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## TRANSFORMATION TOWARDS A MARKET ORIENTED ECONOMY – AN IMPETUS OR HINDRANCE FOR ORGANIZED CRIME IN POLAND?

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**Key words:** transformation, organized crime groups, Poland, shortage economy, market oriented economy, the pattern of crime.

### Abstract

This article deals with the phenomenon of organized crime that has emerged as an urgent and serious problem in Poland during the transformation period. The solid background for organized crime group activity was created during the communist time. Due to the strong position of the police (that time called *militia*), and the security body, organized crime was not so well developed. After 1989, the organized crime groups (OCG) started to be more active, both in the domestic and the international market. The patterns of organized crime group activity were presented. So the main objective of the paper is to reveal the evolution of OCG activities and their scale in Poland. The organized crime groups have proven to be skillful in the exploitation of legal loopholes. The OCG became less violent, and focused more on economic crimes.

### TRANSFORMACJA W KIERUNKU GOSPODARKI RYNKOWEJ – WSPARCIE CZY BARIERA DLA ZORGANIZOWANEJ PRZESTĘPCZOŚCI W POLSCE?

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**Słowa kluczowe:** transformacja, zorganizowane grupy przestępcze, Polska, gospodarka nie-doboru, gospodarka rynkowa, wzory przestępczości.

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## Abstrakt

W artykule przedstawiono swoisty fenomen powstawania zorganizowanej przestępczości jako poważnego problemu w czasie transformacji ustrojowej. Początków zorganizowanej przestępczości należy szukać w założeniach poprzedniego systemu. W owym czasie policja (a właściwie milicja) nie była przygotowana do nowych wyzwań. Po 1989 roku przestępczość zorganizowana stała się bardziej aktywna. W artykule zaprezentowano charakterystyczne dla omawianego okresu wzorce przestępczości. Z tego względu można przyjąć, że głównym celem badawczym było zidentyfikowanie rozwoju grup przestępczych w Polsce. Dysponują one dużymi umiejętnościami i wykorzystują luki prawne. Grupy te stały się mniej agresywne, ale skupiły się na przestępstwach ekonomicznych.

## Introduction

The market oriented reforms in Poland started in 1989. Before that time the Polish model of economics was similar to the other communist countries. It is well known as a planned economy (Ellman, 2014; Myant & Drahoukoupil, 2010). Because of its inefficiency, quite often this model was coined as the shortage economy. In spite of that, there are some academics, researchers and politicians who have tried to investigate and provide advantages of such a model, but generally it was proven to be a very wasteful one (Landauer, 1947; Mandel, 1986; Kornai, 2013). Moreover, based upon the literature studies many recognized authors like Hayek (1945), Tirole (1991), Aharoni (1997), Gaddy (1993), and countless others claim the relative advantages of private ownership than central planning in many aspects and in criminal activity as well. However, some have indicated the case of China where the model of the planned economy has proven to be a success (Wayne, 2015). On the other hand, corruption based upon specific ties – *guanxi* and the organized crime groups (triads) did not disappear, and have been expanding (Chu, 2000). In a fundamental way, organized crime emerges in conditions that are antithetical to the main assumption of much of economic modeling. Most economic ideas tend to be limited historically to certain kinds of social organizations or institutions. Those entities can be affected by the specific type of criminal organization. Such unambiguous activity existed in former communist countries. Patterns occurred that differed quite substantially. In Russia, organized crime has had a long history and could implement itself even in harsh times. It is almost impossible to draw a line between the state and organized crime. The economic conditions and problems in Poland differ in some respects from those in the former Soviet Union, Bulgaria or Czechoslovakia. In contrast to the above mentioned countries, more than 70 per cent of Polish factories were self managed by the 1980s. Central planning, even in state enterprises, was never extensive in Poland. With respect to firm management, Poland was closer to the Yugoslavian model of “socialism without planning” than the Soviet format (Giffin, 1994). Such a situation was favorable for a shadow economy, but organized crime was not so well developed. Organized crime is

very dangerous for the economic development of any country. This fact must be taken into account, especially in those countries that undergo transformation. The governments of such countries are trying to create conditions for economic growth, but such circumstances are also exhausted by organized crime. Organized crime is very sophisticated. In a market oriented economy, their sources and opportunities have increased dramatically. If OCG groups are overlooked and do not attract the Government's attention, then economic reforms make a convenient space of their development. Organized crime is very flexible and can utilize all possibilities. So even though economic reforms are regarded as a success they do not limit OCG activity expressively. The essay is organized as follows. Chapter one is devoted to emblematic crime activity in Poland. Then a methodological approach is presented. Chapter three gives an explanation to the economic situation fostering organized crime in Poland. Chapter four suggests the possibilities of organized crime extension during market reforms. After that, crime group activity was described after 2000. This is because some patterns of organized crime need some time. They need to familiarize with the new circumstances. The last section concludes.

### **Typical crime activity in Poland during the communist period**

Under the communist regime, the key direction of motion characterized by the state power was its expansionist bureaucracy that monopolized the allocation of resources. Economic decisions were made in the political domain, and control over resources ensured state power. Demand always outpaced supply, creating economies of shortage, as Kornai (1980) has detailed (Wedel, 2001). There was a permanent lack of the basic products in the market. This was an inspiration for the shadow economy creation, as well as for organized crime group activity. The size of the shadow economy was at a high level, constituting nearly 30% of GDP (Buszko, 2016). The typical activity of the shadow economy in the communist times were related to smuggling, food product manufacturing and trading, corruption, illegal trade of official manufactured products, theft, and undeclared work. Such activity was strictly prohibited, even the death sentence was foreseen (Buszko, 2014). Nevertheless, the rate of economic criminal acts was growing. In 1954 the number of public thieves was 91 thousand, in 1955 – 96.7 thousand, in 1958 – 101 thousand, in 1960 – 134 thousand. Only 40% of the lawbreakers were caught and punished. The corruption escalated. From time to time, the big corruption scandals were brought to light. We can indicate as an example the corruption scandal in 1957 of the state owned company Centrogal, where the commercial director took bribes from private manufacturers. Over estimated deliveries supported by fake invoices done by private entities

to the state companies were normal practice. In order to cut off such actions, a special body was created – the Central Office for Corruption Fighting (Centralny Zespół do Walki z Nadużyciami i Korupcją). This office proved to be inefficient, even though some successes were sometimes achieved like: in Przeworsk – illegal apartment trading, milk fraud in Olsztyn and Białystok, smuggling in Gdańsk and Szczecin, and illegal drug trafficking in Warsaw (Buszko, 2017). Stealing and selling state owned products were popular practice during the communist time. Referring to Prosecution Statistics, the economic crimes during the sixties and seventies constituted ca. 30% of all crimes; but in the eighties – 37% (Prokuratura Okręgowa Warszawa Śródmieście, 1990). The well-known practices were swindles of the raw material supply. A good example of such a practice was the fake delivery of fabrics to the cooperative Panora located in Warsaw in 1957. The speculators earned nearly 8 million Polish Zloty (PLN). The medium salary of that time circulated at the level of 1,000 PLN (*Prokuratura w walce z przestępczością...*, 1957). The crucial thing of such a practice was the wide acceptance of those procedures. It was not regarded as a violation of ethical standards, such acts were even treated as being heroic deeds. This problem of the dual morality was well described by Firlit and Chlopecki in their article entitled *When Theft is not Theft* (1992). However, the economy of shortage created a sound base for informal group connections. The groups were formed in many industries, all over Poland. The reason for the creation was to achieve economic benefits. That is why different kinds of people joined such groups: starting from the owners of small and medium-sized private companies, members of the police (at that time called *militia – milicja*), clerks (especially from the revenue offices), managers from state owned companies (particularly responsible for raw material supply and distribution), bankers and government officials. Those groups did not operate on a constant basis, but from one dealing to another one. They did not use the threat or power solutions, just a focus on the swindle operations. Such informal groups were quite strong in the local communities, they even controlled small towns and rural areas. The very important factor fostering acceptance for such structures was the role of the Secret Security Body in Poland (Służba Bezpieczeństwa). The officers of this bureau kept an efficient net of informants, contacts from all over the country. They accepted some illegal activity in return for useful information. Those who just focused on the economic deals (not politics, and did not harm the Government too strongly), and were loyal to the Secret Security Body were allowed the freedom of functioning. A typical example of such relationships were the contacts with the hard currency black market dealers. The hard currency operations were under strict control, albeit there were shops (Baltona and Pewex) where citizens could buy foreign manufactured products. Those products were very popular and there was great demand for them. Naturally the illegal market for hard currency occurred. The dealers of hard currency very often informed secret security officers about what amount of money had been spent or what was bought. In this way the



information on the smuggling procedure by footballers of Legia Warsaw was delivered to the Secret Security Body. Some players Grotyński (goalkeeper) and Żmijewski (forwarder) wanted to handle contraband from Holland (during the rematch with Feyenoord Rotterdam in 1970) some products (shirts, jeans, raincoats, stockings – were very popular products in the shortage economy). This crime was cancelled since Legia Warsaw was a military club and the activists of the club were high ranking officers. This example gives two interesting pieces of information. First the source of information (from hard-currency dealers to secret security officers) and second – during the communist regime the right connections could provide efficient protection. Not everybody was equal in regards to the legal regulations. The second type of such a relation fostering organized crime in Poland was revealed during the swindle called 'Iron'. In the sixties secret security engaged skillful mobsters to steal valuable products in western countries (mainly in Germany and Switzerland) and bring them to Poland. The profits of such activity were gathered by secret security officers. In the seventies, smuggling boosted out. Further, key activists of Polish organized crime groups were given good lessons and experience based upon smuggling activity (like Pershing – one of the dominant persons in the Pruszków group, Nikoś – the Gdańsk group, Kozina – the Southern Part of Poland Group). The destination of these movements was Budapest and Vienna. Later on it was Germany. Gangsters started to steal and sell cars in Poland from these countries mainly (Jasinski, 1997).

The beginning time of transition for Polish organized crime was not so developed compared to Russia, for example. The tradition of organized crime had roots before the Revolution, and after that time it developed sharply. Organized crime was fostered by gangs operating in big cities (Gilinskiy, 1997). In the Polish case, the tradition of organized crime was limited but during the communist time the resourceful factors fostering organized crime were created:

- Corruption;
- Lack of trust in the Government;
- Low efficiency of the law system. The system was not prepared for organized crime activity in a market oriented economy;
- Informal relations among secret service officers, police, justice representatives, even politicians and gangsters;
- High level of the shadow economy;
- Gangsters set up good bases abroad. Nikoś (Nikodem Stokarczak) had a base in Germany (for auto theft operations mainly), Baranina (Jerzy Barański) in Vienna (cigarettes and spirits business);
- The code of criminal behavior was developed – the loyalty among mobsters, no cooperation with police (in practice the police had quite good sources of information in criminal circles. Later on those who cooperated were verified), own slang (called *grypsera* – especially used by those who spent some time

in jail), tattoos (gang members underlined their position by names like in military structures – where captains, majors, colonels and even generals were appointed).

## The methodological approach

Two goals were adopted in the study. The attempt to describe in detail the formation of organized crime in Poland was taken. The second target was to identify the economic factors fostering organized crime groups in Poland. The linear multiple regression technique has been used. It is an extension of linear regression models based on Pearson's linear correlation coefficient. It assumes the existence of a linear relationship among variables exists. The linear multiple regression model was calculated based on the following formula:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_k X_k + \mu,$$

where:

- $Y$  – dependent variable describing the model,
- $X$  – independent variables explaining the model,
- $\beta$  – parameters calculated by least squares method,
- $\mu$  – random variable (this is the residual vector – the difference between the actual values of the dependent variable  $Y$  and  $Y_1$  values predicted from the model); Statistica Software was applied.

The following independent variables were taken into account:

$X_1$  – the level of criminality (calculated per 10,000 citizens). The organized crime groups recruit members from criminal circles. The higher level of criminality has a positive impact on organized crime group activity,

$X_2$  – unemployment rate. The higher level of unemployment has a positive impact on organized crime,

$X_3$  – GDP per capita/the higher level of GDP per capita means more legal possibilities to get a good paid job,

$X_4$  – effectiveness of law enforcement, expressed as a ratio of convictions to the number of offenders. If this ratio is low, it creates a space not only for simple criminality but for organized crime as well,

$X_5$  – number of police,

$X_6$  – income diversification measured by a Gini coefficient. It is a measure of statistical dispersion intended to represent the income or wealth distribution of a nation's residents, and is the most commonly used measurement of inequality. If this inequality is high, one such situation is favorable for organized crime activity since the poorer part of society is highly likely affected by criminality. Such conclusions were developed by Fajnzylber, Lederman and Loayza (2002).

The data come from the Central Statistical Office (GUS) and cover the years 2000-2015.

## Findings

Based upon the methodological approach model recapitulating the level of organized crime in Poland, it matches following prescription:

$$Y = 0.740 + 0.301X_1 + 0.121X_2 + 1.11X_3 - 0.411X_4 + 0.700X_5 + 0.021X_6.$$

The level of significance was less than 0.05 ( $p < 0.05$ ).

In Poland, the Gini coefficient in 2008 was at the level of 0.34. Since the early 1990s, its systematic growth has been observed, however, this tendency was reversed and the Gini coefficient dropped in Poland in 2009-2015 from 0.313 to 0.299. A quite surprising situation was noticed with GDP. In the years 2000-2015, GDP growth was undoubtedly noticed. Growth was dynamic. At the beginning of 2000, it was PLN 747 billion and in 2015 PLN 1,799 billion (Statistical Yearbook, 2018). Such dynamic growth allowed Poland to even overtake Greece. Therefore, it may seem that such a situation should limit organized crime in Poland, although economic growth was conducive to the creation of comfortable places of action for organized crime. In its reform plans, the government did not take into account the possibility of the expansion of organized crime in the framework of a market economy. In the communist time, the crimes were the lowest – about 90-100 per 10,000 residents. This is mostly due to strict supervision of police. The communist wanted to control every sphere of human activity. A sharp rise in crime occurred in 1990, as a very unfavorable component of transformation. The crime rate increased from around 140 in 1989 to 230 in 1990. In the following years, up to 1997, the crime rate did not exceed 270. After 1997 there was an increase in the rate crime, which in 2002 exceeded 360. In relation to the most favorable time, the seventies, in 2002 it was almost 4 times larger (Sztudynyger & Sztudynyger, 2003). In the next years common crimes decreased. According to the data of the Command Chief Police, detection of criminal offenses amounted to 57.4%. Over the last 10 years, detectability of criminal crime oscillated between 43.4% (2000) and 54.4% (2015) (*Raport o stanie bezpieczeństwa*, 2016). This means increased effectiveness of the law, but still many criminals may feel unpunished. The number of police fluctuated around 100,000 people; however, in the last few years a slight decrease was noticed.

