

[1] I: communes with high potential attractiveness for investment: $d_i \geq \bar{d}_t + S_{d_i}$ II: communes with medium potential attractiveness for investment: $\bar{d}_t \leq d_i < \bar{d}_t + S_{d_i}$ III: communes with average potential attractiveness for investment: $\bar{d}_t - S_{d_i} \leq d_i < \bar{d}_t$ IV: communes with low potential attractiveness for investment: $d_i < \bar{d}_t - S_{d_i}$; where: d_i – synthetic measure calculated by the Hellwig development pattern method; $\bar{d}_t$ – arithmetic average of the synthetic index d_i; S_{d_i} – standard deviation of the synthetic measure d_i.

of the post-working age per 100 people of the working age, the length of the water supply distribution network per 100 km^2, the length of the sewerage network per 100 km^2, percentage of roads in the geodetic structure of the commune area, percentage of railways in the geodetic structure of the commune area, average floorage area in houses and flats, average floorage area in houses and flats per person, number of flats per 1,000 people, proportion of personal income tax in taxes being state budget income, proportion of corporate income tax per employee in taxes being state budget income.

By applying the Hellwig development pattern method, the communes in the voivodship were classified with respect to the indices of potential attractiveness for investment and the synthetic indices of individual sections. These were separated into four classes from the most to the least attractive. The average level of potential attractiveness for investment prevailed (55% of the communes) in the voivodship communes and in the sections under analysis. The largest number of communes with a high development level were observed in the technical infrastructure and administration (15%) sections, while the smallest number of communes were observed (9%) in the "market" section (Tab. 2).

Table 2

The percentage of communes in the Warmińsko-Mazurskie Voivodship in individual classes depending on the level of potential attractiveness for investment and its components

Specification	Class			
Departments	I	II	III	IV
Potential commune attractiveness for investment	16	21	55	9
Labour resources	10	36	43	10
Technical infrastructure	15	19	59	8
Social infrastructure	14	32	39	16
Administration	15	29	46	10
Market	9	4	79	7

Source: own data.

The stepwise regression method was applied to determine which element had the greatest effect on the commune potential attractiveness for investment. The model obtained for all the communes of the Warmińsko-Mazurskie Voivodship (N=116) explained 99% of the variance of the commune's potential attractiveness for investment in the region. The multiple variance coefficient (R=0.99) indicated a strong link of potential attractiveness for investment with the five sections under analysis. A high level of F (5229.9) and the corresponding level of test probability p confirmed a statistically significant linear relationship. The value of t showed that the absolute term and the regression coefficient differed significantly from zero.

Table 3

Potential investment attractiveness of a commune

Departments	Technical infrastructure	Administration	Social infrastructure	Labour resources	Market
Potential commune attractiveness for investment	0.37	0.23	0.18	0.11	0.09

Source: own data.

The results showed that the level of a potential commune's attractiveness for investment is affected by the following factors: technical infrastructure, administration, social infrastructure, labour resources and the market (Tab. 3).

According to a study by the College of Entrepreneurship Science, the Warmińsko-Mazurskie Voivodship is ranked 13th in terms of potential attractiveness for investment among the voivodships of Poland (*Atrakcyjność inwestycyjna regionów 2017. Województwo warmińsko-mazurskie*, 2017). Along with Świętokrzyskie, Lubelskie and Podlaskie, the Warmińsko-Mazurskie Voivodship is among the least attractive for investment. The attractiveness for investment in all voivodships can be increased by using their unique resources as a base (*Atrakcyjność inwestycyjna regionów Polski 2016*, 2016).

A study by Invest in Poland, entitled *Atrakcyjność inwestycyjna regionów Polski 2016* (2016) examined the potential attractiveness of communes for investment based on six synthetic indices called microclimates: labour resources, technical infrastructure, social infrastructure, market, administration and nature. Apart from a determination of the general attractiveness of communes for investment, its level was also determined for four economic sections: processing industry, accommodation and gastronomy, commerce and repair as well as professional, scientific and technical activities. Therefore, one additional section, omitted in this study, was taken into account – the natural microclimate. The need for taking it into account in the study mentioned above may be a result of analysing the potential attractiveness for investment for the section accommodation and gastronomy, which is closely related to tourism, as well as to professional, scientific and technical activity. The natural microclimate can be regarded as a stimulant for these sections, it can also be regarded as a destimulant for the processing industry and it could be a stimulant or destimulant for commerce and repair, depending on the type of activity. The highest marks in all of the sections under analysis were given to nine communes of the voivodship (8 urban and one rural). The largest number of communes with above-average attractiveness for investment was found in the "accommodation and gastronomy" section. In total, the level of potential attractiveness for investment in the "accommodation and gastronomy" section is above average or higher in more than half of the communes of the Warmińsko-Mazurskie Voivodship. Therefore, it is justified to regard the touristic sector as one of the best opportunities in the Warmińsko-Mazurskie Voivodship.

The report entitled *Atrakcyjność inwestycyjna regionów 2017. Województwo warmińsko-mazurskie* (2017) examines the level of potential attractiveness for investment based on five factors: the situation in the labour market, technical infrastructure, social infrastructure, situation in the market and natural conditions. Administration, taken into account in this study, was disregarded. It was replaced with natural conditions, with the argument that there is a need for "evaluation of attractiveness of location of touristic and related services". The level of potential attractiveness for investment was also examined in the following sections: processing industry, commerce and repair, accommodation and gastronomy as well as professional, scientific and technical activity. The highest marks in all the sections under analysis were given to 17 communes (15 urban and 2 rural). In total, the level of potential attractiveness for investment in the "accommodation and gastronomy" section is above average or higher in nearly 40% of the communes of the Warmińsko-Mazurskie Voivodship.

The findings of studies conducted in 2016 among investors for the Wrocław agglomeration showed that the level of attractiveness for investment is affected to the greatest extent by: size and quality of labour resources, engineering personnel, knowledge of foreign language by the population/workers, common safety level, size and quality of labour resources, managerial staff and cost of labour, and engineering personnel (Ignacy, 2016, p. 94). In terms of the factors of attractiveness for investment analysed in this study, the majority of these factors (except for the common safety level) can be included in the "labour resources" section. This factor was of the greatest importance among the communes of the Warmińsko-Mazurskie Voivodship.

The findings of a study conducted among communes representatives by W. Lizińska, R. Marks-Bielska and R. Kisiel (2011, p. 195-198) showed that the attractiveness of communes of the Warmińsko-Mazurskie Voivodship for investment was affected to the greatest extent by location (100% of the respondents mentioned its distinct or significant effect) and technical infrastructure and land development (85% of the respondents mentioned the distinct or significant effect of each). The "land development" factor should be regarded as an element of technical infrastructure, whereas, according to the study authors: "The commune location is rather a historical factor, whose importance should be reduced by applying tools, such as creating economically privileged areas".

According to the findings of a study (Lizińska & Nazarczuk, 2008, p. 150) conducted among commune representatives, investors were offered aid to encourage them to invest in communes of the Warmińsko-Mazurskie Voivodship, such aid having the form of tax exemptions, assistance in finding unoccupied land or establishments and improvement of the technical infrastructure condition. The findings indicate that the last of these factors has a great effect on the level of commune attractiveness for investment.

Many authors have emphasized the importance of infrastructure as a factor in economic development (Gładkowska-Chocian, 2016, p. 151, 152; Świdyńska, 2017, p. 60; Adamowicz, 2011, p. 198; Burda &Wyplosz, 2013, p. 145; Ratajczak, 2000, p. 84).

Conclusion

A link was observed between the level of a commune's potential attractiveness for investment and their type. Urban communes proved to be the most attractive places for investment and the rural communes the least so. These findings are consistent with the center and peripheries theory. The urban communes are the center which develop faster. Rural communes, which are unable to keep pace with them, are the peripheries. Olsztyn – the capital city of the voivodship – is regarded as the growth pole. The city, together with the neighbouring communes (regardless of their type) has high potential attractiveness for investment.

The study findings show that communes oriented towards improvement of potential attractiveness for investment should take action regarding each of the sections analysed; however, such improvement can be achieved most effectively by investing in technical infrastructure.

The Warmińsko-Mazurskie Voivodeship is one of the least developed in the country. For the less developed regions, the priority is to exceed a certain developmental ceiling, triggering the process of self-sustainable growth and development. The creation of infrastructure should be a priority.

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PROFITABILITY OF THE BANKING SECTOR IN POLAND BETWEEN 2015-2019

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JEL Classification: G21.

K e y w o r d s: banking sector, profitability of the banking sector.

A b s t r a c t

Our research objective was to assess how the main profitability indicators of the banking sector have been used in Poland in the years 2015-2019 and to analyse the elements that make up their value. Return on assets (ROA) and return on equity (ROE) were used to measure the profitability of the banking sector in Poland. The research methods used included an analysis of available literature and statistical data published by the Polish Financial Supervisory Authority, the National Bank of Poland and the European Central Bank. We used dogmatic, statistical, and comparative methods. We put forward the following research hypothesis: the reason for a decrease in the profitability index of the Polish banking sector in the face of growing profits was an increase in the value of assets and equity. The research results confirmed this hypothesis. The reasons for the decreasing profitability of banks in Poland included excessively low levels of generated profits in relation to the increase in the value of capital and assets. Moreover, we identified the factors influencing this phenomenon.

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RENTOWNOŚĆ SEKTORA BANKOWEGO W POLSCE W LATACH 2015-2019

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Kody JEL: G21.

S ł o w a k l u c z o w e: sektor bankowy, rentowność sektora bankowego.

A b s t r a k t

Celem badań była ocena kształtowania się głównych wskaźników rentowności sektora bankowego w Polsce w latach 2015–2019 oraz elementów składających się na ich wartość. Do pomiaru rentowności sektora bankowego wykorzystano wskaźnik zwrotu z aktywów (ROA) oraz wskaźnik zwrotu z kapitału własnego (ROE). W badaniach zastosowano metodę analizy dostępnej literatury przedmiotu oraz danych statystycznych publikowanych przez Komisję Nadzoru Finansowego, Narodowy Bank Polski i Europejski Bank Centralny. Zastosowano metodę dogmatyczną, statystyczną i porównawczą. W badaniach postawiono następującą hipotezę badawczą: powodem spadku wskaźników rentowności polskiego sektora bankowego w warunkach jego rosnących zysków był wzrost wartości aktywów i kapitału własnego. Wyniki badań potwierdziły postawioną hipotezę. Wśród przyczyn malejącej rentowności banków w Polsce wskazano zbyt niskie poziomy generowanych zysków w stosunku do wzrostu wartości kapitałów i aktywów oraz zidentyfikowano czynniki wpływające na to zjawisko.

Introduction

Modern science recognises the importance of the financial sector for economic development, claiming that a well-developed financial system plays a significant role in the efficient allocation of resources and is directly correlated with economic growth (Włodarczyk & Szturo, 2018, p. 8). As opposed to other forms of economic activity, banking plays a very important role, which consists, among others, in providing financial support to the economy, conditioning the functioning and development of individual economic entities and, in the macroeconomic perspective, influencing the development of the entire economy, as well as its individual sectors (Kopiński, 2008, p. 12). Bank profitability is one of the basic categories determining the condition of the banking sector. It is very important both for the profitability of any business activity and the assessment of the current financial situation of banks in Poland.

Our research objective was to assess how the main profitability indicators of the banking sector have been functioning in Poland in the years 2015-2019

and to analyse the elements that make up their value. Our analysis confirmed the research hypothesis concerning the reasons for the decreasing profitability index of the Polish banking sector despite growing profits and a growing value of assets and equity. Moreover, we identified the main factors that influenced this phenomenon. This study indicates that the aggregated financial result of the banking sector in Poland has assumed increasingly higher values in the period under review, which is indicative of its growing profits in that time period. At the same time, assets and equity values had also increased. Despite this, decreasing profitability indexes were observed for this sector. In this article, the profitability of the banking sector was assessed using two indicators, i.e. return on assets (ROA) and return on equity (ROE). As their value is determined as the ratio of achieved profit to assets or capital, they show the proportions between their individual components. For this reason, in this paper, we discuss the aggregated values of the entire banking sector in Poland, without distinguishing between commercial and cooperative banks. We assumed that the ratio of the above-mentioned values depicts the general trend in the banking services market in Poland, and thus our conclusions would pertain to both groups of entities. With this assumption, it was possible to obtain data comparable to an international context. Our analysis was based mainly on statistical data and information provided by the Polish Financial Supervision Authority, the National Bank of Poland, and the European Central Bank. We compared the obtained data with the values recorded in other European countries. The research period covered the years 2015-2019. Such a choice was dictated by the desire to show the discussed trend in the period of tax, social contribution, and capital charges of the Polish banking sector and the availability of data. In this paper, we also propose a subjective evaluation of the results, forecasts, and reasons for these trends.

The profitability of the banking sector – concept and measurement

Next to liquidity and solvency, a bank's profitability is one of the three basic foundations for assessing the bank's financial standing (Romanowska & Kowalik, 2016, p. 244). Profitability can be defined in most general terms as the capacity to generate profits that link these profits to the expenditures used to achieve them (Majewska & Pacuła, 2016, p. 208). According to Kopiński (2016, p. 225), the bank's profitability fulfils several basic functions:

– profitability is the primary objective behind a bank's operations;
– profitability is an aggregated measure of a bank's economic efficiency;
– profitability is a source of financing a bank's further development;
– profitability provides motivation for the bank's management;
– profitability has a positive impact on public finance.

Profit identified with a positive financial result is the basis for the assessment of the bank's profitability. In turn, the financial result is determined as the relationship between income and costs generated by the bank. The rational business of banking consists of obtaining an appropriate relation between the income earned and the costs incurred. Banks gain their income primarily as a result of the sale of banking products and the provision of services (Kopiński, 2016, p. 226).

Pursuant to art. 43.1 of the Accounting Act of 29/09/1994, the financial result of banks consists of:

– an operating result (including banking activity);

– the result of extraordinary operations;

– the obligatory taxation of the financial result with income tax for which an individual is a taxpayer and contributes payments equal to it, which are subject to separate regulations.

According to the above-mentioned act, the result of banking activity includes net income from interest and commissions; income from shares, interests, and other securities; as well as being the result of financial operations and foreign exchange. The operating revenue includes the results of banking activity, adjusted for the difference between the remaining operating income and the remaining operating costs, the costs of banking activity, the depreciation of fixed and intangible assets, and the results from the value of the reserves update. Meanwhile, the result of extraordinary operations is the difference between extraordinary profits and extraordinary losses.

The financial result is the basic measure of banking profitability. Maintaining positive financial results allows the bank to operate safely, maintain its credibility as a public trust institution and expand. A high profit for the bank is proof of good management and it strengthens its market position. It also allows for a preliminary assessment of the effectiveness of a given bank or the entire sector (Gabrusiewicz, 2002, p. 42).

Thus, profitability can be identified by earning capacity if the financial result is positive, or by a deficit if the financial result is negative, i.e. a loss is observed. The financial result is an absolute category that can be used as a basis for the assessment of the bank's efficiency. On the contrary, to assess a bank's profitability, the ratios of the financial result against other categories, such as assets or equity, are usually examined (Albertazzi & Gambacorta, 2009, p. 393-409). Therefore, to measure the profitability of the banking sector, two basic indicators are most frequently used (Porębski, 2014, p. 45-57; Redecka, 2014, p. 280). These indicators were also used in this article and they include:

– ROA (*return on assets*) – calculated as the ratio of the financial result to the total value of assets;

– ROE *(return on equity*) – calculated as the ratio of the financial result to the value of equity.

The former shows the amount of net profit per unit of assets, while the latter shows the level of profit from every single zloty invested. Thus, ROA determines the assets' ability to generate profits, assesses the bank's management with respect to assets, and the use of assets to generate results. On the other hand, ROE estimates the rate of return achieved by shareholders, i.e. the benefits they get by investing capital (Rose, 1997, p. 150-152).

Moreover, apart from the indicators discussed above, there are other indicators such as net return on sales (ROS), return on base equity (Majewska & Pacuła, 2016, p. 208), cost level ratio and/or PM (profit margin) (Kochaniak, 2010, p. 57).

To sum up, profit that is understood to be a positive result of conducting banking activity is usually defined not as a relative value, but as a factor of generating income which exceeds the costs of doing business. The above-mentioned profitability ratios illustrate the intensity of this phenomenon (Kopiński, 2008, p. 12). The higher their value, the higher the bank's profitability and its financial standing. No rational range is defined for profitability ratios. This means that the value range has not been defined for this measure. Such a range is usually perceived as desirable, and its value should be comparable to that obtained by similar entities (Kałużny, 2012, p. 223). Therefore, positive values are generally considered desirable, but their level depends both on the type of business and the current developmental phase (both for the market, and the specific company or bank).

Assessment of banking sector profitability in Poland in 2015-2019

The analysis of financial results served as the basis for assessing the bank's profitability (Romanowska & Kowalik, 2016, p. 246). At the end of November 2019, the banking sector in Poland consisted of 30 commercial banks, 538 cooperative banks, and 32 branches of credit institutions, of which 3 commercial banks and 15 cooperative banks reported a total loss of PLN 582.5 million, which means that they had a negative financial result. These banks accounted for 4.3% of assets of the banking sector in Poland (KNF *Monthly Banking Sector Data*, 2019). Other banks showed a profit, which means that they had a positive financial result in the total amount of PLN 15.0 billion.