## New times, new possibilities

The organized crime did not receive much public attention in Poland under socialism. It was assumed that organized crime would disappear as the system would provide jobs for everybody. Moczydłowski (1999) pointed out the role of the security service as the animator of the organized crime in Poland. Paradoxically,

the security service (the Polish equivalent of the Soviet KGB), and the police in the first post – communist period created possibilities to develop organized criminal groups. Because in the communist period militia (later on police) were isolated from society, they wanted to gather information from criminal circles. Informants, in order to function properly, had to commit crimes and often they used information presented to the militia or another state agency to fight other criminal groups. Between the 1980s and 1990s, the militia lost control over their pseudo-informants and they were building their own criminal organizations. The first wave of organized crime in Poland was possible because of such informant – policeman connections and wide scale corruption (Moczydłowski, 1999). At the time, crime groups did not dominate specific segments of the economy, but were mainly involved in crimes such as burglaries, robberies and car thefts (Plywaczewski, 1997). This pattern of crime was changed during the first years of transformation and later on. Even during the communist time, crime groups had good contacts in western countries, especially in Germany, Italy, and other eastern countries like Russia, Ukraine and Lithuania. This is because of the close location and even family contacts. Quite a few Polish citizens had families in neighboring countries, particularly Pomerania, Silesia, the Warmia and Mazury region, in Germany, the eastern and southern parts of Poland and in Ukraine. Those contacts started from small scale smuggling and were developed into robberies, burglaries and fake financial operations. The transformation made an impact on organized crime development.

On 1<sup>st</sup> January 1990 the post communist government in Poland undertook a set of radical reforms. This is due to the fact that in 1989 the level of macroeconomic destabilization of the Polish economy was much bigger than that of the economies of other countries of real socialism. It was only Poland that did not service the majority of its foreign debt and only in Poland inflation approached the hyperinflation level, undermining the confidence of citizens to its own currency so seriously that in August 1989 the average monthly pay, according to the market exchange rate, declined to 20 US dollars. In the period 1990–1991 transformation destroyed a large part of the Polish industry (Gomułka, 2016). Very few of the large state industrial companies in Poland had actually gone bankrupt – the legal system and existing property rights did not encourage bankruptcy proceedings for insolvent or troubled enterprises. However, employment in this sector declined by more than 30%. At the same time, the number of private business incorporations had increased from 1,275 in 1988 to 11,693 at the end of 1989, 33,239 at the end of 1990, and 45,077 by the end of 1991 (Johnson & Loveman, 1995). In 2013 the industrial output (manufacturing and mining) in constant prices was 2.5 times higher than in 1989, and about 3.7 times higher than in 1991. There was a change in the composition of industrial production in the right direction: the extraction of raw materials shrank while the production and export of processed goods, including high tech goods, grew many times (Gomułka, 2016). The reforms generally proved

to be a success, but for organized crime, the first two years of transformation were very crucial ones (Slay, 1994; Adam, 1999). The authors of reforms did not pay close attention to the limitation of potential organized crime future development activity (Krajewski, 2004; Siemaszko, 2000). In July 1990 the new legal act related to the trading of alcohol was established. Based upon this act, the Government supervision on production and alcohol trading was abolished. Additionally, to this the Government allowed the import of alcohol for personal use without any taxes. This made an open gate for organized crime to smuggle spirits from western countries and from Ukraine and Russia. The market for this trade was calculated at 32 million liters of pure alcohol in the beginning of the nineties (Foks, 2000). The first route of smuggling spirits from western countries was controlled by the organized crime groups. Some deliveries were handled on fake invoices. The purchase price indicated in the invoice was a very low one, and the taxes were paid based upon this price. So the budget revenue was very small. This business made for organized crime profits calculated at 200 million USD on a yearly basis. One of the organized crime group leaders – nick named – *Dziad* in his book writes “The price in Germany for one liter of pure alcohol Royal was 1 USD, in Poland 7 USD. The profit can be calculated on 4-6 USD per bottle. Some money should be paid to sellers (shop keepers, restaurants, whole sellers etc.) and the transport costs must be born. One truck could carry 24 thousand bottles” (Niewiadomski, 2002). Such good profits even caused a war between organized crime groups. Gdańsk and Zielona Góra crime groups began to be very active in controlling the cross checking points in Zgorzelec and Słubice (the border between Poland and Germany). The procedure with smuggling spirits to Poland was named Schnapsgate – this is because of the scale of it and fortunes creation (Pytlakowski & Ornacka, 2013). In the begging of of the nineties, the Pruszków organized crime group developed an association with a characteristic spirit smuggling activity. One – truck robberies. This was a very profitable business since the operators of this illegal business did not report the robbery to the police. The second way was devoted to fake invoice deliveries. The smugglers declared the transit of goods through Poland, but in fact the goods were unloaded in the country and sold. Officially the transport left Poland and no tax was paid. All profit was taken by the organized crime group. These two kinds of activity were called – The Pruszków style. The important feature for developing the organized crime activity was the hard currency operation. The role of the exchange rate in monetary policy in Poland was very important and played a crucial role in inflation targeting, and attracting foreign investors. It was a fixed rate against the US dollar set up, and from May 1991 the Polish zloty was based upon a basket of five currencies. In May 1991, the devaluation was noticed by 16.8%. The exchange rate played an effective role as an anti-inflation anchor. During the time of October 1991 – May 1995 a crawling peg with a monthly rate of devaluation declining steadily from 1.8% to 1.2% was introduced. Two devaluations took place, by 12% in February 1992 and 8%

in August 1993. Starting from May 1995 until 2000, there was a crawling band system with a fluctuation band increasing from  $\pm 7\%$  to  $\pm 15\%$ . After 2000, a free-floating exchange rate system was implemented (National Bank of Poland, 2008, 2011). These steps show that Poland had a logical plan on the exchange rate regime. Those steps in general terms proved to be a success (Przystupa, 2002). Meanwhile in the Polish foreign trade with other communist countries the *transfer ruble* existed as the tool for clearing up transactions. The transfer ruble did not have a “material form” it was only created for accounting purposes (Welsh, 1997). When the transformation period began, some companies (which had good connections with the former communist regime) concluded contracts with CMEA countries (especially with Russia) for different kinds of deliveries. Some contracts proved to be fake ones, but the money due calculated in the transfer ruble was then exchanged for USD and PLN. The total loss of the Polish budget was calculated at 400 million US dollars (*Afera rublowa (1990)*, 2017). This case should be connected more with crime group activity than the idea of the common ruble area on the territory of the former Soviet Union (FSU) in 1992-1993 (Dąbrowski, 1995). The second issue related to hard currency was the decision of the opening of private exchange entities (kantory). The first one was opened in March 1989 at the cross border check point in Świecko (border with Germany). The demand for hard currency was tremendous. At the end of 1989, the Ministry of Finance issued nearly 2000 permissions for the opening of kantory. Those setups were mainly devoted to people who did such transactions illegally during the communist times. Thanks to this possibility they could earn huge profits officially and enter the group of the richest people in Poland. Such practices gave rise to basic questions:

- Did the Authors of the transformation deliberately set up conditions for particular group activity? Or did those possibilities appear by chance?
- Who influenced crime group activity during the first years of the transformation?

Zybertowicz (2002a, 2002b) declares that Poland of the 1980s was a post-totalitarian police state. He states that the transformation in Poland (as well as in many other post-Soviet countries) was executed in favor of informal elite groups rather than democratic institutions and exerted real influence on the state decision-making process. Since the secret police had good contacts among crime groups (the contacts collaborated with the police and the secret police), those groups could be used as tools for the goals of the secret police.

Poland was among the countries with the lowest number of murders per 100,000 inhabitants. Nevertheless, it should be noted that within the period 1990–2002 the activities of the criminal groups led to the deaths of several hundred people. These included Ireneusz Sekuła, a former deputy prime minister of Poland, Jacek Dębski, the sports minister, and the Police Chief Commandant Jacek Papala, whose investigation has not yet been completed and those responsible for the crime have yet to be brought to justice (Raczkowski

& Gołębiowski, 2011). The thread of organized crime made an impact on the Police and a special group called Marathon was formed. Based upon the research of this unit, in 1992 there were 30 criminal groups involved in economic crime activity on a large scale in Poland. Those groups should be classified as typical well organized units, with efficient structures and flexible adaptation to the new environment. One of the new arenas of organized group activity which brought huge profits was connected with narcotics. The Pruszków group started smuggling cocaine from Columbia and the Wołomin group was involved in amphetamine production and selling it to western European countries mainly. At that time, Russian crime groups appeared (the mafia) in a more visible way. The Pruszków Group was recognized as being involved with extortion and counterfeiting. This was underestimating their activity. This group just from the early years of transformation was involved in money laundering, mainly by opening restaurants, discothèques and even casinos. Those businesses were based on cash transactions mainly. It was not so easy to change money from organized crime to a legal business. In the early years of transformation, the police and other Government institutions did not have enough knowledge about crime group activity, which is why they did not adopt adequate tools to limit the illegal operations.

During the first years of the transformation, violent crimes were noticed. The organized crime groups wanted to take control of some areas and they were not so well prepared for the advanced knowledge crime action. That is why the most popular crimes were related to extortion, robberies, kidnapping, blackmail, cars theft, and fraud – mostly connected with automobile operations. The mobsters sold cars to their partners in the east (Russian and Ukrainian, mainly), and then they declared the theft. In this way, they gained money from the insurance company and the buyers. At that time the acts were violent ones, but the government budget did not suffer too much. However, the situation steadily changed. Firstly, those acts were simply identified and the gangsters were punished. Police were given more tools like having a key witness. The minor offender could be free, but they needed to provide some evidence of a felony. Thanks to this tool, the police could liquidate the most dangerous Pruszków OCG. Secondly, gangsters started to avoid violent actions and take care of more profitable operations. Such operations required more knowledge and based on it – a more sophisticated approach. A good example of such dealings was the manufacturing of fake products and smuggling them to west European countries. For example, in 1994 the German video market lost more than \$140 million to pirates that year, according to the anti-piracy organization GVU. Illegal copies came into the country from organized crime in Eastern Europe. The GVU had discovered that a large proportion of the illicit product entered Germany across its border with Poland. The tapes were then sold in Germany via an intricate, market-based network of dealers (Spahr, 1995). The illegal copies were partly manufactured in Poland (Warsaw, Łódz area) and in the Far

East. The Polish OCG started to set up contacts with Asian groups. Over the last few decades, the arrival of visible numbers of Asian migrants to Poland has been seen. This is because Poland can be regarded as a good destination for different kinds of operations, and has a close connection to other European countries. Asian (especially Vietnamese) migrants came to Poland in the sixties for educational purposes and then part of them decided to stay. The population of Vietnamese in Poland is calculated at 60-70 thousand people. Some of them are heavily engaged in criminal activity with occasional cooperation with Polish partners. The police have had problems with Asian groups since they are very loyal to their members and are organized around the traditional native culture, so the trust between 'strangers' and Asians has always been in short supply (Basham, 1996). Polish crime groups are still very active in stealing cars from west European countries. During the first years of the transformation, the customs office and police identified the value of stolen cars at 33-38 million PLN yearly (Potakowski, 2008). This value of stolen cars was kept later on, even after 2000. But the pattern of this crime was changed. The number of these crimes has decreased from 1,300 in 2002 to 740 in 2010, so it means that the OCG focused on luxury and more expensive models. The stolen cars come to Poland not only from Germany and other neighboring countries, but also from Belgium, Italy, France and Spain. Quite often before stealing the cars, all other necessary procedures are foreseen. They are mostly connected with documents and the corruption of clerks responsible for the registering the cars in Poland. The Polish OCG are specialized in changing Vehicle Identification Numbers (VIN). Parts of the stolen cars are sold in Poland and parts of them are sold in Russia, Ukraine and even in Tajikistan, Uzbekistan and Kazakhstan. The route of stolen luxury cars to Central Asia goes through Poland, then Kaliningrad (Russia) and via sea ports to Iran. From there, they are sent to their final destination. Such a logistic undertaking requires international crime group cooperation. In Poland the crime groups involved in car theft are characterized by the territory of activity, method of operations and the way of profit gaining. The small groups operate locally, more advanced ones internationally. The profit of the former group is relatively small, but the profit of the latter is far higher. The Polish police pay close attention to criminal terror. Terrorist acts appear quite frequently. Some acts are strictly connected with crime groups. In this way they want to eliminate competitors or reach goals. The second category is devoted to individual acts. In Warsaw the "Rurabomber" terrorized residents by constructing bombs and causing explosions in densely populated areas. In the begging of the nineties, the number of extortions was at the level of 45 thousand, but in 1997 this figure started to decrease. Right now, it is at the level of 12 thousand annually (Komenda Główna Policji, 2016). In the first years of transformation, kidnaping for ransom was a very popular crime group activity in Poland. The Police during the time of 1992-1996 identified



182 such cases. After 1996, the number of such acts fell sharply to 4-6 per year. This decrease was due to effective police activity and more strict cooperation with victims (Nyc, 2006).

## Crime group activity after 2000

After 2000, the Polish OCG started to be very active in all financial swindles affecting the national budget very much. During the first years of transformation, not only were entrepreneurs, administrative officers, politicians, police, and government officials given a good lesson on the market oriented economy but the organized crime groups as well. They started to work in a more effective way, searching for gaps in the law and more profitable operations. One operation is connected with VAT fraud. Tax collection in Poland as a percentage of GDP is lower than what is found in other EU member states. Additionally, there is a low efficiency of tax collection.