The positive financial result of the banking sector in Poland in 2015-2019 merits a good assessment from the point of view of the profitability of this sector. In 2015, the profit of the banking sector amounted to PLN 13.1 billion, it kept increasing annually and at the end of November 2019 reached PLN 14.5 billion. Thus, the banking sector in Poland keeps increasing its profitability every year. Only in 2017 did the banking sector in Poland record a decrease in profitability (Fig. 1). According to the opinion of the Polish Financial Supervision Authority

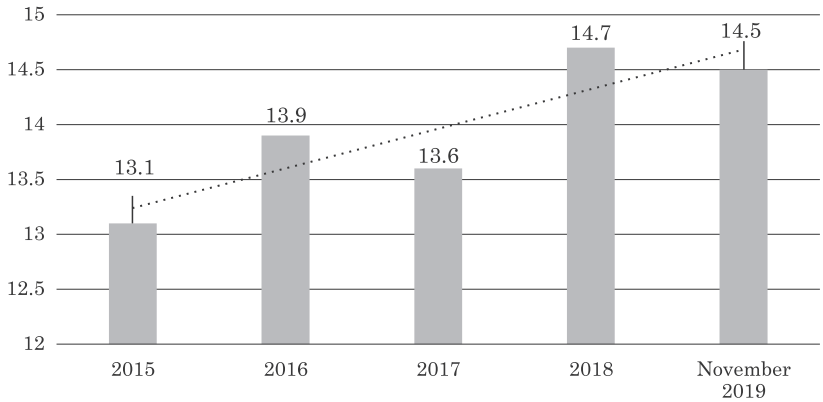

Fig. 1. Financial results of the banking sector in Poland [PLN billion]
Source: own data analysis based on Statistics Poland data provided by the National Bank of Poland and KNF for November 2019. Retrieved from https://stat.gov.pl/obszary-tematyczne/podmioty-gospodarcze-wyniki-finansowe/przedsiebiorstwa-finansowe.

(KNF), the main reason included charges resulting from the introduction of the bank tax in 2016 (*Report on the situation of banks*, 2017). For us, it was also one of the premises for choosing 2015 to 2019 as the research period. The bank tax in Poland was one of the highest applied in Europe and amounted to 0.0366% of the tax base per month, i.e. 0.44% per year. The decrease visible in 2017 never repeated and in subsequent years the increase in profit was observed again, which indicates that the tax had no further negative impact on profitability. This may also result from the good economic conditions in the years under review. In 2018, economic growth in Poland exceeded 5%. In the same period, the unemployment rate fell to its lowest historical levels (GUS 2020). In the period under analysis, progressive financialization of households, understood as the growing importance of financial factors in their functioning, was observed (Ostrowska & Dondalski, 2020 p. 105). It manifested itself in a growing willingness of households to incur debts, which was a stimulus to the development of the banking sector in Poland. Moreover, a good situation in the labour market translated into rising wages, which was indirectly favourable to banks as well. Recently, banks have also optimised the structure of their operations, among others, by closing unprofitable branches and reducing employment. This resulted in a significant reduction in costs incurred by the banks (Włodarczyk & Burchi, 2017, p. 292, 293), which also translated into an increase in profit. Despite all these favourable conditions, the increase in the profitability of the banking sector oscillated around 3% annually on average.

A steady increase in the value of assets of the Polish banking sector was observed in the period under analysis. The upward trend has continued since 2015, when the value of assets amounted to PLN 1,599.97 billion, whereas at the

end of 2018 it reached PLN 1,896.20 billion. At the end of November 2019, this value exceeded the PLN 2,000 billion threshold, reaching PLN 2,015.9 billion. In the period under study, the assets of Polish banks grew at a steady pace, averaging 6% per year (Fig. 2). This tempo was much faster than the profits discussed previously. A review of the financial statements of the largest banks in Poland allowed for an analysis of the volume of assets at the end of 2018. Bank PKO Bank Polski S.A. held the largest assets, with a total of 300 bilion PLN. Bank Pekao S.A. proved the second largest bank with assets of PLN 184 bilion. BOŚ Bank S.A. was the smallest of the commercial banks listed on the Warsaw Stock Exchange with the value of its assets at the level of PLN 18 bilion.

With data on the size of assets and profits in the banking sector, we calculated ROA for the banking sector in Poland for individual years (Fig. 3).

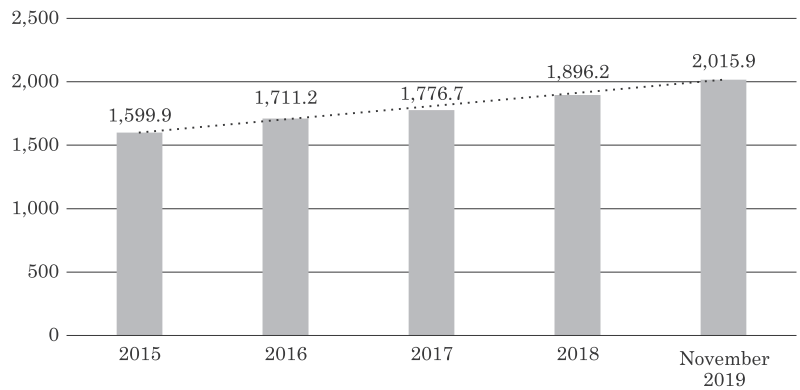

Fig. 2. Assets of the banking sector in Poland [PLN billion]
Source: own data analysis based on KNF data.

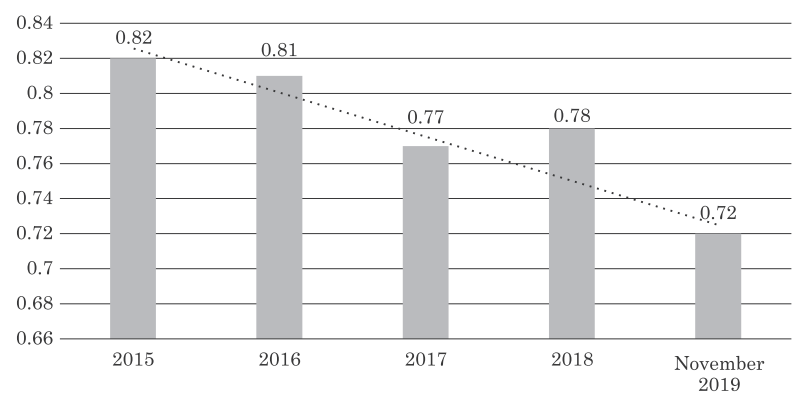

Fig. 3. ROA of the Polish banking sector [%]
Source: own study based on KNF data and the NBP report entitled "Strategic challenges for the banking sector in the EU and Poland in the coming years, dated 18.06.2019".

An analysis of the correlation between the financial result of the banking sector in Poland and the value of its assets indicates that despite both profits and value of assets increasing, the actual banks' profitability is decreasing. Every year, the return on assets of the Polish banking sector is falling. This is due to a much faster growth of the banks' assets in relation to their profits, which confirms our initial hypothesis. As receivables from the non-financial sector (excluding debt instruments) are the main asset component of Polish banks, accounting at the end of 2018 for about 55% of banks' total assets portfolio (National Bank of Poland 2019)[1], we can also conclude that the growth in credit products does not translate sufficiently into profits.

At the end of November 2019, ROA for the banking sector in Poland was calculated at 0.72% based on this data, while at the end of 2015 it was 0.82%. Therefore, a decrease in the return on assets by over 12% in the studied period can be judged significant.

The ROE of the banking sector in Poland was higher than in Western Europe. Comparing the aggregated annual results as of 31.12.2018, we can see that for Poland they were higher than the EU average (0.43%), e.g. ROE in Germany was 0.18% and in France 0.44%, while a negative return on equity was observed in Greece. The choice of 2018 as the comparison year was dictated by the availability of the latest data for individual national sectors published by the European Central Bank (ECB) and the National Bank of Poland (NBP) for a full year. We already mentioned that there is no specific model level for ROA and its value should be comparable to the values obtained by entities or sectors of a similar nature. For this very reason, we considered a comparison between the countries of Central and Eastern Europe to be the most reliable. The values obtained were the lowest when compared to these countries. In Bulgaria and Hungary, ROA amounted to 1.6% and 1.58% respectively, which was twice as high as in Poland. Higher ROA levels were also observed in Romania, Estonia, Slovenia, Lithuania, Latvia and the Czech Republic. Nowhere in Central and Eastern Europe was ROA lower than Poland (Fig. 4).

Return on equity (ROE) was the second of the discussed bank profitability indexes. To calculate it, the elements that make up its value must first be discussed. In addition to the profit-related element presented above, in this case, it is equity. Similarly to the case of assets, for many years banks in Poland have been significantly increasing their equity. Increasingly higher capital requirements resulting from regulations are the main factor contributing to this situation.

For equity, the upward trend is even more pronounced than for assets. In 2015, the value of the Polish banking sector's equity amounted to PLN 159 billion, while at the end of November 2019 it amounted to PLN 211 billion, which translated into an increase of over 32% (Fig. 5). In the period under review, banks quickly

[1] Own data analysis based on NBP data

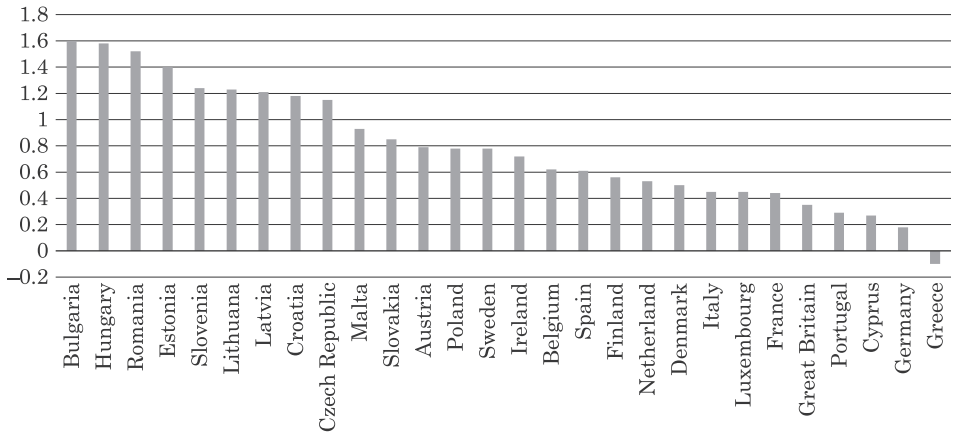

Fig. 4. ROA in the EU banking sector [%]
Source: own data analysis based on EBC and NBP data – as of 31.12.2018.

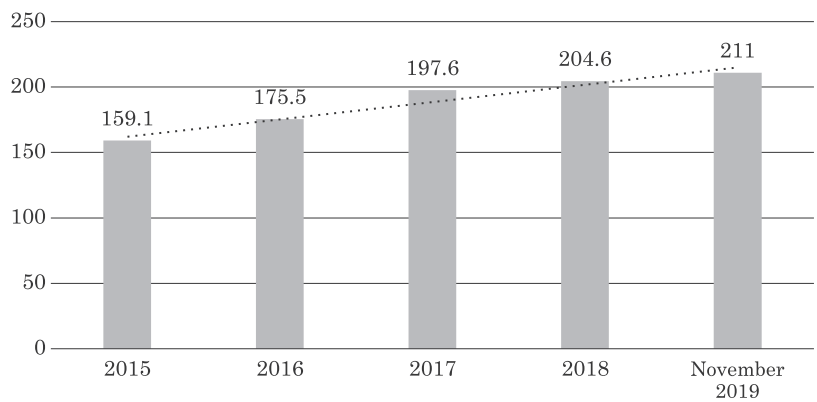

Fig. 5. Equity of the Polish banking sector (PLN billion)
Source: own data analysis based on NBP data.

kept increasing the value of their capital. This contributed to greater security in this sector, but negatively affected its profitability.

Based on data concerning the value of profit achieved by the banking sector in Poland and the amount of capital held, ROE was calculated. Similarly to the previously discussed index, its value also exhibits a downward trend in the period under review. At the end of 2015, the ROE for the Polish banking sector was 8.2%, whereas according to the end-November 2019 data, it was only 6.8%. Thus, the decrease in the period under analysis was 17% (Fig. 6).

Therefore, for capital profitability equity capital clearly accumulated faster than the profit generated by the banks. This confirms another part of our hypothesis set out in this article. Instead of showing a profit and allocating it, for example, to dividend payments or development, banks accumulate a significant

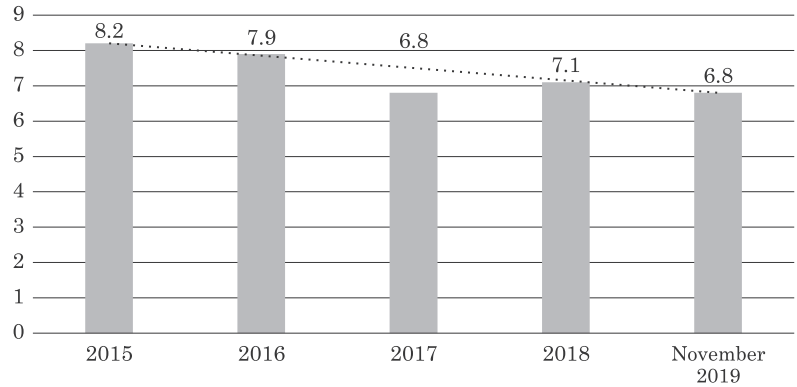

Fig. 6. ROE of the Polish banking sector [%]
Source: own study based on KNF data and the NBP report entitled "Strategic challenges for the banking sector in the EU and Poland in the coming years, dated 18.06.2019".

amount in capital. This is not a desirable situation from an investors' point of view, since banking activity requires the involvement of more and more capital, generating proportionally smaller profits from it.

The image that emerges in comparison with other European countries is similar to that of the ROA. Moreover, in this case, the Polish banking sector exhibits one of the lowest levels both in comparison with the CEE and Western European countries. ROE recorded in Hungary, Romania, and Czech Republic was more than twice as high as in Poland. The values observed in France (6.5%) and Italy (5.8%) were the most similar to Polish values. Altogether, only eight countries exhibited a lower return on equity than Poland, none of them in Central and Eastern Europe (Fig. 7).

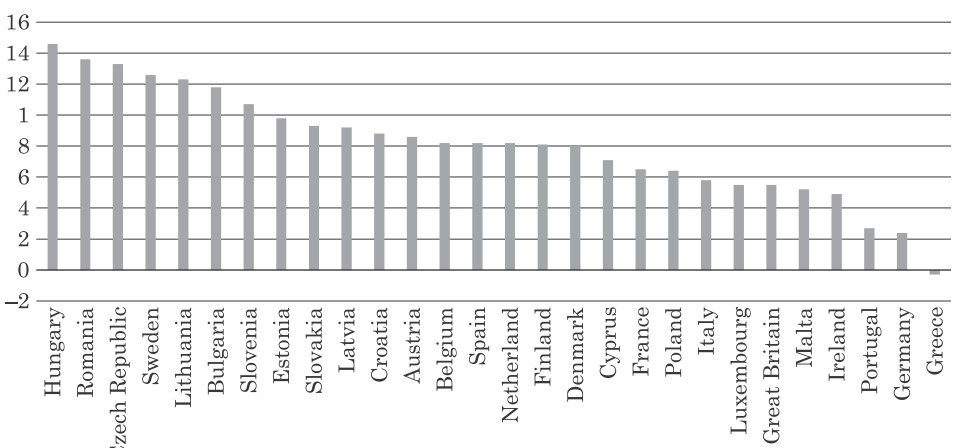

Fig.7. ROE in EU banking sectors [%]
Source: own data analysis based on EBC and NBP data – as of 31.12.2018.

The factors determining the profitability of the banking sector are related to the components of the indexes used for the profitability analysis in this paper. These include both the increasing burden on the banking sector in Poland and growing capital requirements. The former presents a constraint on the profits generated by Polish banks in spite of the favourable economic conditions and the development of the banking sector, as evidenced by increases in the level of assets. The latter, on the other hand, causes a rapid increase in equity. Especially the above-mentioned bank tax, as well as other tax and contribution burdens, such as contributions to the Bank Guarantee Fund, the Borrowers' Support Fund, and contributions to the costs of financial supervision, constitute a growing burden on banks. Increasing capital requirements, in turn, mostly result from increasing capital charges such as own fund requirements and combined buffer requirements (Capital Conservation Buffer, Countercyclical Capital Buffer, Systemic Risk Buffer and the buffers for systemically important institutions). The opinions of the Polish Bank Association (according to which the Polish banking sector counts among the most burdened in the whole of Europe) confirm this (Association of Polish Banks ZBP: Poland and Europe – challenges and limitations 2019). They specify that the maximum effective taxation of the largest Polish banks is 44%, and the nominal taxation is approx. 33%. The tax rate is 50% higher than in other countries in the CEE region. Bank Guarantee Fund fees are not recognized as an expense of income, and the additional bank tax does not contribute to the stability of the banking sector and is also not recognized as tax deductible. The above examples will translate into the situation discussed in this article.

An analysis of the profitability of the Polish banking sector in comparison with other European countries allows us to conclude that, compared to similar sectors, the Polish banking sector exhibits some of the lowest values. Also, when compared to economies with similar characteristics, their negative differentiation was observed. This may be indicative of its low attractiveness for investors who, when choosing markets for their investments, are certainly suggested by the indexes discussed in this paper. Banks, alongside countries, are the most important entities subject to ratings, whose level is a sign of investment attractiveness and a guarantee of financial strength and operational stability. Since the positive image of the Polish banking sector in the financial markets contributes to the growing trust in the whole economy and its sustainable development, this image must be confirmed by the high ratings of recognized rating agencies. The profitability indexes discussed in this paper are among the important elements influencing these ratings (Capiga, 2011, p. 217).