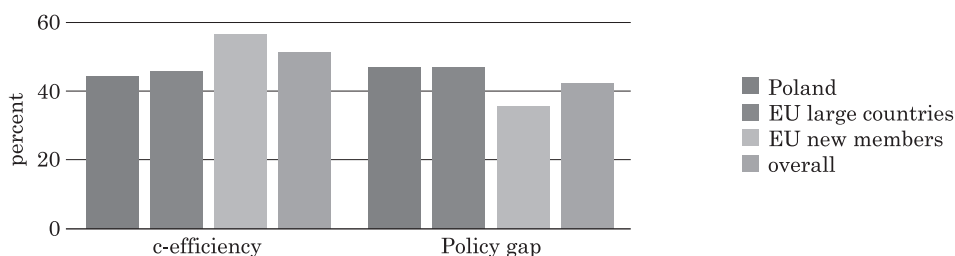


Figure 1. Efficiency of Value-Added Tax Collection in Poland in 2012

Source: based on: Toro *et al.* (2015).

The VAT gap in Poland is calculated at the level of 2.5% of GDP (*VAT Gap in Poland, 2014; Luka podatkowa w VAT...*, 2014). This gap is just very partially created by tax optimization, but mainly by VAT fraud. The PwC report found that VAT fraud in Poland was the key element in the growing VAT gap. The report's evidence for this included recurring indictments in VAT fraud investigations, suggesting that it had penetrated into several industries, and EC reports of endemic refund fraud across the entire EU. In particular, the report found that 'carousel' refund fraud, a highly corrosive variant of Missing Trader Intra-Community fraud (MTIC), which exploits EU rules on the intra-community movement of goods, had a significant presence in the following sectors: scrap metal; construction steel; fuels; electronics (mobile phones, computer parts); agricultural goods (oils, sugar); and the wood industry (Toro *et al.*, 2015).

The mechanism of VAT fraud is very simple. Tax fraud involves illegal traders setting up shell companies which they use to import or export goods from

a company or another country. The sell is accompanied by the invoice including VAT. The shell company disappears or is closed down before paying back the collected tax. The VAT fraud operations are controlled by the OCG based in well-developed regions and big cities. This is due to the fact that there are many business activities over there, and shell companies can be easily hidden. Sometimes the shell companies are registered as sister firms in less developed regions in Poland (like Warmia and Mazury). Thanks to those tricks, crime groups pretend to improve business in poor areas. They want to avoid unnecessary and quick controls by local authorities. In this way crime groups gain time. When the VAT fraud maneuver is done, the shell company is closed down. VAT fraud is heavily supported by the law and inadequate tax administration. Staff resources directed to tax administration are not properly aligned to the function. General principles have emerged over the years that help the modern tax administration decide on proper resourcing levels for the major tax administration functions. For example, taxpayer service/registration should have 15 to 20 percent of staff resources, and audit 25 to 30 percent. There is no such approach that governs tax administration in Poland and as a result, resources could be inappropriately allocated across work functions – which can be aggravated by the excessive autonomy of chambers and tax offices (Toro *et al.*, 2015).

The process of harmonizing Polish law in the field of turnover taxes to the European Union's rules officially started in 1990 (it was developed after May 2004 when Poland joined the EU). The Polish tax law system has not been fully adjusted to the European Union. For example, Regulations concerning VAT refunds like the one included in the Eighth Council Directive 79/1072/EEC of 6 December 1979 and the Thirteenth Council Directive 86/560/EEC of 17 November 1986, were not included in Polish law. Some minor changes were done later on (Karolak, 2011). Referring to the Poniatowski study (2016), the VAT fraud in Poland should be explained by organized activity. The estimation of the scale of excessive claims is based on data on the level of refunds and their share in total obligations. Because the relationship of refunds to liabilities is growing, which cannot be explained by changes in tax law or in the structure of the economy, the increase in refunds in excess of the increase in theoretical obligations to a large degree reflects the growth in illegal behavior, such as claims for goods for private consumption or the use of fictitious invoices. The estimates of VAT overstatement were corrected for the scale of MTIC crime, which also affects the value of returns in the VAT system (Poniatowski, 2016). In addition to that, the legal acts are changed very often and the regulations are quite often contradictory. Starting from 1993, practically each year new regulations were introduced. The Government could not simplify the law and make it more friendly and transparent to taxpayers. The mess in the legal system attracted not only Polish crime groups, but foreign ones as well. Groups from Italy, Russia and Ukraine are active in this field. They have cooperated with Polish crime groups very firmly. Gangsters from those countries view Poland as a good place for a hidden destination. Their

stay in Poland is quite often supported by local crime groups. Simultaneous to crime group movement, money laundering activity emerged, partly because of the large size of the shadow economy. A money laundering control system does not exist in the practice of financial institutions other than banks. This makes such procedures easier for organized crime groups. They are even active on the Polish Stock Exchange. Even a simple transaction has proven to be very effective. This is when the stocks are bought at market price and then sold at a higher price with a cash transfer. The organized crime group quite often squeezes the price in the stock market and makes dummy derivative trading, as well. The omnibus and nominee accounts are used as well (*Financial Action Task...*, 2006). Prostitution and bazaars could be examples of dangerous connections between more or less legal work and organized crime. According to Polish law, prostitution is a private relation between prostitute and client and a prostitute is not obliged to pay taxes on profits obtained in this way, according to article 2 of Act of 26 July 1991 on Income Tax from Natural Persons. Organized crime also controls bazaars. In reality, a lot of bazaar sellers are dealers of property obtained in an illegal way and bazaars are warehouses of stolen, smuggled or falsified goods. Credit and leasing frauds are popular among crime groups in Poland. One popular form of fraud is known as ‘dummy pillar’, where a criminal forces an entrepreneur to take out large loans. While the criminal takes control of the borrowed money, the entrepreneur ends up with some little money but bears all the liability for the default. This reflects on the share of irregular loans in Polish banks. They are on the level of 6.7% of the total credit portfolio. However, the rates in other countries are: Germany, Czech Republic (3%), in Sweden, Norway (1%), Great Britain (2%) (Rudke, 2016).

The organized crime groups are very active in excise fraud. Those frauds are related to illegal manufacturing, smuggling and trading cigarettes, spirits and fuel. The pattern of the cigarette business has been changed. Until 2000, most illegal cigarettes came to Poland from abroad. The smuggling motion was mainly executed in Russia, Ukraine and Belarus; but some transports came from East Asia as well, from Malaysia mainly. There was (and there still is) a tiny smuggling operation done by individuals in eastern Poland. Residents of eastern Poland do this based upon close location to Russia, Ukraine and Belarus identifying cigarettes, spirits and fuel smuggling as a good part time job. That merchandise is partly used by them, partly sold in the domestic market and partly delivered to the organized crime groups. Such a category of smugglers are called “Ants”. The larger scale operations are done by Polish organized crime groups with Russian speaking crime groups. After 2000, this pattern changed. More illegal cigarette factories were opened in Poland. The first locations were in the east of Poland and then they spread all over the country. Police identified and closed down in 2010 – 17 such factories, in 2011 – 19 factories, in 2012 – 20, 2013 – 22, 2014 – 20, 2015 – 18, 2016 – 26 manufacturing works (*Rekordowa liczba nielegalnych...*, 2017). The factories were very well equipped and could

even produce a few thousands cigarettes per minute. Police quite often found Russian speaking citizens among those arrested. A similar pattern applies to spirits. Such an operation is extremely profitable for the organized crime groups. The price for one box of cigarettes in Great Britain is ca. 7 £, in Germany – 5.10 Euro, in Norway – 100 NOK but in Ukraine 0.5 Euro only. The production cost of one box of cigarettes (20 pcs) in Poland is about 15 Euro cents (*Rekordowa liczba nielegalnych...*, 2017). One transport of illegal cigarettes to Western Europe can bring for the organized crime groups up to 1 million Euros. The budget losses for the sale of 10 thousand illegal cigarettes are calculated at 1.5 million PLN. Those products are characterized by a low price elasticity of demand. A high level of excise tax (31.41% of the price) and steady price growth (during the last 10 years the price has risen by 116%) has made an impact on the shadow economy and organized crime activity (*Straty budżetu państwa...*, 2014).

## Conclusion

The Organized Crime Groups in Poland (OCG) started to be very active in the first years of transformation. They skillfully adopted themselves to the new business environment, typical in a market oriented economy. This situation happened even though the economic reforms generally proved to be quite successful. Theoretically, a good economic situation should limit organized crime, but in practical reality it had a strong impact in fostering OCG. The OCG changed their patterns of activity, becoming less violent and paying more attention to economic crime. The first economic crime schemes can be regarded as quite simple ones, but they became more sophisticated. They could identify the legal loopholes and exploit them in a professional way. A good example of it are VAT frauds. The OCG in Poland cooperate with foreign crime groups not only from Russia, Ukraine, Belarus, and other European countries (Italy, Greece, Cyprus, etc.) but also with South American and Mexican narcotic cartels, American and Far East criminal groups. OCG activity does not simply create losses to the national budget but undermine confidence in the financial system as well. Authors of reforms should take into the account the problem of eventual OCG expansion. More studies on the issue are required, especially on the estimation of OCG activity, their direction and effective tools to minimize the scale of OCG operations.

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## THE EFFICIENCY OF SOVEREIGN DEBT MARKETS IN THE EMU: TRUTH OR MISTRUTH?

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### Abstract

Ever since the last financial crisis, the efficiency of financial markets has been widely challenged. On the basis of sovereign debt markets in the European Monetary Union (EMU), we tried to contrast some reservations about the market efficiency existing in the literature with findings coming from our empirical analysis of weak-form efficiency.

To do so, we first outlined the crux of the efficient market hypothesis. Secondly, we show the main reservations in relation to this concept. Then, after a brief review of outcomes from contributions in this area, we conducted a three-stage empirical procedure that Worthington and Higgs (2006) as well as Borges (2009) had employed to stock markets analysis. Then, the results were evaluated and conclusions were drawn.

To sum up, we did confirm the weak-form efficiency on examined sovereign debt markets from the EMU. That suggests that a random process plays a key role in shaping bond yields. Finally, neither theoretical nor practical reservations deflate the weak-form efficiency in the public debt markets of the EMU.

### EFEKTYWNOŚĆ RYNKÓW DŁUGU PUBLICZNEGO W EMU: PRAWDA CZY FAŁSZ?

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### Abstrakt

Od ostatniego kryzysu efektywność rynków finansowych jest szeroko podważana. W artykule postarano się zweryfikować, czy zastrzeżenia co do efektywności rynków finansowych pojawiające się w literaturze przedmiotu potwierdza empiryczna analiza słabej efektywności rynków długu publicznego w krajach EMU. W pierwszej części tekstu przedstawiono istotę hipotezy rynków efektywnych oraz główne zarzuty kierowane wobec tej koncepcji. Następnie, po krótkiej analizie dotychczasowych wyników badań empirycznych, przeprowadzono trójstopniową procedurę badawczą tożsamą z badaniami Worthingtona i Higgsa (2006), a także Borgesa (2009), prowadzonymi wcześniej dla rynków akcji. Na koniec przedyskutowano rezultaty i zaproponowano wnioski.

Potwierdzono występowanie efektywności informacyjnej w formie słabej na wszystkich rozważanych rynkach obligacji skarbowych. Wynika z tego, że proces błędzenia losowego odgrywa główną rolę w kształtowaniu się rentowności obligacji długoterminowych. Ani zatem zastrzeżenia teoretyczne, ani praktyczne co do nieefektywności finansowej w segmencie obligacji publicznych nie znajdują uzasadnienia w przypadku badanych gospodarek ze strefy euro.

## Introduction

Questioning the financial markets' efficiency intensified after 2008. Most likely, such a tendency resulted from the fact that the roots of the last crisis were mostly financial. Although there are some well-grounded reservations as to the efficiency of financial markets in the literature, we decided to re-evaluate them empirically on the basis of data from sovereign debt markets.

In order to scrutinize public debt market efficiency, this paper is organized as follows. In the first part, the theory of efficient markets is presented. We also cover theoretical and practical reservations against the debt market efficiency. The second part is empirical in nature. First, a brief review of previous findings is presented. Next, our empirical procedure is conducted on the basis of Worthington and Higgs (2006) and Borges (2009) methodology, which has been applied to stock markets before. Finally, our findings are interpreted as well as conclusions being drawn.

Finally, the analysis points to very strong evidence that the EMU public debt market exhibits weak-form efficiency. As a consequence, the random process, showing the reaction of creditors, plays a key role in shaping sovereign bond yields.

### The crux of an efficient market

The efficient market hypothesis (EMH) belongs to the main neoclassical theories describing financial markets. It depicts the situation where prices are accommodating themselves promptly to new information from inside and outside the economy (Fama, 1970, p. 384, 385) without ignoring any piece of information and without systematic errors (Beechey *et al.*, 2000, p. 2). The financial market is efficient in an informational sense when it provides all market participants with



news that may be quickly discounted into the return of a financial instrument (Sharpe *et al*, 1998, p. 92-97). The concept of informational efficiency was linked to the stock market at the beginning, however, it has also been applied to other sectors of financial markets e.g. to the bond markets in the 1970s. (Katz, 1974; Shiller, 1979). According to EMH, whatever happens is discounted into the bond yields by market players. Based on that assumption, future bond yields are an effect of previous values as well as unexpected news (random factor) that is described as a current market reaction to new information. To put it simply, the debt market's participants expect a higher risk premium incorporated into the yields of national bonds when news about the economic, financial and political situation becomes precarious. Many commercial agencies unfailingly analyze the macroeconomic situation taking on board the wide range of well-known socio-political and economic factors as well as news from public and private institutions, which are responsible for promoting and conducting informative policy about their own decisions and actions. Standard and Poor's evaluates the stance of the national debtor through the prism of political risk, income and economic structures, economic growth and prospects, fiscal and monetary flexibility, external liquidity, public and private sector external debt, and potential debt (Kodres, 2010, p. 99). Other studies point to citizens' revenues, economic growth, inflation, budgetary balance, current account balance, economic development and credit history as indicators determining the current as well as the future credibility of a national debtor (Afonso & Strauch, 2007, p. 262-264).