Conclusions

In the years 2015-2019, the Polish banking sector witnessed an increasing value of both assets and equity, which is positive for both the security and stability of the sector. This phenomenon was accompanied by profits growing from year to year. However, the increasing value of assets and equity did not translate into an increase in profitability, which means that Polish banks exhibited a capacity to generate profits which were too low in relation to the increase in capital and assets. The reasons for this phenomenon mainly included the growing burden on the banking sector in Poland, as well as the growing capital requirements. Thus, the hypothesis set out in the article was confirmed. The reasons for the decreasing profitability of banks in Poland included excessively low levels of generated profits in relation to the increase in the value of capital and assets. From an investors' point of view, such a situation is not desirable, as it generates steadily increasing costs while at the same time generating less and less profit relative to these costs, and makes it less attractive compared to other European countries.

To meet our research objective, we also calculated that, in the period under review, the profitability indexes for the Polish banking sector oscillated between 6.8%-8.2% for ROE and 0.72%-0.82% for ROA. Their value decreased from year to year. In an international context, their levels were the lowest among all the Central and Eastern European countries. Since there is no specific model level for ROA and ROE, we consider the comparison of its value to European sectors of a similar nature to be the most reliable.

What is worrying is the uncertainty as to the direction of development of profitability ratios in the coming years. If the broadly understood tax, contribution and capital charges on the banking sector in Poland continue to grow, further declines in profitability can be expected followed by a less and less positive assessment of the attractiveness of the Polish banking sector. This depends primarily on the business and regulatory environment in which banks operate. Taking into account the fact that profitability is falling in economically favourable conditions, this might pose another threat when the economic situation deteriorates.

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ORIGINAL PAPER

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TIME SERIES DECOMPOSITION AS A METHOD OF MEASURING CAPITAL MARKETS CONVERGENCE

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JEL Classification: C32, E32, G15.

K e y w o r d s: time series analysis, international capital markets, markets convergence.

A b s t r a c t

The aim of the article is to present time series decomposition as a method of measuring capital markets convergence. As an example, convergence of two different sets of markets are measured using this methodology. On the basis of this research, it has been established that time series decomposition of the market indices can prove or reject a hypothesis of moving indices in similar directions over a period of time.

DEKOMPOZYCJA SZEREGÓW CZASOWYCH JAKO METODA POMIARU ZBIEŻNOŚCI RYNKÓW KAPITAŁOWYCH

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Kody JEL: C32, E32, G15.

S ł o w a k l u c z o w e: analiza szeregów czasowych, międzynarodowe rynki kapitałowe, zbieżność rynków kapitałowych

A b s t r a k t

Celem artykułu jest prezentacja dekompozycji szeregów czasowych jako metody pomiaru zbieżności rynków kapitałowych. Jako przykład zbieżność dwóch par rynków kapitałowych zmierzono z zastosowaniem tej metodologii. Na bazie tych badań stwierdzono, że dekompozycja szeregów

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czasowych składających się z wartości indeksów cenowych rynków kapitałowych może służyć do potwierdzenia lub odrzucenia hipotez dotyczących poruszania się indeksów w podobnych kierunkach w badanych okresach czasu.

Introduction

In the capital markets there is said to be "convergence" between markets when investors regard the instruments traded in these separate markets as substitutes. Prices of these instruments will in turn show a tendency of moving in the same direction. As examples, we can show cases in which an increase in stock prices follows an increase in bond prices. Or, examples where stock prices on different international markets are moving in the same direction. According to another definition of "convergence", it occurs when capital can move between markets which have no transactional barriers between them. In such instances, the price of risk (the reward which investors receive for taking this risk) on different markets is equal for the same kind of assets. The opposite term is "divergence" which describes the situation when the prices of similar instruments are moving in different directions. The objective of the study described in this article is to demonstrate how convergence can be measured using one of the quantitative methods – time series decomposition. The analysis of convergence is based on comparison of the value of the divergence factor calculated as a sum of the differences between extracted values of irregular component, for two time series.

Analysis of literature on time series decomposition

Time series decomposition is used by economics and finance researchers to examine different phenomena that can be described by time series. Examples presented by authors (Cooraj, 2008; Enders, 2003) include such time series as sales and/or profits of companies, production facilities outputs, various indices (such as retail or consumer prices indices). The application of the method to measuring stock markets convergence is a novelty and has not been noticed in the existing literature.

Research methodology

A time series is a series of figures or values recorded over time. There are several components of a time series which it may be necessary to identify:

– a trend;
– seasonal variations or fluctuations;
– cyclical variations;

– non-recurring, random variations. These may be caused by unforeseen circumstances, such as political events (e.g. elections, change in the government etc.), a war or technological changes.

The trend is the underlying long-term movement over time in the values of the data recorded. Basically, there are three types of trend: a downward trend, an upward trend and a static trend, where there is no clear movement up or down along the time series.

Seasonal variations are short term fluctuations in recorded values, due to different circumstances which affect results at different times of year (or of a few-years periods), on different days of the week or at different times of day. "Seasonal" is a term which may appear to refer to the seasons of the year but its meaning in time series analysis is somewhat broader (the seasons in question don't have to cover the actual seasons of the year and may be shorter or longer, however it is safe to assume that in case of most of stock of exchange indices movements seasons correspond to certain seasons of the year – e.g. stock indices usually go up in May and December etc.)

Cyclical variations usually refer to the variations of the frequency higher than 1 year. As an example, we can bring the data on employment using quarterly data. For stock exchanges indices such variations are hard to identify and are not meaningful within the long timespan selected for research. Therefore, from now on, we will exclude any reference to this component.

In practice, a time series could incorporate all three components. For efficient decomposition, the three components have to be isolated. We can begin the process of isolating each feature by summarizing the components of a time series by equation 1 (Hamilton, 1994; Valkanov, 2003):

$$Y = T + S + I \tag{1}$$

(we have excluded the cyclical component)

where:

Y – the actual time series,
T – the trend series,
S – the seasonal component,
I – the irregular (random) component.

The alternative method is to use the multiplicative model whereby each actual figure is expressed as a proportion of the trend. Sometimes this method is called the proportional model. This model summarises a time series as $Y = T \cdot S \cdot I$. Please note that the trend component will be the same whichever model is used but the values of the seasonal and residual components will vary according to the model being applied. For the purpose of our study we will use the additive model described previously.

The first step of the time series decomposition is isolating the trend. There are three principal methods of finding a trend. The trend line can be drawn by eye on a graph in such a way that it appears to lie evenly between the recorded points, that is, a line of best fit drawn by eye. Alternatively, a statistical technique known as linear regression by the least squares' method can be used to calculate a line of best fit. However, the most frequently used method is a technique known as moving averages. This method attempts to remove seasonal variations from actual data by a process of averaging in order to produce trend values. The methods described above are useful for finding a linear trend. There are also different types of trend such as polynomial, logarithmic or exponential, for which different methods of decomposition are used such as exponential smoothing or other, but their usage is outside of the scope of this study.

A simple moving average is an average of the results of a fixed number of periods. Since it is an average of several time periods it is related to the mid-point of the overall period. In order to calculate the simple moving average, we can use the formula 2 (Frątczak, 2015; Frątczak & Korczyński, 2013):

$$X_t = \frac{1}{2q+1} \sum_{r=-q}^{q} x_{t+r}, \quad (t = q+1, q+2, \ldots, n-q) \tag{2}$$

where:

X_t – moving average,
x_i – next value from time series,
q – a natural number, representing fixed, odd number of periods, divided by 2 and rounded down,
t – moving average counter,

The formula presented above concerns a case when moving averages are taken of the results in an odd number of time periods, and the average is related to the mid-point of the overall period. If a moving average were taken of the results in an even number of time periods, the basic technique would be the same, but the mid-point of the overall period would not relate to a single period. The trend line average figures need to relate to a particular time period, otherwise, seasonal variations cannot be calculated. To overcome this difficulty, we take a moving average of the moving average (we repeat the process). For measuring capital market convergence periods equal to calendar months have been taken.

Once a trend has been established, by whatever method, we can find the seasonal variations. The additive model for time series analysis is $Y = T + S + I$. We can therefore write $Y - T = S + I$. In other words, if we deduct the trend series from the actual series, we will be left with the seasonal and irregular (residual) components of the time series.

In order to identify the irregular (residual) component, we have to calculate the average values of the sums of S and I components for every month of the

cycle (we assume that the full cycle lasts 12 calendar months). Then we have to deduct from the sums the seasonal component alone. In order to calculate the seasonal component alone, first we calculate the sums of the $S + I$ values for every calendar month over the whole period and divide by the number of the cycles in the whole period (years in the period examined) to arrive at the average value for each month. One more step is necessary in case the sum of the calculated seasonal component does not total to zero. We divide the excess by the number of months in the cycle and deduct the result from the sums of S and I components for each month of the cycle to arrive at adjusted seasonal component. After deduction of the values of the adjusted seasonal component from the $S + I$ values, we are left with the irregular (residual) component alone. (Cooraj, 2008; Enders, 2003). Time series decomposition can be used for making forecasts (Peck & Devore, 2012; Jóźwiak & Podgórski, 2000). These can be made as follows:

– trend line is found by calculating the moving averages and the trend line values are plotted on the graph;

– the trend line is extended so that readings for points in time outside of time covered by the original data can be taken. This method is known as extrapolation;

– the readings found using the extrapolated trend line are adjusted by the average seasonal variation applicable to the future period.

Alternatively, time series decomposition can be used for measuring the convergence of two (or more) time series. For such exercise we use the irregular component alone. A good example can be measuring the convergence of capital markets stock price indices. In order to compare the irregular component for different stock exchanges we need to standardize these values first (deduct the arithmetic mean and divide by the standard deviation). As the movements of the irregular component of the stock price indices is a measure of reaction of the stock exchanges to various political or macroeconomic events, we can assume that these are also a measure of the stock markets convergence for the different markets. In order to measure the convergence of capital markets the values of standardized irregular component need to be compared in months where this component is higher than 1 or lower than -1 and the difference in the pairs of the component values for the stock exchanges selected need to be computed. Then the sum of the absolute values of the differences needs to be calculated and compared between selected pairs (or sets in case we compare more than 2 time series). As a result, we can determine that the sets with larger value of the sum of the differences are less convergent than the sets with a smaller value of the sum of the differences, so we can call the sum of the differences a divergence factor. The formula for the divergence factor is as follows 3:

$$D = \sum_{1}^{n} |d_n| \tag{3}$$

where:

D – divergence factor,

n – number of months where the values of standardized irregular component is higher than 1 or lower than -1,

$|d_n|$ – the absolute value of the n-th difference between the 2 markets' irregular components in cases described above.

Description of the research results

To illustrate the usage of this technique, the convergence of 2 capital markets has been measured (in 2 examples). Selected pairs of capital markets were NYSE market and BSE market in India and NYSE market and SSE market

Table 1

Sums of the differences between NYSE/BSE and NYSE/SSE irregular components of the indices and the convergence factors

Month	Diff BSE/ NYSE	Month	Diff BSE/ NYSE	Month	Diff SSE/ NYSE	Month	Diff SSE/ NYSE
08.2007	1.1291	05.2010	0.1537	08.2007	2.3091	03.2010	1.0592
09.2007	1.3802	06.2010	1.772	09.2007	1.6536	05.2010	0.2759
10.2007	0.2823	08.2010	1.5631	10.2007	1.958	06.2010	0.2893
11.2007	2.4587	09.2010	1.2008	12.2007	2.047	08.2010	1.5631
12.2007	3.9615	10.2010	1.4286	03.2008	0.3793	01.2011	1.1154
01.2008	1.1083	12.2010	1.1605	05.2008	1.9195	02.2011	1.4633
02.2008	1.1561	01.2011	1.1154	06.2008	1.2432	04.2011	1.1337
03.2008	1.0363	02.2011	1.4633	07.2008	1.269	08.2011	1.006
05.2008	1.9195	04.2011	1.1337	08.2008	2.3829	09.2011	2.5914
06.2008	2.3351	08.2011	1.006	09.2008	1.3338	02.2012	1.2615
07.2008	1.269	09.2011	1.466	10.2008	0.0623	05.2012	1.6724
08.2008	1.041	11.2011	1.3488	11.2008	0.9775	04.2014	1.0669
09.2008	1.3338	12.2011	1.8556	12.2008	0.338	05.2014	1.1288
10.2008	0.4343	02.2012	0.2315	01.2009	1.7977	04.2015	2.6079
11.2008	0.1931	05.2012	0.276	02.2009	3.1237	05.2015	3.2402
12.2008	0.0709	07.2012	1.1511	03.2009	2.3345	06.2015	2.4254
01.2009	0.1298	01.2013	1.0914	04.2009	1.4855	08.2015	1.0914
02.2009	1.2003	07.2013	1.0034	07.2009	1.8391	09.2015	0.196
03.2009	0.6034	08.2013	1.6257	09.2009	1.2947	01.2016	0.2649
04.2009	0.2497	02.2015	1.293			06.2016	0.0716
05.2009	1.0877	09.2015	1.1619				**55.273**
09.2009	1.2947	01.2016	1.0095				
03.2010	1.0592	02.2016	0.2029				
			52.448				

Source: own computation on the basis of data from WFE website.

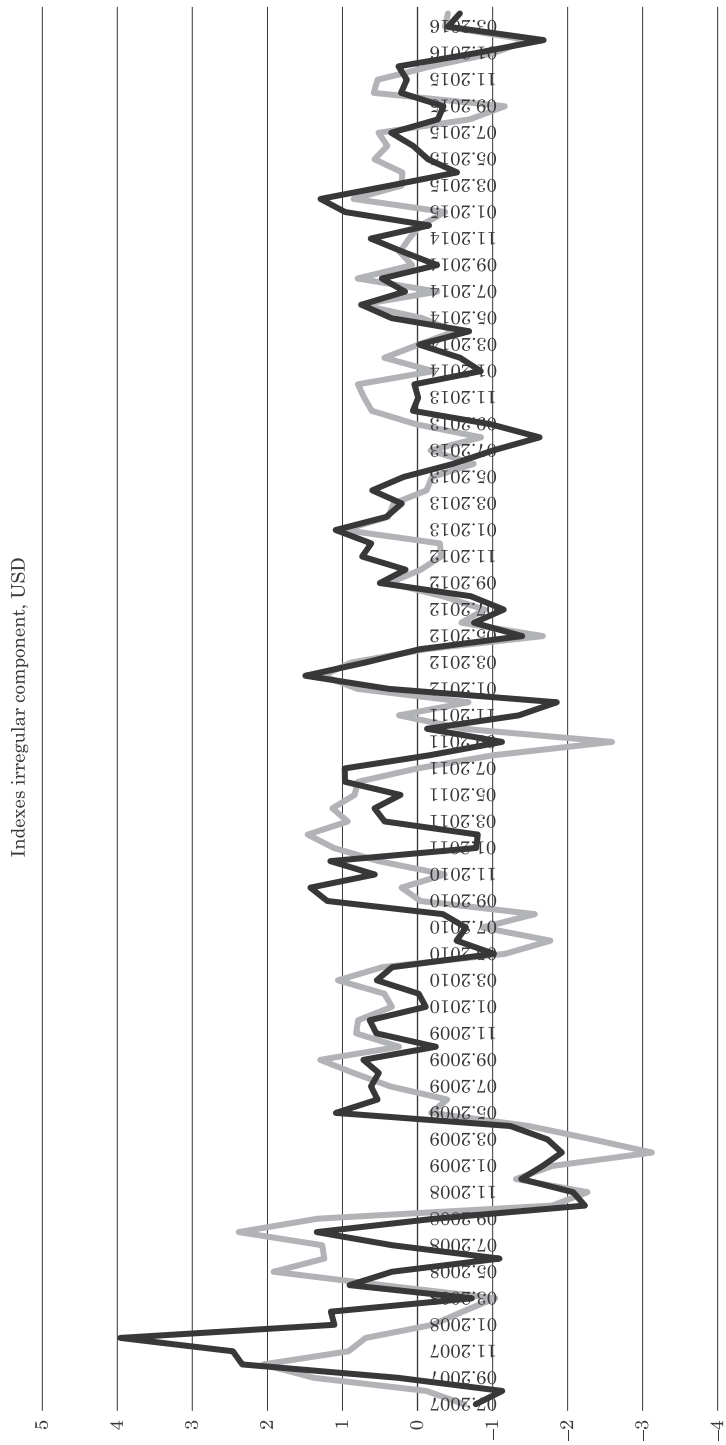

Fig. 1. Irregular components of NYSE market and BSE market indices

Source: own computation on the basis of data from WFE website.