The given information (about fundamental economic factors as well as authority behaviour) is gathered not only by individual and institutional investors, but also by national and international analytics, and supervisors who finally provide creditors with expertise about a national debtors' solvency (debt sustainability). As long as lender's expectations converge on good outcomes, bond costs can remain stable (Deburn *et al.*, 2019, p. 22). According to Wyplosz (2011, p. 25), the market players' reaction function depends on the debt sustainability that is achieved as long as the authorities react adequately to the shocks. Such an approach treats the political agents' behavior as a cause for financial market reaction due to the potential risk transfer from the political sphere to finance (Waszkiewicz, 2017, p. 127). Thus, market players are obliged to take into consideration not only a country's economic capability, but also a country's (national authorities) willingness to service its debt (Waszkiewicz, 2015, p. 261). Finally, when any kind of uncertainty grows investors may react and expect a higher yield and lower prices for public bonds (Mishkin, 2002, p. 157-162). The role of a debtor is to meet a creditors' requirements, if he still needs loans from the financial market. When the debtor cannot pay a greater risk premium he will limit budgetary spending or collect money another way, without placing bonds. This means the financial markets (market players together) impose discipline on the debtor.

Informational efficiency is classified into three categories, the first one is the weak efficiency, where bond yields (price) solely reflect all the information contained in the history of past yields (prices), decomposing them into previous value and random effect. The next category is semi-strong efficiency. Besides the information considered above, bond yields should discount all current information from the public sphere such as the budgetary deficit, public debt, inflation, etc. The final category is strong efficiency, this happens when bond yields incorporate both previous groups of news as well as actual information coming from the public and private spheres such as commercial data (Zunino *et al.*, 2012, p. 4343, 4344).

### **Typical reservations about financial market efficiency**

Contemporary criticism of debt market efficiency has developed on the basis of arguments from behavioral economists as well as a critique of European Union institutions. Theorists concentrate on psychological and sociological aspects of investing, and market anomalies (seasonal, fundamental as well as hyperactivity, and market resilience) as reasons for inefficient markets. Individual investors are treated as irrational because they tend to deviate from rationality into misjudgment. Typical deviations present regret and cognitive dissonance, anchoring, mental compartmentalization, overconfidence, over (under) reaction, gambling behavior and speculation, etc. (Shiller, 1998). Behaviorists pay attention to limited access to reliable knowledge and informational asymmetry, because some groups of creditors are not capable of keeping up with all the new information or they do not have indispensable experience in investing. Some academics (Sims, 2003) address the problem of rational inattention that is connected with the fact that people suffer from a limited capability of information processing, and they are predisposed to notice information according to their interests and needs.

The practical aspect is associated with international governance in the EMU. Firstly, the configuration of primary dealers made public debt markets overbanked<sup>1</sup> with high liquidity (Dunne *et al.*, 2006, p. 31). That created market distortions through overbidding at auctions, because auction prices were normally higher than post-auction valuation on secondary markets. Finally, high prices in comparison to low coupons give preferences to national debtors. Secondly, the European Central Bank (ECB) created short-term interest rates (3M – three months) at a low level due to repurchase agreement (repo) transactions (Buiter & Sibert, 2005, p. 1-42). Because of the low rate of haircuts, all public issuers could be treated on similar terms regardless of their macroeconomic performance. This gave an anchor for long-term bond yields (Allen, 2007, p. 36-53). Moreover, the introduction of non-standard monetary measures has helped to restore national debtors' confidence since 2010. Such a solution predominantly gave

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<sup>1</sup> Variety of banks from inside and outside Europe.

relief for highly indebted member countries and offered them time for structural reforms. De Grauwe and Ji (2015, p. 2-5) noticed that implementation of Outright Monetary Transactions (OTM) in 2012 caused the ECB to become a lender of last resort, which could stabilize (and protect) the entire system. This way the ECB could quell the power of financial market participants (threat of real evaluation), and avoid sovereign debtor bankruptcies (Coeure, 2012).

Finally, the practical aspect seems to be prevailing since the non-financial creditors play a minor role in public debt markets<sup>2</sup>. Instead, OTM, and next quantitative easing (QE) could hamper the common response of investors (bond yields evaluation). This way, the politically-related actions of the ECB might have stiffened the rules of efficient markets.

## A short review of previous research

The research on the efficiency of public debt markets is not as popular as the analysis of stock markets. Katz (1974) was a pioneer in that field because he pointed at adjustment processes into bond yields, however, he concentrated on bond yield sensitivity towards rating classification. Shiller (1979) addressed the problem of short-term volatility and the structure of long-term bond yields. Nonetheless, our approach fits in with the strand that was initiated by Afonso and Teixeira (1998). By employing daily observations and non-linearity tests (namely the BDS test and the Hinich bispectrum), they tested the weak-form efficiency of government bonds in the EMU. Finally, the authors found some countries to be efficient while others were not, therefore, challenging the belief that the daily rates of return can be viewed as independent random variables.

In recent years, after a crisis, more economists were interested in examining the efficiency of the public bond markets. Fakhry and Richter (2015) studied the impact of the recent crisis in the US and on German public bonds. They confirmed that both markets were also too volatile (over/under reaction) to be weak-form efficient. In the next study, Fakhry and Richter (2016) enriched the previous procedure (Fakhry & Richter, 2015) with an asymmetric effect. They concluded that debt markets were efficient in spite of the volatile time during the last crisis.

Testing semi-strong efficiency on debt markets, Zunino *et al.* (2012) tested the sovereign market efficiency of thirty bond indices in both developed and emerging economies, using a complexity-entropy causality plane. He found a link between the entropy measure, economic growth, and market size. Finally, according to the work of Zunino *et al.* (2012), developed markets tend to be more efficient

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<sup>2</sup>The share of sovereign debt held by non-financial residents in 2014: Germany (6.4%); France (2%); Italy (10.2%); Portugal (7.2%); Czech Republic (5.8%); Hungary (11.1%); Poland (3.5%); Spain (2.4%) (Structure, 2015).

than emerging markets. In turn, Ahdieh (2004) and Cross (2006) scrutinized sovereign bond contracts. Network effects and information costs made bonds contractse boilerplate (inefficiently static), such a specificity makes it difficult to examine the debt market reaction. On the other hand, applying time-varying detrended fluctuation analysis, Farreira (2018) noticed that Eurozone countries were mostly affected by the last crisis, that is why the dependence is more evident, but only during the term of a large variation in bond yields.

To sum up, there is a scarcity of research dedicated to the efficiency of the European sovereign bond market in the literature. Rare works provide mixed results depending on applying empirical methodology.

## Empirical examination

Taking into consideration the fact that market efficiency is more often scrutinized in the context of equity markets than public debt markets, we have applied developed and tested econometric techniques that are commonly used when analyzing the behavior of stock prices. Similarly to Worthington and Higgs<sup>3</sup> (2006) and Borges<sup>4</sup> (2009), we focused on examining the weak-form market efficiency, because those assumptions seem to be the most possible to fulfill. Thus, only previous values of one variable were tested. Market players know the value of past bonds yields (official data), there are no other factors that need to be found or bought. That allowed us to posit that potential inefficiency would not be dependent on the lack of information on bond yields. In this way, we excluded typical reservations about efficient markets. What is important from the econometric perspective, is the concept of avoiding seeking yield sensitivity to various factors (often unknown to a wide audience or is commercial information), which is contrary to semi-strong and strong market efficiency. Moreover, the applied methodology has been used just to examine weak-form efficiency before.

## Data description

Yield time series (daily data) are available on [www.stooq.pl](http://www.stooq.pl). We took into consideration only daily closing yields. Because applied variables (yields of 10 year government bonds) were traded on secondary markets, they include a factor of investor prizing. Our analysis concerned data from January 2007 to December 2018. We considered only 10 Euro members<sup>5</sup> out of 13 that had

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<sup>3</sup> Examination of Asian emerging and developed stock markets.

<sup>4</sup> Examination of Portugal stock market.

<sup>5</sup> Belgium (BEL), Germany (GER), Greece (GRE), Spain (ESP), France (FRA), Italy (ITA), Netherlands (NDL), Austria (AUS), Portugal (PRT), Finland (FIN).

participated during the entire period. In the case of Slovenia, Luxemburg, and Ireland we couldn't obtain reliable data encompassing the whole time-range. Unlike Worthington and Higgs (2005) and Borges (2009), we applied daily bond yields, not daily stock prices. For this reason, we did not compute data as the logarithmic difference between two consecutive prices in a series (Borges, 2009), because part of our time-series presents values below zero, especially since 2016. Table 1 presents descriptive statistics of utilized time-series. Contrary to reference works, the mean shows the daily average of bond yields, not the day-to-day return. What is more, the greater volatility of bond yields was observed in GRE and PRT; whereas the lowest was observed in NDL and FRA.

Table 1

Descriptive statistics: bond yields 2007-2018 (daily data)

Economy \ Results	AUS	BEL	ESP	FIN	FRA	GER	GRE	ITA	NLD	PRT
Mean	2.29	2.57	3.49	2.15	2.33	1.92	9.77	3.55	1.97	4.80
Median	2.10	2.75	4.01	1.92	2.30	1.67	7.84	4.00	1.85	4.17
Std. Dev.	1.48	1.53	1.60	1.44	1.37	1.42	6.71	1.43	1.36	2.85
Variance	2.18	2.34	2.55	2.07	1.88	2.00	45.05	2.06	1.85	8.11
Kurtosis	-1.48	-1.57	-1.23	-1.38	-1.40	-1.24	4.05	-1.00	-1.22	1.72
Skewness	0.10	-0.17	-0.06	0.22	0.04	0.33	2.04	-0.01	0.31	1.42
No. of Obs.	3,071	3,494	3,073	3,066	3,073	3,066	2,810	2,835	2,835	3,340

Source: own calculations on the basis of original data.

## Method

Both Worthington and Higgs (2005) and Borges (2009) employed a three-stage procedure to test random walk in daily returns. Firstly they applied parametric serial correlation and a nonparametric run test. Secondly, the Augmented Dickey-Fuller (ADF) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) unit root test as well as the Phillips-Peron unit root test were also applied. Finally, they used multiple variance test statistics as a decisive measure, because the unit root test does not track departures from a random walk (Liu & He, 1991).

In our verification, we considered a random walk process with a drift:

$$Yd_t = Yd_{t-1} + \beta + \varepsilon_t \quad (1)$$

$$\Delta Yd_t = \beta + \varepsilon_t \quad (2)$$

where:

- $Yd_t$  – bond yields at time  $t$ ,
- $\beta$  – drift parameter (trend),
- $\varepsilon_t$  – random process (white noise),
- $\Delta$  – increment, change of variable.

Under the random walk hypothesis, the market is weak-form efficient if the current yield contains all available information. That is why there is no chance to beat the market only on the basis of previous yields. Future yields can be driven by unexpected information or actions, which are incorporated into the future bond yields, and depicted as a random process ( $\varepsilon_t$ ). Besides the random process, there can be a drift in the time-series that signals the trend (Equation 2).

In the first stage, we checked parametric serial autocorrelation in order to test increment independence and non-parametric run tests to verify their serial dependence. Secondly, taking into consideration the fact that even if yields are serially uncorrelated with independent increments, the series must be identically distributed to conform to the random walk model. For this reason, unit root tests were employed. That allowed us to determine whether time-series (original and detrended data) have any kind of trend and if they are stationary or not.

Whether unit root exists or not, there is still a chance to predict future yield movement (volatility) because the market may present the most restrictive notion of a random walk. In such a market, bond yields are serially uncorrelated and conform to a random walk hypothesis with independent and identically distributed increments. Therefore, in the third stage, we used the Chow and Denning (1993) statistic that examines maximum absolute value from a set of multiple variance ratio statistics as well as the Lo and MacKinlay (1988) variance test ratio.

## Results

In the beginning, we checked the parametric serial correlation in time-series on the basis of the Ljung-Box test. The lack of autocorrelation (in the case of one series) is tantamount to the fact that future bond yields are not dependent on the previous ones. We built basic Var models for each economy where current bond yields are dependent on the previous ones. On this basis, we checked serial correlation for the following intervals (lags): two days, one week (five days), two weeks (10 days) and one month (20 days). The autocorrelation test assumes that:

$H_0$ : time-series are independently  
distributed  
(no serial correlation)

$H_1$ : time-series are dependently  
distributed  
(serial correlation)

Firstly, observing correlograms, we noticed that autocorrelation in the original data is close to 1 and slowly drops, this is a sign of random walk. Secondly,  $H_0$  was rejected for all economies regardless of the number of lags (Tab. 2). Finally, past values are crucial to predict future bond yields. That suggests weak-form inefficiency.

Table 2

Autocorrelation test (Qstatistics)

Market \ Lag	2	5	10	20
AUS	0.50	1.45	0.36	0.46
BEL	0.00	1.83	0.26	1.21
ESP	1.82	1.49	0.10	0.61
FIN	1.20	0.70	0.41	0.83
FRA	1.11	0.92	0.58	0.46
GER	1.90	0.88	0.13	0.93
GRE	3.32	2.26	0.77	0.69
ITA	3.88	1.66	0.68	0.14
NDL	0.90	0.95	0.47	1.04
PRT	1.27	1.03	1.54	0.44

Note: all statistics present insignificance level.

Source: own calculations.

The next step is in regards to a non-parametric run test (Tab. 3) that assumes:

$H_0$ : data distribution is random       $H_1$ : data distribution is not random

According to Table 2,  $H_0$  was rejected for all considered markets. The number of observations under/above the mean value is reflected by the sign of skewness. Finally, run tests show a lack of random walk into the time-series (Tab. 3). Like the test above, the run test is in favor of weak-form inefficiency.

Next, we concentrated on testing time-series stationarity, a fundamental method in tracking random walk. According to this concept, two options were assumed. If yields are shaped by a random walk process, their changes cannot be foreseen on the basis of previous observations. Alternatively, bond yields may be stationary and they tend to return to mean values. This time future bond yields can be foreseen and the market is predisposed to be inefficient. The examination comes down to checking the stationarity of the time-series on the basis of three types of tests – parametric: Augmented Dickey-Fuller test (ADF), Kwiatkowski-Phillips-Schmidt-Shin test (KPSS), and non-parametric: Phillips-Peron test (PP).

Table 3

## Runs test

Results Economy	Runs test					
	Obs.> $M$	Obs.≤ $M$	No. of observations	No. of runs	$Z_{\text{value}}$	$p_{\text{value}}$
AUS	1,439	1,632	3,071	14	-54.95	0.00***
BEL	1,830	1,664	3,494	18	58.54	0.00***
ESP	1,846	122	3,073	2	-55.40	0.00***
FIN	1,387	1,679	3,066	22	-54.61	0.00***
FRA	1,504	1,569	3,073	20	-54.75	0.00***
GER	1,298	1,768	3,066	38	-54.01	0.00***
GRE	956	1,854	2,810	29	-51.84	0.00***
ITA	1,614	1,221	2,835	12	-52.83	0.00***
NDL	1,318	1,517	2,835	19	-52.57	0.00***
PRT	1,035	2,305	3,340	25	-56.83	0.00***

Note:  $M$  means the mean. Significance level: \*\*\* 1%.

Source: own calculations.

The ADF and PP test assumes that:

$H_0$ : unit root (time-series distribution is random)       $H_1$ : no unit root (time-series distribution is not random)

In order to check the level of variable integration, we conducted the ADF test, which allowed us to hold or reject  $H_0$ . We employed the Akaike criterion and 28-29 lags dependent on the length of the particular times-series.

ADF and P-P tests confirmed the lack of stationary input data. Moreover, our verification suggested that the series are mostly trend (incremental) stationary. To verify the preceding results, we applied the KPSS test, where:

$H_0$ : no unit root (time-series distribution is not random)       $H_1$ : unit root (time-series distribution is random)

Taking on board the dynamic characteristics of the financial time-series developed by Nelson and Plosser (1982)<sup>6</sup>, we examined the structural breaks. After 2008 the dynamic of political and economic events could have had an impact on the unit roots test's sensitivity, especially the engagement of ECB into OMT and QE. Verification was done on the basis of an ADF test with one structural break. According to Zivot and Anders (2002), we assumed an unknown time

<sup>6</sup> Endogenous shocks might have permanent effects on the long-run level of variables. This time ADF tests may be biased towards the non-rejection of  $H_0$ .



of endogenous shock. The results are presented in the Table 4. Finally, except for Belgium, structural breaks had no impact on the trends of the examined time-series in the long perspective. This problem deserves a discrete examination in the future since all other unit root tests have suggested the same findings (Tab. 4). Namely, original time-series were nonstationary, whereas detrended data turned out to be stationary. Such results confirmed the typical non-stationary characteristic of financial time-series. Results of the unit root test proved time-series follow the random walk model (markets are weak-form efficient).

Table 4

Unit roots test (test statistic)

Test Economy	ADF test		P-P test		KPSS test		ADF test with structural break	
	YLD	D(YLD)	YLD	D(YLD)	YLD	D(YLD)	YLD	D(YLD)
AUS	0.89	50.94***	0.78	59.77***	6.78***	0.06	3.64	51.4***
BEL	0.47	49.77***	0.26	49.05***	6.92***	0.16	5.10***	50.09***
ESP	0.83	31.27***	0.78	47.63***	4.59***	0.15	3.78	32.04***
FIN	0.97	53.21***	0.96	53.18***	6.73***	0.06	3.23	53.61***
FRA	0.92	53.05***	0.91	53.01***	6.74***	0.05	3.26	13.27***
GER	1.09	53.72***	1.05	53.81***	6.65***	0.05	3.36	40.30***
GRE	1.93	31.55***	1.87	48.14***	1.03***	0.12	2.37	20.01***
ITA	1.41	38.44***	1.33	47.89***	4.32***	0.09	3.36	11.72***
NLD	1.33	51.09***	1.32	51.07	6.27***	0.07	3.18	51.54***
PRT	0.76	19.63***	1.07	49.04***	2.11***	0.19	2.83	18.59***

Note: significance level: \*\*\* 1%; \*\* 5%; \* 10%. Test statistics denotes critical value for ADF, P-P tests (absolute values);  $p_{\text{value}}$  denotes asymptotic value (only results with the lowest  $p_{\text{value}}$ ). Critical values in ADF and P-P tests: \*\*\* 3.43; \*\* 2.86; \* 2.56. Critical values in ADF with break point: \*\*\* 4.93; \*\* 0.44; \* 4.19. Critical values in KPSS test: \*\*\* 0.74; \*\* 0.46; \* 0.35.

Source: own calculations.

Taking into consideration that in fact the results from the correlation test and run tests are not consistent with results from unit root tests, we applied Chow and Denning's (1993) multiple variance tests. We assumed two hypotheses:

$H_0$ : time-series follow  
random walk

$H_1$ : time-series do not follow  
a random walk

According to Chow and Denning (1993), the final decision about the null hypothesis is obtained from the maximum value of the individual  $V_j$  statistic (Charles & Darné, 2009). If test values are bigger than the critical value of the Studentized Maximum Modulus distribution (2.49) and the  $p_{\text{value}}$  is significant

(<0.05), we can reject  $H_0$ . Taking the results of multiple variance test ratios into account, we found that the maximum value of the series is mostly obtained for the 2 day-interval.

In the Table 4 presents only the maximum absolute value of  $Z_{(q)}$  – a test statistic for a homoscedastic random walk, and  $Z^*_{(q)}$  – a test statistic for a conditional heteroscedastic random walk. Z statistics characterize  $q$  and Variance ratio ( $VR_q$ ) with the lowest  $p_{\text{value}}$ . We avoided presenting individual specifications because they do not change the general conclusions apart from cases that require further checking.

With regard to homoscedastic increments  $Z_{(q)}$ , all tests rejected  $H_0$  (Tab. 5). Therefore, we were compelled to make a decision on the grounds of conditional heteroscedasticity  $Z^*_{(q)}$ .  $H_0$  was held in the case of AUS, BEL, FRA, GER, NDL, and FIN. Thus, the achieved results gave evidence that sovereign debt markets are efficient in those economies.

Table 5

Multiple Variance Test for 2007-2018

Economy	Results	Maximum values		
		$VR_q$	$Z_{(q)}$	$Z^*_{(q)}$
AUS		1.08 (2)	4.65***	1.30
BEL		0.90 (2)	2.61**	0.69
ESP		1.07 (2)	4.03***	2.62**
FIN		0.39 (20)	6.72***	1.33
FRA		1.05 (2)	3.04***	0.96
GER		0.86 (5)	11.45***	2.17
GRE		1.23 (2)	7.26 ***	3.73***
ITA		1.06 (2)	3.38***	2.33*
NDL		0.65 (5)	8.31***	1.56
PRT		1.14 (2)	8.24***	3.37***

Note:  $Z_{(q)}$  – test statistic for homoscedastic random walk,  $Z^*_{(q)}$  – test statistic for heteroscedastic random walk. Significance level: \*\*\* 1%; \*\* 5%, \* 10%.

Source: own calculations.

In reference to ESP, PRT, ITA, and GRE we gained mixed results on all stages of our procedure. Taking unclear results into consideration as well as the fact that Lo and MacKinlay (1988) argued that the individual variance ratio test is more powerful than the Augmented Dickey-Fuller unit root test, we decided to check the individual variance ratio for those four markets. We examined individual intervals for ESP, PRT, ITA, and GRE for four distant intervals (2, 5, 10, 20). Finally, it is noticeable (Tab. 6) that at higher intervals  $H_0$  is not rejected. Additionally, conditional heteroskedasticity is confirmed by

Table 6

Individual Variance Test for 2007–2018 (heteroscedastic factor)

Economy		$q$	2	5	10	20
ESP	$VR_q$		1.07	1.02	0.94	0.91
	$Z^*_{(q)}$		2.62***	0.72	0.50	0.46
GRE	$VR_q$		1.14	1.13	1.08	0.98
	$Z^*_{(q)}$		3.73***	1.65*	0.69	0.06
ITA	$VR_q$		1.06	0.99	0.97	1.01
	$Z^*_{(q)}$		2.33*	0.06	0.23	0.13
PRT	$VR_q$		1.14	1.17	1.12	1.12
	$Z^*_{(q)}$		3.37***	1.84*	0.86	0.67

Significance level: \*\*\* 1%; \*\* 5%, \* 10%.

Source: own calculations.

autocorrelation in the original data (Tab. 2). Thus, public debt markets in ESP, PRT, ITA, and GRE are efficient, especially at higher rows.

To sum up, all scrutinized debt markets turned out to be weak-form efficient on the basis of the applied restrictive procedure from stock markets. Empirical findings from parametric and non-parametric unit root tests were confirmed by a multiple variance test or an individual variance test.

## Discussion: empirical findings against EMH criticism

Analysis of random walk into the behavior of bond yields comes down to determining whether yields are created by random processes or not. If the following yields are generated by unexpected news or actions that are unknown for market players, it is impossible to predict future yields. According to Equation 1, future bond yields are dependent on the previous yields as well as drift, and random processes. Our empirical analysis has proven that the drift ( $\beta$ ) is incrementally stationary, not deterministic. For this reason, the trend does not play an important role here. Thus, bond yields might have followed previous yields provided that a random factor ( $\varepsilon_t$ ) does not exist in the time-series. Our three-stage empirical verification has provided conclusions that sovereign bond yields are generated by a conditional random walk.

With regard to the above-mentioned reservations, the literature willingly credits irrationality to individual investors based on sociological and psychological aspects, but their tendency to deviate from rationality into misjudgment results from operating in highly uncertain investing conditions that Fakhry and Ritcer (2015) called bounded rationality. Certainly, governing practice connected with

preventing bond yields' erosion could have increased the uncertainty in the economic and financial milieu.

To sum up, on the one hand, the randomness in bond yields means that an individual investor cannot predict future bond yields (prices) regardless of access to reliable information. On the other hand, due to a random transition, bond yields are not rigid but are susceptible to changes. The randomness of bond yields is crucial from the point of view of investors and decision-makers. Debt market participants, in response to irresponsible internal economic policy (or growing uncertainty) in the debtor's economy, can complicate its situation in international debt markets.

## Conclusions

The theory of efficient financial markets is fundamental to financial economics. However, this notion is often criticized on the grounds of behavioral economics and European institutions' governance. Regardless of the number of objections to market efficiency, our empirical findings provide strong evidence that scrutinized public bond markets present conditional weak-form efficiency. According to existing theory, the sudden change into bond yields is an effect of new, adverse information that has been revealed. Randomness into bond yields proves that investors react to unexpected or adverse news and put creditors under pressure. Thus, neither individual investors' weaknesses, nor politically-related anchors for long-term credit costs eliminate the weak-form efficiency in public debt markets in the EMU.

Because of the applied empirical procedure, typical to stock markets, our approach to the problem may be novel. Apart from its novelty, our work provokes some implications for both market players and academics. Firstly, financial markets can impose discipline on public debtors due to the shifts in bond yields (prices). Secondly, our research is an introductory piece that needs to be developed. As only one factor (past bond yields) has been taken into account, there is room for verifying our findings on the basis of a semi-strong form of efficiency.

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## SELECTED ASPECTS OF THE RESIDENTIAL PROPERTY MARKET IN THE CONTEXT OF CREATING A CITY IMAGE (AN EXAMPLE FROM RZESZÓW)

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### Abstract

The main goal of the article is to evaluate the city's real estate sub-product and identify the impact of perception of this urban sphere on the overall image of Rzeszów city among students. A thesis was accepted by the authors that the attractive image of Rzeszów determines the development of the residential real estate market, attracting especially young, educated people to the city. On the basis of a literature analysis of the subject, information obtained from secondary sources on the topic of Rzeszów, as well as surveys carried out in 2018 among students ( $n = 325$ ), the thesis was confirmed. Thanks to the fast, modern development of the city and consistently implemented marketing activities, Rzeszów is perceived as an innovative city that is friendly to residents, investors and students. This contributes to the inflow of new, usually young, educated residents and investors, which in turn translates into high dynamics in the residential real estate market. Questionnaire surveys carried out among students have shown that they highly appreciate the current image of Rzeszów and, most after graduation, plan to stay in the city which in their opinion is an attractive place for everyday life.

**WYBRANE ASPEKTY RYNKU NIERUCHOMOŚCI MIESZKANIOWYCH  
W KONTEKŚCIE KREOWANIA WIZERUNKU MIASTA  
(NA PRZYKŁADZIE RZESZOWA)**

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Kody JEL: M31, M37, R20, R31.

Słowa kluczowe: wizerunek miasta, megaprojekt, subprodukty, rynek nieruchomości mieszkaniowych.

A b s t r a k t

Celem opracowania było przedstawienie roli subproduktu mieszkaniowego w kreowaniu wizerunku jednostki terytorialnej na przykładzie Rzeszowa. Autorzy przyjęli tezę, że atrakcyjny wizerunek Rzeszowa determinuje rozwój rynku nieruchomości mieszkaniowej, co przyciąga do miasta zwłaszcza młode, wykształcone osoby. Na podstawie analizy literatury przedmiotu, pozyskanych informacji ze źródeł wtórnych na temat Rzeszowa oraz badań ankietowych przeprowadzonych w 2018 roku wśród studentów ( $n = 325$ ) potwierdzono założoną tezę. Dzięki szybkiemu nowocześnie-emu rozwojowi miasta oraz konsekwentnie realizowanym działaniom marketingowym Rzeszów jest postrzegany jako miasto innowacyjne, przyjazne mieszkańcom, inwestorom, studentom. Przyczynia się to do napływu nowych, najczęściej młodych, wykształconych mieszkańców i inwestorów, co się przekłada na wysoką dynamikę rozwoju rynku nieruchomości mieszkaniowych. Badania ankietowe przeprowadzone wśród studentów wykazały, że młodzi ludzie wysoko oceniają aktualny wizerunek Rzeszowa i w większości po ukończeniu studiów planują pozostać w mieście, które w ich opinii jest atrakcyjnym miejscem do codziennego życia.