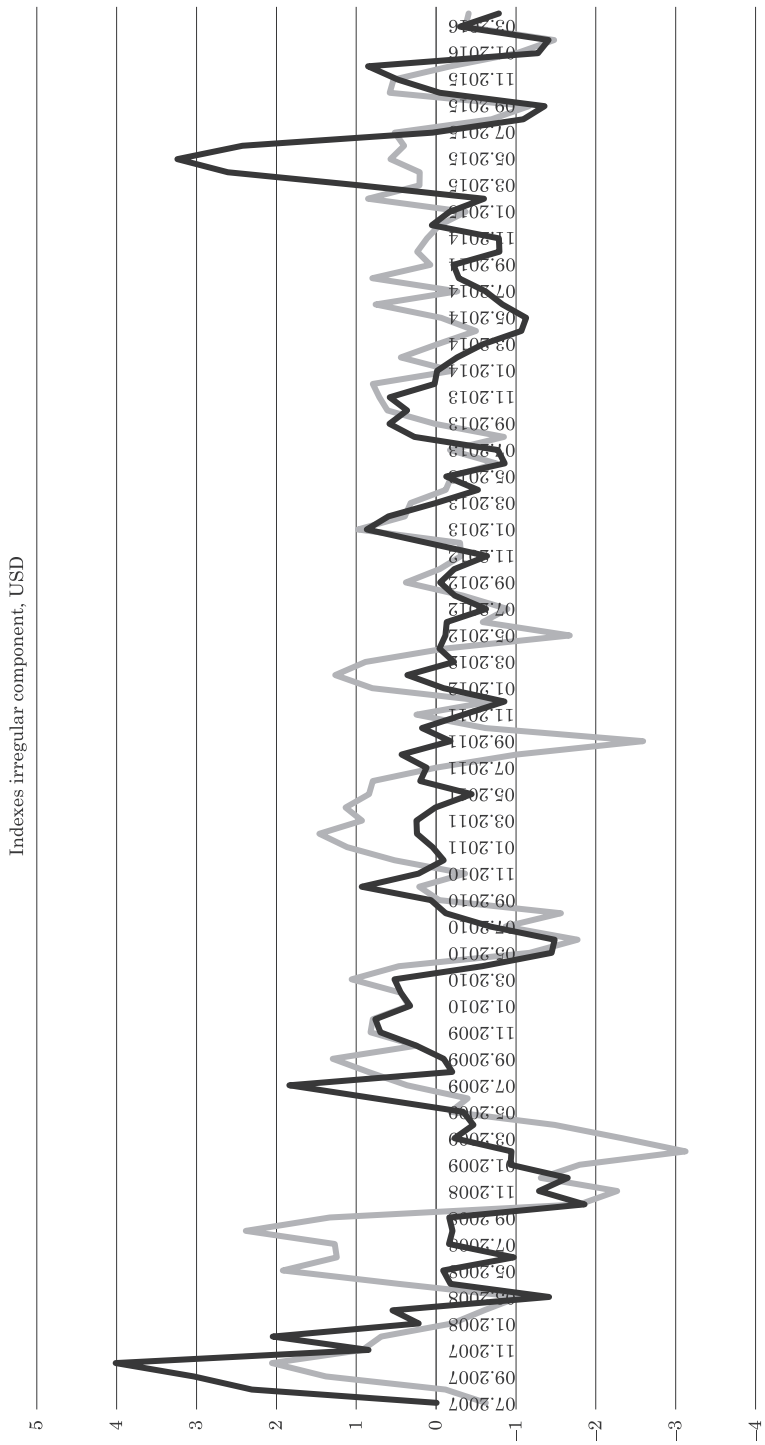

Fig. 2. Irregular components of NYSE market and SSE market indices

Source: Own computation on the basis of data from WFE website.

in China and a period between July 2007 and April 2016 has been chosen. The indices selected were NYSE Composite (for the NYSE market), S&P BSE 500 (for the Indian market) and SSE Composite (for the Chinese market). The irregular components for these markets in these periods have been isolated and standardized. The differences between the irregular components for the markets concerned (in case the standardized irregular component is higher than 1 or lower than -1) and their sums are presented in Table 1. The irregular components for these markets are presented in Figures 1 and 2.

The interpretation of the research results

Calculated divergence factor amounts to 52,448 for NYSE/BSE pair and 55,273 for NYSE/SSE pair, so the factor is bigger for the NYSE/SSE pair than for the NYSE/BSE pair. Therefore, BSE is more convergent with NYSE than SSE in the period examined (the bigger the divergence factor, the lower the convergence).

Conclusions

This paper tried to shed light on time series decomposition which can be used for the measuring and comparison of the extent of the convergence of two or more time series (by using the divergence factors). A practical application of this method has been demonstrated using the example of time series consisting of the values of various selected stock market indices. Using the examples of the pairs of stock market indices (NYSE vs BSE and NYSE vs SSE) their convergence has been measured and compared using this method. The final conclusion was that NYSE in the period examined is more convergent with BSE than with SSE, since the divergence factor NYSE-BSE is lower than the divergence factor NYSE-SSE.

The empirical model developed above can be improved and extended in multiple ways. First of all, a larger dataset could be used to check whether the conclusions reached here remain valid or not. Second, alternative models might be used (instead of time series analysis) to study the long-run dynamics of price formation. It is worth to note that convergence (or divergence) can be measured using other quantitative methods, such as calculation of the correlation coefficients or one-way analysis of variance (one-way ANOVA). What cannot be provided by the alternative methods is the measurement of the impact of unexpected events on the data described by given time series (e.g. the impact of political or macroeconomic events on the capital market indices). These extensions are left for the future research.

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DIMENSIONS OF CULTURE AND THE SIZE OF THE SHADOW ECONOMY IN THE MEMBER STATES OF THE EUROPEAN UNION

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Abstract

This article discusses connections between dimensions of culture and the size of the shadow economy in the European Union member states. A critical perusal of the literature led to the development of the theoretical groundwork, while statistical analysis revealed connections between the shadow economy and the dimensions of culture. The research findings suggest a strong stochastic relation of the culture in a given country and the size of its shadow economy. Countries with a high level of complacency, distrust of the authorities, collectivism and aversion to uncertainty are characterized by shadow economies of a substantial size.

WYMIARY KULTURY A ROZMIAR SZAREJ STREFY W PAŃSTWACH CZŁONKOWSKICH UNII EUROPEJSKIEJ

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Abstrakt

W artykule przedstawiono związek między wymiarami kultury a rozmiarem szarej strefy w państwach członkowskich Unii Europejskiej. W celu zaprezentowania części teoretycznej wykorzystano krytyczną analizę źródeł naukowych, natomiast analiza statystyczna umożliwiła określenie zależności między szarą strefą a wymiarami kultury. Zgodnie z wynikami badań występuje silna stochastycznie zależność między kulturą danego kraju a rozmiarem szarej strefy. Kraje o wysokiej pobłażliwości, dystansie do władz, kolektywizmu i unikania niepewności charakteryzują się wysokim poziomem szarej strefy.

Introduction

A shadow economy exists in every country (Enste & Schneider, 2000, p. 3). Its size will vary around the world, including the European Union member states. Differences arise from numerous circumstances. The essential factors causing the diversity among shadow economies in particular regions of the European Union are the culture of every country, its economic history, as well as its current social and economic development.

Kondzielnik (2017) has enumerated three groups of determinants that shape the size and prevalence of the shadow economy. These are focused on three aspects: legal, economic, and social. The latter group of determinants mainly deals with individual autonomy, flexibility and survival. Other cultural aspects are also important, as they play a major role in shaping the public's attitude towards the emergence and development of the shadow economy.

Philosophers and economists (such as Smith, Mill, Torsten Veblen) noticed that national cultures determine the economic behaviour of market entities (Buszko, 2019, p. 14, 15). Experts are increasingly interested in the influence of national culture on business policies and organizational culture. Buszko (2018, 2020) maintained that culture may determine, directly or indirectly, the attitude towards illegal activities.

The aim of this research is to determine a correlation between particular aspects of national culture (distrust of authorities, aversion to uncertainty, individualism, masculinity, and long-term orientation) and the size of the shadow economy in the European Union member states as of 2017. The research undertaken so far into this area has focused on the relation between dimensions of culture and the size of the shadow economy in the OECD countries.

Research methodology

The main methods employed in this study were a critical analysis of scientific references and statistical analysis. In order to identify the dimensions of culture which determine business attitudes, the relevant literature was reviewed in

both the Polish and English languages. The indicators of various dimensions of culture for the European Union member states were retrieved from https://www.hofstede-insights.com/country-comparison/. Excel software was used to calculate the relations.

Dimensions of culture determining business attitudes by Hofstede

In his most early research, Hofstede (1984) made an attempt to identify the business culture of his own country, taking into account several aspects. The psychologist later studied several other countries (such as the United States, and countries in Europe and Asia) against the assumed criteria (Wu, 2006, p. 35).

Hostede (2011) finally identified six dimensions of culture which determine business attitudes, namely the power of distance, aversion to uncertainty, individualism-collectivism, masculinity-femininity, and short-term or long-term orientation.

The first dimension concerns a distrust of the authorities (power of distance). It indicates the degree to which weaker members of the society (deprived of power) accept an unequal distribution of power. The society with a short distance from authority will strive to make the distribution more equal. The society with a large distance from authority will accept the hierarchical order, where everyone finds their place (Andrijauskienė & Dumčiuvienė, 2007, p. 190).

The next dimension is based on the relation of individuals in a given culture. In individualistic societies, individuals look solely after themselves and their close families, whereas in collectivist societies individuals belong to groups that look after them in exchange for their loyalty (Soares & Shoham, 2007, p. 280).

The indicator of masculinity relates to the degree to which "masculine" values, like efficiency and success, dominate over "feminine" values. These are two extremes illustrating the distribution of emotional roles between genders. Masculine values (assertive extreme) include competitiveness, assertiveness, ambition and accumulation of wealth and material assets; whereas, feminine values (modest extreme) are focused on relations and quality of life. What follows from the research by Dimitrow (2014) is that:

– feminine values vary between societies to a lesser extent that masculine values;

– masculine values in particular countries may significantly depart from assertive and competitive ones and be at the opposite end of the spectrum from the feminine values, or else they may be close to the feminine values of modesty and caring for others;

– women in feminine cultures have the same modest and caring values as men, although they are more assertive and competitive in masculine countries, albeit not as much as men.