## Introduction

The growing mobility of people and the ease at which they can make a decision to change their place of residence means that local authorities who wish to attract external stakeholders to invest in their territorial unit must have the image of their locality shaped in a professional way. The marketing message is consistently addressed mainly to young and well-educated people, whose decision to move or return to a given city is dictated by several considerations, such as attractive job offers, well-developed infrastructure and, significantly, an attractive real estate market, especially its residential sector.

The main goal of the article is to evaluate the city's real estate sub-product and identify the impact of perception of this urban sphere on the overall image of Rzeszów city among students.

These specific goals have been assigned to the main goal:

– presenting the significance of the real-estate sub-product in creating the image of the city as a territorial mega product;



- characteristics of Rzeszów in the context of the perceived image;
- identification of statistical relationships between the perception of the real-estate sub-product of Rzeszów and selected independent variables characterizing the respondents.

Thus, the authors intend to explore relations between the residential real estate market in a given city and its image. The hypothesis they put forth is that the attractive image of Rzeszów depends on the development of the housing immobile property market, which attracts young and well-educated people to this city.

It is worth underlining that the research area dealt with in this article, which involves the implementation of the concept of marketing places and sites in the real estate market, is one that is rarely undertaken in the Polish literature devoted to this subject field. This gap in knowledge has been noticed by several researchers, e.g. M. Borkowska and J. Domańska, who made an analysis of the current real-estate market as an area of research investigation in both the Polish and global literature (Borkowska & Domańska, 2016, p. 26).

The authors of this article have employed two methods. One consisted of a critical analysis of the subject literature, pertaining to the research problem and inclusive of the presentation of collected information about the image of Rzeszów. The other approach was composed of a survey based on a questionnaire. The survey was conducted in October 2018, among 325 respondents, who were students of the University of Rzeszów (79.1% women and 20.9% men). The selection of our respondents was a non-random incidental one. The analyzed population included 126 residents of Rzeszów, which makes up 38.8% of the sample. The remaining 61.2% were respondents permanently residing outside Rzeszów, who made an evaluation of the residential estate market in that city based on their own observations and experiences gained while staying in that city.

Apart from basic statistical measures concerning the evaluation of the image of Rzeszów and the quality of living in the city, the authors made an analysis of variance and a test of significance of LSD at  $\alpha = 0.05$ .

### **Megaproduct and subproducts distinguished as elements of a city's image**

An image of a city is most often defined after Ph. Kotler as a specific sum of ideas, beliefs and images that an individual holds with respect to a given location (Kotler & Barich, 1991, p. 94-101). A. Szromnik defines an image as a complex set of subjective emotions and opinions regarding a given unit, which have been created on the basis of information originating from different sources (Szromnik, 2015, p. 39, 40).

It is stressed in the subject literature that an image is above all a carrier of the character of a given location, and that it implicates decisions about one's place of residence, a location for making investments, a site chosen for recreational or educational purposes, etc. The role of a created brand of a location is visually exposed by S. Anholt, who compares it to a magnet. He maintains that a strong brand of a city will act like a magnet, that is, it will attract what is valuable for the city (e.g. tourists, investors), and it will provide other objects (e.g. products originating from this city) the same magnetic power due to their association with the city. This will transform chaos into order (an attractive brand policy can also cause mutual attraction between various groups of local stakeholders) (Anholt, 2005, p. 226).

To a large extent, the image of a town in the social perception can be an outcome of purposeful and planned actions, which can be addressed to both the internal environment, mainly the town's inhabitants, and to the external surroundings, e.g. investors, potential residents or students (Glińska *et al.*, 2009, p. 36). First and foremost, a positive image affects the town's residents, as its chief stakeholders, through their sense of identity, satisfaction and pride in belonging to a given territory or participating in the development of their town. As underlined by A. Łuczak, a positive image of a territorial unit helps to forge strong bonds with one's place of residence; it energizes the inhabitants and encourages them to cooperate in order to create a local living space (Łuczak, 2001, p. 89, 90).

The research conducted by M. Angelidou shows that in creating the image of cities a special role is attached to information and communication technologies that improve the functionality of urban systems and the development of transfer and innovation networks (Angelidou, 2017, p. 3-28). These technologies support the process of solving the most difficult problems of urban planning (including spatial planning), as well as create the ingenuity of citizens, collective intelligence and knowledge-based urban development (Kolotouchkina & Seiseddos, 2018, p. 115-124).

Creating an image of a town or a region is a long-lasting process, which in the view of increasing competitiveness between such territorial units, needs professional and internally coherent measures. The subject literature emphasizes the fact that the branding of a place requires strong cooperation between all objects engaged in this process, and it should be coordinated by local authorities, especially the departments of town councils and agencies established specifically for this purpose (Glińska, 2016, p. 305).

The basic tools used to create an image, according to C. Riel and J. Balmer, include: human resources, a promotional mix, visual presentation of the unit, and a territorial megaproduct (Riel & Balmer, 1997, p. 340). T. Markowski defines a megaproduct as a set of utilities typically offered at a price or free of charge to interested groups of customers (Markowski 1999, p. 224). The literature distinguishes several basic internal products, termed as sub-products, i.e.

sub-products connected with housing, investment, tourism, social opportunities, trade and services, education and culture, fairs and exhibitions, recreation and sports, and the public sphere.

The housing sub-product, discussed herein, is an integral part of the territorial megaproduct and is closely linked, mostly by being complementary, to the other sub-products. A problem arises when expectations of individual groups of stakeholders regarding specific sub-products are different and sometimes even mutually contradictory. This situation is pointed to by R. Bartłomiejski, who notices that the growing demographic pressure and shortage of urban space affect the potential capability of a city to satisfy the needs of its inhabitants. The endless demands of consumers on the one hand, and the limited resources on the other hand generate conflicts in many spheres of social life (Bartłomiejski, 2015, p. 59), including the market of immobile properties. A problem of contradictory interests of residents and other groups of stakeholders may occur in such areas as the spatial development of a city, protection of the natural environment or respecting principles of sustainable development.

Taking into consideration the needs of urban residents and other groups of stakeholders, it is recommendable to strive towards a situation where all sub-products create a coherent offer of a given territorial unit, which is fundamental to creating its image.

### **The image of Rzeszów versus the attractiveness of the residential real estate market**

Rzeszów, the capital city of the Podkarpackie Province, covers an area of 120.4 km<sup>2</sup> and has a population of 190.2 thousand (as of 30 June 2018). The highest percentage of the working population is employed in the industrial sector (35.7%), nearly one in four works in commerce, and one in ten in the civil engineering sector (11.8%). The unemployment rate in mid - 2018 was 5.5%.

Rzeszów is the economic, cultural, academic and recreational centre of south-eastern Poland. It plays a role as an important center of industry, aviation, IT, the chemical industry, commerce and trade, construction and services. There are about 25.5 thousand companies registered in the city, and they are served by around 800 financial and business environment institutions.

An important role in the development of Rzeszów is played by the city's brand and promotional slogan: Rzeszów – the capital of innovation, which challenges the city dwellers to achieve high innovativeness. As a result, there are many companies in Rzeszów that represent innovative sectors, technology transfer and advanced business models; another outcome is the general increase in the quality of human capital (Miasto Rzeszów, online).

As innovative solutions are being implemented, the city reinforces its position as a smart city, for example it employs cutting-edge technologies in areas of smart transport, supply systems, etc. An example of how the life of the local community was improved with respect to the real estate market is the support given to the Podkarpacki Cluster of Renewable Energies, connected with the project Intelligent Eco Housing Estate 2020. Another example is the efficient use of ecological sources of energy, with special emphasis laid on solar energy, used for instance to power traffic lights or to supply public buildings with electricity (*Aktualizacja strategii marki i programu...*, 2014). The fact that Rzeszów has received several prestigious awards, including the Smart City statue (*Rzeszów po raz trzeci nagrodzony...*, 2018) awarded to the city three times, confirms the high level of innovativeness in the city in terms of the implementation of smart solutions. It needs to be highlighted that Rzeszów as an innovative city is open to a dialogue with target groups, frequently using the Internet as a medium. Moderators of social media profiles are highly active; they respond to comments of Internet users and enable them to make remarks, suggestions, or to give their ideas for some changes. The multidimensional flow of information favors greater trust and underlines the openness of the city to new forms of contact with stakeholders, especially with the city inhabitants (Kuźniar & Kawa, 2018, p. 49-59).

For the quality of life of the city's present and future residents, it is important that over the past years Rzeszów has been consistently ranked among the top cities in Poland as a safe and friendly place to live (*Bezpieczne i otwarte miasta*, 2017). New places of work have helped to keep university graduates in the city, which has propelled a higher demand for housing, both new and second-hand. Quantitative changes in the housing market in Rzeszów in 2010-2017 are illustrated in Figure 1.

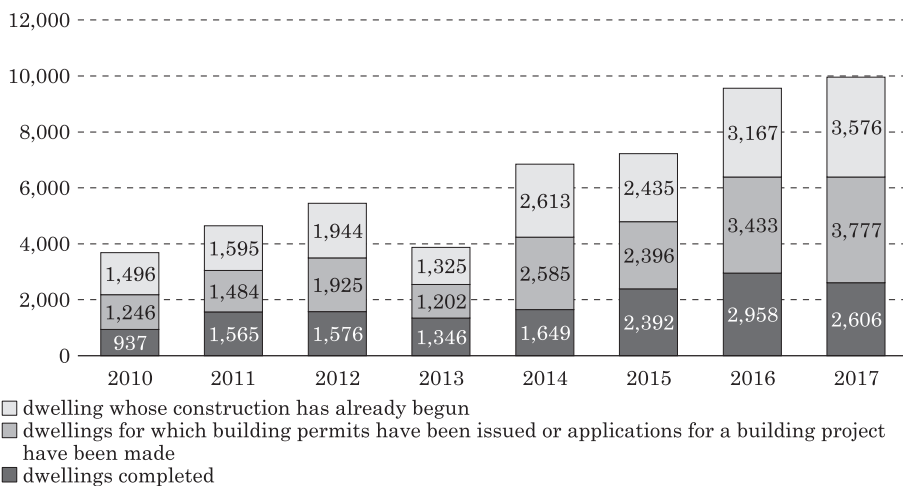


Fig. 1. Quantitative changes in the housing market in Rzeszów in 2010-2017

Source: based on *Sytuacja na lokalnych rynkach...* (2018, p. 131).

One of the basic measures of the growth of a real estate market is the number of new housing units in consecutive years. The data depicted in the above diagram covering eight years indicate a generally rising tendency, which is an effect of both the activity of commercial developers (1,957 new flats in 2017) and housing cooperatives (328 flats in 2017). A slight decrease in the number of new flats made available in 2017 relative to the previous year is a consequence of a prolonged building cycle and delays in making flats available to clients. In the first half of 2018, the number of new flats put on the market was notably higher, and the forecasts indicate that that particular year might prove to be another time period with a record number of new flats. The growth of the housing market is accompanied by changes in prices. Over the past year, the prices of flats in the city, as well as the value of second-hand flats, have risen (the transactional price of a new flat in Rzeszów was 5,200 zł/m<sup>2</sup> whereas five years earlier it was around 4,400 zł/m<sup>2</sup>) (*Ceny mieszkań w Rzeszowie...*, 2018). Experts have expressed the opinion that in 2018 the residential housing market in Rzeszów joined the group of large real estate markets in Poland (*Rynek mieszkań w Rzeszowie...*, 2018), which can be credited to the good management of the city, its rapid development and an increasingly stronger image of Rzeszów.

As a consequence of the high dynamics in the construction of new residential houses in Rzeszów, the structure of housing resources has changed (Tab. 1).

Table 1

Selected measures of the housing stock in Rzeszów

Specification	2012	2013	2014	2015	2016	2017
Housing stock						
– flats in total	65,588	69,804	71,400	73,740	76,621	79,920
– flats per 1,000 population	377	381	386	397	409	418
Usable floorspace of flats						
– total (1,000 m <sup>2</sup> )	4,583	4,672	4,783	4,932	5,117	5,286
– average (1,000 m <sup>2</sup> )	66.8	66.9	67	66.9	66.8	66.7
– per capita (1,000 m <sup>2</sup> )	25.2	25.5	25.8	26.5	27.3	27.9

Source: based on *Sytuacja na lokalnych rynkach...* (2018, p. 130).

The data contained in the table justify the claim that the availability of housing in Rzeszów has been improving steadily in recent years, both per 1,000 residents and in terms of the floorspace per capita.

To a large extent, an interest among investors in the residential property market is stimulated by the fact that the boundaries of Rzeszów have been expanding systematically, as several suburban villages have been incorporated into the city. Another significant contributor is the fact that Rzeszów is a Polish city with the highest number of students per 1,000 residents; it is also an

attractive destination for immigrants from Ukraine searching for employment in Poland. The growth of the residential housing market in Rzeszów is also connected with changes in the number of businesses which provide services in the area of constructing new residential buildings and in their subsequent management. The quantitative increase in the number of enterprises operating in the real estate market in Rzeszów over the past six years is demonstrated by figures included in Table 2.

Table 2

Businesses operating in the real estate market in Rzeszów

Specification	2012	2013	2014	2015	2016	2017
Developers	112	124	147	178	220	261
Real estate agents	57	55	63	88	82	85
Notary offices	27	28	32	36	33	34
Real estate appraisal services	44	58	58	63	61	65
Housing cooperatives	25	25	26	24	21	20
Housing associations	502	522	552	583	635	676

Source: based on *Sytuacja na lokalnych rynkach...* (2018, p. 130).

The data found in the above table show that the number of companies operating in the immobile property market in Rzeszów has been on a steady rise. This is particularly notable with respect to developers and real estate agents. The rapid rate of development of the residential housing market stimulates a dynamic growth in the number of housing associations, which by power of law must be founded the moment a building with residential flats is sold.

The diverse scope of tasks performed by the real estate market participants and sometimes goal discrepancy among them necessitate coordination of their actions with those carried out by spatial management entities and local government, which are responsible for the cohesion and quality of undertaken activities. These in turn are an important element of the currently created image of the city, where Rzeszów is presented as a modern city, friendly to inhabitants and other groups of stakeholders. Significant contribution into the process of creating the city's image is made by residents themselves, who join numerous civic initiatives, where they co-participate in the achievement of specific goals in the city's development, shaping the value of Rzeszów and thereby strengthening the city's image.

## Evaluation of the selected aspects of the housing property market in Rzeszów in light of our questionnaire results

The decisions made and the actions undertaken which are connected with directions in the development of a city should occur in collaboration with stakeholders, particularly with the town's inhabitants. As emphasized by M. Konecnik Ruzzier and L. de Chernatony, an ideal situation is when stakeholders are engaged in both the process of developing the image of their city (co-decision) and its implementation (co-creation) (Konecnik Ruzzier & De Chernatony, 2013, p. 45-52). Knowledge of opinions and attitudes of the town's dwellers plays an important role in creating the image. It is particularly valid when shaping the megaproduct and transforming it into specific offers addressed to target groups, simultaneously defining the conditions of availability of these products. Acquired information is useful, for example, when taking decisions and actions in the area of shaping the housing sub-product, which is the subject of our study.

The place of residence was adopted as an independent variable for empirical analysis apart from gender, which allowed an answer to the question whether the inhabitants of Rzeszów appreciate the housing attractiveness of their city and how they perceive its attractiveness in relation to external groups of stakeholders (Tab. 3).

Table 3

Assessment of the attractiveness of the housing offer in Rzeszów

Specification	In total*	According to the place of living			According to sex	
		Rzeszów	Podkarpackie Province	Outside Podkarpackie Province	men	women
Availability of flats for sale	3.66	3.86	3.53	3.55	3.56	3.69
Availability of flats to rent	3.71	3.81	3.65	3.68	3.85	3.68
Cleanliness and aesthetic value of housing estates	3.77	3.99	3.59	3.89	3.82	3.76
Prices of new flats for sale	2.99	2.97	2.99	3.05	3.03	2.98
Prices of second-hand flats for sale	3.15	3.24	3.11	3.03	3.37	3.09
Prices of flats to rent	3.01	3.06	2.99	2.89	3.07	2.99
Standard of flats for sale	3.81	3.97	3.69	3.76	3.88	3.79
Standard of flats to rent	3.36	3.48	3.30	3.21	3.53	3.32

\* average of scores on a 1 to 5 scale, where 1 means a very low opinion and 5 is the highest opinion  
Source: the authors, based on the questionnaire results.

The respondents scored all the analyzed features of Rzeszów's housing offer above the medium score. Regarding the place of residence, nearly all categories, except the price of new flats, were evaluated higher by those of our respondents who lived in Rzeszów. The survey results showed that men gave slightly higher scores to most of the characteristics, while women evaluated higher the availability of flats for sale. The highest score (3.99) among all the analyzed characteristics was given to the cleanliness and aesthetic value of the housing estates in Rzeszów, the feature which is particularly valued by the residents of the city. To a large extent, this is credited to the local authorities, whose activity contributes to the improvement of the quality of life of the town's residents (Tab. 4).

Table 4

Evaluation of the activity of the town's authorities in the scope of the improvement of life quality for the town's residents

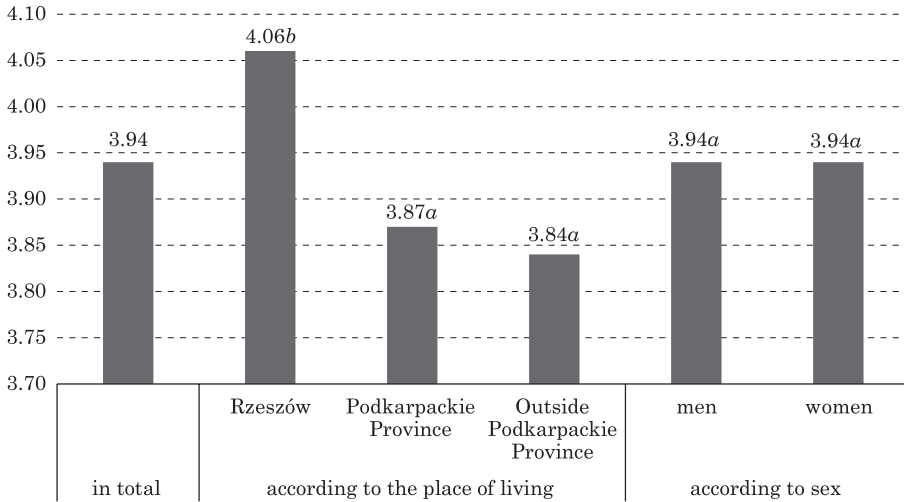
Specification	In total*	According to the place of residence		
		Rzeszów	Podkarpackie Province	Outside Podkarpackie Province
Innovative actions implemented by the authorities of Rzeszów contribute to the improvement of the quality of life of the city's residents	3.96	4.13	3.86	3.87
The city is highly active in the scope of development of residential building	4.41	4.56	4.30	4.39
The city is highly active in the scope of attracting new residents, especially university graduates	3.83	3.86	3.81	3.84
The city has a rich offer of comfortable flats for sale	3.94	4.17	3.80	3.79
The city has a rich offer of comfortable flats to rent	3.78	3.86	3.72	3.79

\* average score on a scale from 1 to 5, where 1 means complete negation of the statement and 5 stands for complete agreement

Source: the authors, based on the questionnaire results.

The study showed that the measures taken by the local authorities to improve the quality of life of residents is highly valued by the respondents, regardless of which of the distinguished categories they belonged to. These results are confirmed by the numerous awards earned by the city council, for example the Pearl of the Local Government – for the authorities of a municipality with a population of over 100,000, or the Super Local Government Award of 2018. Among the characteristics submitted to our analysis, the respondents attributed the highest value to the efforts taken by the town's authorities to help stimulate the housing development, manifested for example by a large offer of comfortable





\* average score on a 1 to 5 scale, where 1 means very low score and 5 is the highest score

\*\* different letters in the diagram (a, b) indicate significance of differences at the level of significance  $\alpha = 0.05$

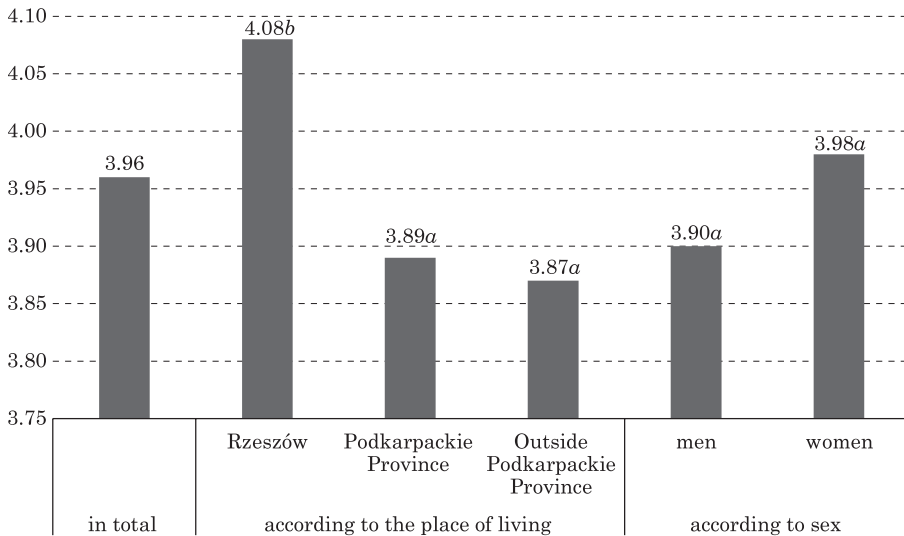
Fig. 2. Attractiveness of Rzeszów as a place of living

Source: the authors, based on the questionnaire results.

flats for sale. High scores given to particular areas of activities pursued by the local authorities are also confirmed by the generally high assessment of the attractiveness of Rzeszów as a place of living (Fig. 2).

In order to find out whether the place of residence or the gender of respondents had a statistically significant effect on their evaluation of Rzeszów as an attractive place of living, analysis of variance and LSD significance tests were performed. Based on the results of these tests, it can be concluded that the place of living had a significant influence on the respondents' opinion about the conditions of life offered to people living in Rzeszów, as confirmed by the value of probability level  $p$  equal to 0.0131. The opinions expressed by inhabitants of Rzeszów (4.06) were statistically significantly higher than those provided by people living permanently outside the analyzed city. An analysis of the opinions divided between male and female respondents did not show any statistically significant differences ( $p=0.7467$ ). Similar dependences were observed in the evaluation of the attractiveness of Rzeszów's current image, which is illustrated in Figure 3.

The information collected through the survey shows that the place of residence had a significant effect on the perception of the city's image, which is proven by the value of the probability level  $p$ , which reached 0.0088. Opinions of persons living in Rzeszów (4.08) were statistically higher than those given by persons living elsewhere. However, our analysis did not reveal statistically significant differences in the evaluation of the town's image between men and women ( $p=0.1792$ ). Still, it needs to be stressed that the image of Rzeszów is generally



\* average score on a 1 to 5 scale, where 1 means very low score and 5 is the highest score

\*\* different letters in the diagram (*a*, *b*) indicate significance of differences at the level of significance  $\alpha = 0.05$

Fig. 3. Evaluation of the attractiveness of the current image of Rzeszów

Source: the authors, based on the questionnaire results.

highly valued by all groups of the respondents, with the lowest score, 3.87, assigned by those who lived in other Polish provinces. Yet, even this score, given the scale from 1 to 5, should be considered as a high one.

To verify the assumption made by the authors, suggesting that an attractive image of Rzeszów determines the development of the real estate market by attracting to the city young and well-educated people, the final part of the questionnaire contained questions addressed to our student respondents about their plans for the future, and about their future place of living (Tab. 5).

Table 5  
Plans of respondents considering future place of living after graduation [%]

Specification	In total	According to the place of residence			According to sex	
		Rzeszów	Podkarpackie Province	Outside Podkarpackie Province	men	women
I will definitely live in Rzeszów	8.9	14.3	6.8	0.0	7.4	9.3
I will probably live in Rzeszów	50.2	58.8	44.1	47.4	64.7	46.3
I will probably live somewhere else, not in Rzeszów	32.0	19.0	40.4	39.4	14.7	36.6
I will definitely not live in Rzeszów	8.9	7.9	8.7	13.2	13.2	7.8

Source: the authors, based on the questionnaire results.

Based on the declared intentions of our respondents, it appears over half of the students asked were planning their future in Rzeszów. Whereas it may seem obvious regarding the persons currently living in the city, positive answers given by those who were from other localities in the province (50.9%) or from other Polish provinces (47.4%) are a consequence of perceiving Rzeszów as a dynamically developing city, a city which offers good conditions of living to young and educated people.

## Conclusions

In recent years, the growing competitiveness among cities to gain investors, new residents, visitors or students has made the image of a city an increasingly important element of the value of a given territory. Among numerous factors which shape the image of a city is the offer of the residential real estate market, which – when attractive – will appeal to young people, who are at a stage of making important life decisions, such as the choice of work, university or place of living. Their decisions to plan their future in a given location will in consequence contribute to the growth of the local real estate market, including the market of residential properties, which is the core of the housing sub-product. The analysis presented in this paper showed that there is a synergistic process ongoing between the image of a territorial unit and the local residential estate market. The immobile property market affects the assessment of the actual areas which shape the image of a given city, while the image of a territorial unit affects the interest in living there or in making investments in that city. According to the authors, there is a stronger influence of the image, which determines the attitudes and decisions of potential residents or investors. On the other hand, the real estate market is one of the many factors which shape the image of a city. An example illustrating these dependences is the city of Rzeszów, which over the past decade or so, owing to the dynamic growth and consistently implemented promotional initiatives, has been systematically strengthening its image. The capital city of Podkarpacie is more and more often perceived as an innovative city, developing dynamically and managed innovatively. This image contributes to the constant influx of new residents and investors, which results in high dynamics leading to the development of the residential real estate market. The working hypothesis formulated by the authors, suggesting that ‘an attractive image of Rzeszów determines the development of the residential real estate market, attracting especially young and well-educated people to the city’ has been verified positively. It is validated by the results of the survey-based study, which justifies the conclusion that students highly appreciate the current image of the city and in the majority consider staying in Rzeszów after graduating from university.

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## STRUCTURE AND CONSTITUENTS OF DIGITAL MARKETING SYSTEMS

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Key words: marketing, macromarketing, marketing systems, digital economy, digital marketing.

### Abstract

The article addresses the study of digital marketing as a marketing system, the definition of its key elements, feeds and outputs, as well as levels of structure. At the moment, digital marketing is mostly considered at the micro level, while it is functioning at the level of the entire economy, and the systemic interaction between digital marketing and other social subsystems are not well understood. The result of the study is the conceptualization of the digital marketing model as a marketing system and the allocation of three levels of digital marketing. This opens up prospects for a better understanding of the processes of economic development, factors of influence and means to manage.

### STRUKTURA I SKŁADNIKI CYFROWYCH SYSTEMÓW MARKETINGOWYCH

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Słowa kluczowe: marketing, macromarketing, systemy marketingowe, gospodarka cyfrowa, marketing cyfrowy.

### Abstrakt

Artykuł dotyczy badań nad marketingiem cyfrowym jako systemem marketingowym, definicji jego najważniejszych elementów, kanałów i wyników, a także poziomów struktury. Obecnie marketing cyfrowy jest rozpatrywany głównie na poziomie mikro, jego funkcjonowanie na poziomie całej gospodarki, a systemowa interakcja między marketingiem cyfrowym a innymi podsystemami społecznymi nie jest dobrze poznana. Rezultatem badania jest konceptualizacja modelu marketingu cyfrowego jako systemu marketingowego oraz przydzielenie trzech poziomów marketingu cyfrowego. Otwiera to perspektywy do lepszego zrozumienia procesów rozwoju gospodarczego, czynników wpływów i środków zarządzania.

## Introduction

Development of digital media and technologies, resulting in so far in arising of industry 4.0 has introduced a revolution in many sectors and markets, disrupting physical value chains, altering consumer behaviour, communications channels and content, introducing digital products and services, enabling new ways to access value and consumption, to which marketing is continuing to adapt (Kotler *et al.*, 2017).