The aspect of aversion to uncertainty measures the extent of fear of the unknown. Avoiding uncertainty indicates how much the society feels threatened by ambiguous situations, and to what extent they attempt to avoid adhering to strict codes of conduct (Podrug, 2011, p. 39).

The long-term orientation refers to the degree to which the culture has a pragmatic perspective of long and short-term historic orientation. The cultures with long-term orientation tend to value prudence, stamina, perseverance, promoting attempts to build a market share rather than a long-term profit, respect for tradition, exercise of social responsibility and preserving the honour of others in the industry (Rinuastuti *et al*., 2014, p. 144, 145).

Cultural specifics of the European Union countries and their shadow economies

The culture of the European Union countries is diverse. This is the consequence of religious divisions, geographical location, history, the current political situation, economic doctrine, etc. (Barkley & Eggertsson, 2017, p. 32). Dan (2013) suggests that business attitudes are affected by art, tradition, language, lifestyle and manners, history, museums, values and beliefs, sports, etc.

Ghemawat and Reiche (2011) analyzed 30 countries with respect to Hofstede's criteria. They noticed that cultural diversity makes it more difficult for businesses to cooperate, and poses many challenges to international corporations. Their analysis included 11 member states of the European Union (Denmark, France, Germany, Greece, Italy, The Netherlands, Poland, Portugal, Spain, Sweden and The United Kingdom). They found that these countries varied in terms of many cultural aspects.

Buszko (2017) noted that culture is a significant factor affecting the development of the shadow economy. The researcher claims that if the existing patterns and norms accept the existence of the shadow economy, it finds a space for its activities in the society. Buszko (2019) showed the correlation between the cultural dimensions by Hofstede and the size of shadow economies in the OECD countries (Tab. 1).

Table 1

The correlation between the cultural dimensions by Hofstede and the size of shadow economies in the OECD countries

Dimensions	The correlation
Power of distance	0.471476
Individualism-collectivism	-0.366953
Aversion to uncertainty	0.571165
Masculinity-femininity	0.227667

Source: own study based on Buszko (2017).

Buszko's analysis demonstrates that the highest positive correlation (0.57) exists between the aversion to uncertainty and the shadow economy, meaning that a greater fear of discovery of an improper economic conduct coexists with aversion towards and non-acceptance of the shadow economy. An average positive correlation (0.47) was noted for the distrust of the authorities and the shadow economy. A weak negative correlation (0.27) was also observed for individualism and the shadow economy. No correlation was determined for the cultural gender and the shadow economy (Buszko, 2019, p. 66).

Dimensions of culture and the size of the shadow economy in the European Union member states

The European identity has been shaped mostly by a shared cultural heritage (philosophy, art). The common identity became an essential realistic idea after the Second World War. Despite the ongoing process towards cohesion and solidarity among the member states, striving to preserve the cultural diversity of particular countries of the European Union remains an element of integration. There are still many differences between western and eastern Europe (Pellerin-Carlin, 2014, p. 74). Countries also vary in terms of their business culture, according to the dimensions proposed by Hofstede (Tab. 2).

The size of the shadow economy results from several factors. The analysis suggests that the size of the shadow economy in the EU depends on most of the cultural dimensions identified by Hofstede (Tab. 3). The highest positive correlation exists between complacency and the shadow economy (0.71). Average correlations were noticed between the shadow economy and distrust of the authorities, and between aversion to uncertainty (0.52) and individualism (-0.55).

European nations differ in terms of the distrust of the authorities. The countries with the largest distrust are less developed (Bulgaria, Croatia, Romania, Slovakia, Slovenia). These countries, except Slovenia and Slovakia, have vast shadow economies. On the other hand, the countries that have greater trust in the authorities have a high GDP (Austria, Denmark, Ireland, Finland, the Netherlands, Germany). Their common distinctive feature is a small proportion of the shadow economy. It can also be assumed that the degree of the distrust of the authorities may also affect the characteristics and prevalence of the shadow economy.

The countries of the European Union vary in terms of aversion to uncertainty. The average level of this indicator in the EU is 70.59, with a standard deviation of 21.58. The size of the shadow economy usually grows with an increase in aversion to uncertainty. The increase in aversion to uncertainty is usually parallel to the increase in the size of the shadow economy. Four countries where aversion to uncertainty is the lowest (Denmark, Sweden, Ireland, the United

Kingdom) have relatively small shadow economies. On the other hand, there are countries with high aversions to uncertainty, but small shadow economies, like Austria, Belgium, France and the Czech Republic. The countries where both the level of aversion to uncertainty and the shadow economy are high are Bulgaria and Croatia.

Table 2

Comparison of cultural dimensions with the size of the shadow economy in EU Member States in 2016.

Country	Power of distance	Individualism	Masculinity	Aversion to uncertainty	Long-term orientation	Indulgence	The size of the shadow economy [% GDP]
Austria	11	55	79	70	60	63	8.2
Belgium	65	75	54	94	82	57	16.2
Bulgaria	70	30	40	85	69	16	30.6
Croatia	73	33	40	80	58	33	27.7
Czech Republic	57	58	57	74	70	29	15.1
Denmark	18	74	16	23	35	70	12.0
Estonia	40	60	30	60	82	16	26.2
Finland	33	63	26	59	38	57	12.4
France	68	71	43	86	63	48	12.3
Germany	35	67	66	65	83	40	12.2
Great Britain	35	89	66	35	51	69	9.4
Greece	60	35	57	100	45	50	22.4
Hungary	46	80	88	82	58	31	21.9
Ireland	28	70	68	35	24	65	11.3
Italy	50	76	70	75	61	30	20.6
Latvia	44	70	9	63	69	13	23.6
Lithuania	42	60	19	65	82	16	25.8
Luxembourg	40	60	50	70	64	56	8.3
Malta	56	59	47	96	47	66	24.3
Netherlands	38	80	14	53	67	68	9.0
Poland	68	60	64	93	38	29	23.3
Portugal	63	27	31	99	28	33	17.6
Romania	90	30	42	90	52	20	28
Slovakia	100	52	100	51	77	28	14.1
Slovenia	71	27	19	88	49	48	23.3
Spain	57	51	52	86	48	44	18.2
Sweden	31	71	5	29	53	78	13.2

Source: own study based on *Hofstede Insights* (2020).

Table 3

Correlation between dimensions of culture and the size of the shadow economy [% GDP]

Dimensions	Correlations
Power of distance	0.52
Individualism	-0.55
Aversion to uncertainty	0.52
Masculinity	-0.17
long-term orientation	0.11
Indulgence	0.71

Source: own study based on *Hofstede Insights* (2020).

Liberal attitudes prevail in most European countries; according to Hofstede's typology, the countries with the highest level of individualism are the United Kingdom, the Netherlands, Hungary, Italy and Belgium. All of these countries, according to the research, have relatively small shadow economies.

Another cultural dimension is masculinity versus femininity. The average score in the EU member states was 46.37, with a standard deviation of 24.12. No strong correlation between the gender of culture and the size of the shadow economy was observed. In countries having similar cultures in terms of masculinity (Estonia and Portugal, 30 and 31 points, respectively), the difference in the size of the shadow economy reached an 8.6% share of the GDP. The countries which scored the highest were Slovakia (100), Hungary (88), Austria (79) and Italy (70). Among these countries, Austria had the smallest proportion of the shadow economy (8.2% of the GDP) and Hungary had the highest (21.9 of the GDP). However, no correlation was found.

The low correlation between the long-term versus short-term orientation and the shadow economy (0.11) resulted from the fact that most of the researched countries are characterized as having a long-term orientation, but the size of their shadow economies varies.

The European Union member states vary with regard to restraint. The highest negative correlation (-0.71) indicates the significance of this indicator in shaping the shadow economy. The countries with the high restraint tended to have a shadow economy of a moderate size. Such countries were Bulgaria, Estonia, Lithuania and Latvia. Together with an increase in restraint, the size of the shadow economy diminished. The countries with the highest level of restraint were those with a high level of development (Austria, Denmark, the Netherlands, Ireland, Malta, Sweden, and the UK) and a small proportion of the shadow economy.

Summary

There is a certain correlation between the dimensions of culture identified by Hofstede and the size of the shadow economy. In the case of three indicators (i.e. the size of the shadow economy versus the distance from the authority, individualism and aversion to uncertainty) the observed correlations were moderate (0.52, -0.55, 0.52, respectively). On the other hand, the correlations were low between the size of the shadow economy and masculinity (0.11) and long-term orientation (0.11)

Buszko arrived at similar research results. What transpires from his analysis is that the highest positive correlation (0.57) was between the aversion to uncertainty and the shadow economy. A moderate positive correlation (0.47) was noted between the distance from the authorities and the shadow economy. A weak negative correlation (-0.37) was observed between individualism and the shadow economy. No correlation was found between the cultural gender and the shadow economy.

It is worth mentioning that only one simple indicator (Pearson correlation coefficient) was used and the research can only serve as a basis for further research on the relationship between the shadow economy and the dimensions of culture proposed by Hofstede.

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