Marketing is traditionally seen as a foundation for the interaction of a firm with the buyers and consumers in a competitive economy. It outlines the tools of interaction, encompasses strategy and directs the organisation's mission and vision, goals and development. However, marketing also has a significant impact on society through economic, socio-cultural, technological, environmental and other subsystems, and, in turn, is defined by their influence. Thus, the relation between marketing and environmental macro-factors appears to be bilateral and systemic. To embrace that systemic nature of the interaction on the macrolevel, the concept of a marketing system was proposed, see (Alderson, 1964; Fisk, 1967; Mittelstaedt *et al.*, 2006; Layton, 2007). It is widely applied to explore, depict and analyse a variety of multilevel interactions as well as to link marketing to social development (Kadirov, 2011) and economic growth (Layton, 2009). The study of bilateral relationships between economic development and marketing systems as well as the systems themselves is defined and agreed by most scholars as the scope of macromarketing (Hunt, 1981).

Exploring relations between digital marketing, social development and economic growth requires a proper description of digital marketing as a system, defining its elements and the means of interaction between them. It also seems necessary to determine the extent to which digital marketing associates with the processes driving the digital economy. The objective of this article is to propose a framework for the description and understanding digital marketing as a system at the macrolevel.

## Research methodology

The paper presents secondary research, aimed at the development of a conceptual framework for marketing systems emerging around digital media. The research employs the macro-systemic approach, based on General System Theory and Social Systems Theory. To meet the objective of the article, we first analyse the concept and structure of the digital economy and briefly describe its constituent elements. Then we discuss the overall impact of digital technology on changing and (or) disrupting economic processes. Next, we scrutinise the structure and theoretical foundations of marketing systems as a central concept to macromarketing. At the intersection of marketing systems and the digital economy, we will outline the overall structure of digital marketing as a macrosystem, and describe major elements and flows within it. Then we discuss the entire construct and outline some directions for further research.

## The Digital economy and its Structure

Transformation of the environment and ways of value creation and delivery under the influence of digital technologies has led to the disruption of the traditional economic processes in various industries and sectors of the economy. This has changed the ways of interaction and purchasing behaviour, and has caused the development of new economic models based mainly or exclusively on the use of digitalization in creation, production and consumption. The notion of the digital economy embraces economic flows, caused by digitalization. The OECD defines the digital economy as an “amalgamation of several general-purpose technologies (GPTs) and the range of economic and social activities carried out by people over the Internet and related technologies. It encompasses the physical infrastructure that digital technologies are based on (broadband lines, routers), the devices that are used for access (computers, smartphones), the applications they power (Google, Salesforce) and the functionality they provide (IoT, data analytics, cloud computing)” (Dahlman *et al.*, 2016). It is operated primarily by online connections among people, businesses, devices, data, and processes. The technological basis for the development of the digital economy is the IT sector. It produces hardware, software, infrastructure for connectivity and technologically enables data exchange and the production of content based upon it. It also includes IT related consultancy and education. The impact of digital technologies on economic processes is operationalized by its application to value creation and delivery. There are sectors in which value creation emerged exclusively due to ICT development: digital services and platforms are among them. At the same time, a major impact of ICT can be traced to many other sectors, which existed long before the digital revolution. Such sectors (e-business, e-commerce, and precision agriculture) are the digitalised versions of traditional business, commerce, and agriculture.

Digital marketing is an obvious part of the digital economy, which determines its place, functions and connections. Its primary task is to ensure the value exchange process through customer choice and consumption. Due to virtualisation being a close associate of the expansion of digital, outsourcing and out staffing in production becomes widespread. Consequently, much more attention should be paid to the coordination of sometimes many partners in value creation. The digital economy is a network economy.

## The Digital Marketing System

Digital marketing means the application of marketing in the digital economy. The popular understanding of digital marketing has tied it to the functioning of digital channels. For some time, the terms digital marketing, internet marketing, and email marketing have all been used as synonyms and easily interchanged. At the same time, the development of digital platforms and the creation of digital products with value *per se* clearly show that the use of digital technologies is significantly wider than the remaining crucial transfer of data. Digital marketing does not necessarily mean the Internet; it is determined by the use of digital technologies to engage with the market. E-books, SMS and messaging, video games, and mobile applications are just as relevant to digital marketing as online videos, social platforms, and emails. Digital marketing is involved in any interaction, both micro and macro, in which digital media is used to create and deliver value. Therefore, we consider the term digital marketing as being more proper. Chaffey and Ellis-Chadwick (2019, p. 9) simply define digital marketing as achieving marketing objectives through applying digital media, data and technology (Kannan & Li, 2017). The adoption of broader and more inclusive perspectives define digital marketing as “an adaptive, technology-enabled process by which firms collaborate with customers and partners to *jointly* create, communicate, deliver, and sustain value for all stakeholders”. From these definitions, it follows that the digital marketing provides for the presence of specific institutions and effects, including the indirect, arising from the multiple interactions of many participants in digital channels, which are inherent to marketing systems.

According to Layton (2007) “A marketing system is a network of individuals, groups, and/or entities linked directly or indirectly through sequential or shared participation in economic exchange that creates, assembles, transforms, and makes available assortments of products, both tangible and intangible, provided in response to customer demand”. Medeiros and Costa (2019) characterise the concept of a marketing system by six aspects:

a) marketing systems go beyond simple economic exchange, since there are social, behavioural, moral, legal and psychological factors other than economic ones in the context of exchange;



- b) marketing systems are directly linked to other systems;
- c) marketing systems contain other subsystems, so it is necessary to consider the levels of aggregation to determine its size and effectiveness;
- d) each marketing system has specific features that make it unique when compared to other systems;
- e) each system has a certain level and limit of effectiveness, which is determined considering all internal and external elements and circumstances. to which we attach the following;
- f) the marketing system is a dynamic entity and evolves over time.

The evolution of the marketing system over time is influenced by changes in socio-economic conditions just as one of its subsystems, and changes can be caused by endogenous factors. Every point from the list above is pertinent to a digital marketing system. One can easily trace numerous sequences from the constant use of digital media on consumption and wider human behaviour, as well as a much deeper influence on moral, legal and psychological factors; see for example (Bassiouni & Hackley, 2015). The universal application of digital media stands for linking with other systems and subsystems (pp. 2-3 from the list of features above), while at the same time there are specific features of each field of activity requiring the application of specific tools. For instance, the personalisation of marketing communication necessitates an extended application of email marketing and big data while conversation and greater engagement with a firm needs more accent to be put on social media platforms. Digital systems also evolve over time, which reflects both technological advancements, for instance the transition from Web 2.0 to semantic led Web 3.0 and higher, and societal developments, caused by behaviour patterns change due to the increased use of digital media in consumption and production.

The functioning of the digital marketing system is conditioned by the influence of other social subsystems and other marketing systems. Based on a process-based approach, digital marketing can be thought of as a process that has input and output, and where feedback exists. One the one hand, at the entrance to the digital marketing system there are value propositions and, on the other hand, there are customers, with needs and demands. The interaction between them is ensured by ICT, used in the IT sector, with hardware and software, capacities of storage and data transmission, engineering and the development of knowledge and skills. The activity of the system is ensured by acts of search, discussion, sharing, purchase and access. It is realised through marketing flows of ownership, possession, information, money, and risk (Fisk, 1967). The output of the system results in added value, the satisfaction of needs, for which access, quality and various assortment are crucial. This results in economic growth, social development and an increased quality of life.

The operation of the entire system occurs under conditions created by external factors, embodied by other societal (sub)systems and other marketing systems. The overall structure of the digital marketing system is presented in Figure 1.

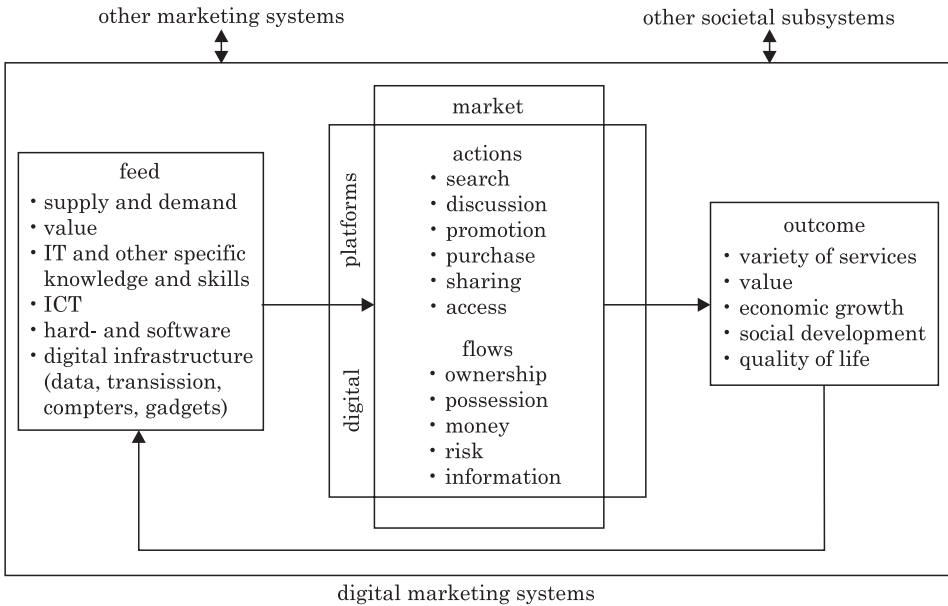


Fig. 1. Structure of the digital marketing system

Source: own elaboration on the basis of Medeiros and Costa (2019).

Digital marketing not only communicates value through digital channels, but is engaged in its creation and delivers via *co-creation*. Engagement with the customer in digital channels requires them to be actively involved in exchanges, taking a vital role in co-creating value. Such an engagement is critically dependent on the sovereign desire of a customer, which is influenced by many factors, in particular: a perceived need for the product; an assessment of its value; the envisaged situation of use and the position in which the customer is located in relation to the firm, other firms, other consumers and other people with whom it is connected with social relations. Marketing systems imply a benevolent nature in many connections, shaping the definite form and outcomes of any iteration (Mittelstaedt *et al.*, 2006). Changes in any of these elements can lead to a significant and sometimes rapid change in the position, intentions and desires of the customer, which is reflected in the purchasing intentions.

Using knowledge and skills to create products, consumers exchange a service for a service, *quid pro quo*. The service from the consumer-seller is to sell the product sought by another; the service from the consumer-buyer is to identify interest, without which contact between them would not have taken place. These types of exchanges are well described within the Service Dominant (S-D) logic developed by Vargo and Lusch (2004). This means that the service is first and the exchange of tangible assets is derived from the exchange of services, being conditioned by the latter. The product itself is essentially just a separate element

in the broader context of value exchanges. In this regard, the product should be regarded as nothing more than a value proposition, a service that provides the exchange of a certain form and extends the service to the economic system. Such a nature of exchange of values emphasizes their nature, very different from the traditional understanding. At the heart of value in a digital channel is service. As a rule, this exchange is not directly reciprocal: *X* supplies *Y*, but *Y* does not necessarily supply *X*, rather transferring the interaction to further agent *Z*. Ultimately, *X* also receives services, but specific to his (her) needs and at other times, as needed. The amount of this value is determined by the expectations of its usefulness and is changing, that is, the value-in-exchange.

In view of the above, the level of development of digital marketing should be determined first of all by the content, scope, and variety of services consumers can provide to each other. By assuming that the service is the primary product and the embodiment of operational resources, it is recognized that these resources are basically knowledge and skills, and it should be then recognized that the level of digital marketing development should be determined directly by the nature and the amount of them. These resources are then possessed by consumers themselves, and indirectly by the factors from which skills and knowledge depend on, or are accompanied with: the level and quality of life, which in turn affect the range and nature of communication in an individual community, society and social networks; the level of access to technology and infrastructure development, including access to the necessary hardware and software, which is an essential technical prerequisite for the creation and operation of exchanges. Furthermore, the content of customer service needs to be defined when the technology itself is in the essence of services provided by one consumer to another.

The depicted structure of the digital marketing system can be applied at all levels of the digital economy. The functioning process and flows in the market are accomplished through the numerous and diverse digital platforms that are the focus of digital marketing operations. Thus, one can see three levels of digital economy:

- the core IT sector;
- digital economy, meaning intensive application of digital technology and developing digital platforms and sharing the economy;
- digitalised economy, standing for extensive use of digital expansion onto various activities, not arisen from the digitalization itself.

At the heart of the system lays the activity of the IT sector that makes it possible to share value within and with all ICT consumers. The IT-level marketing process is aimed at generating and delivering innovation in shape, form and service to the industry itself and its users.

At the wider level of the digital economy, the creation of digital goods and services, the organization and provision of transactions and communications, the organization of consumers and the provision of access to value require certain mechanisms. These are mediated by technologies of interaction between users,

user groups, owners and developers. These mechanisms are known as digital platforms. They create and support certain forms of interaction, ensuring an organized and stable nature of the system. Examples of digital platforms include platforms and aggregators (eBay, OLX, Amazon), social networks (Facebook, Twitter), crowdfunding platforms, training space (Coursera), information sharing, storage platforms (Google Drive), and more. Alongside them, there are platforms of a different kind, designed for group interaction aimed at creating innovative products, such as a variety of creative spaces, and open source environments for creating software products. After all, for the digitalized economy, digital marketing is primarily about adapting to the new ways of interacting with digital media and boosting productivity and efficiency. The threefold structure of the digital economy defines the corresponding threefold structure of digital marketing. Thus, digital marketing appears as a multilevel concept (see Tab. 1).

Considering that digital marketing must provide both transactional and innovation needs, one of the main indicators of digital system performance is to support the diversity of value propositions in digital marketing and, accordingly, the diversity of digital platforms.

Table 1

Principal tasks of different levels of digital marketing

Levels of digital economy	Levels of digital marketing	Principal tasks
IT sector	IT marketing	creating and delivering value to ICT applicants
Digital economy	core digital marketing	creating, developing, and promoting digital platforms, transactional and innovative
Digitalized economy	digitalized marketing	adapting to new ways of interacting with digital media, communications, boosting productivity and efficiency

Source: own elaboration on the basis of Bukht and Heeks (2017).

## Conclusions

The article develops a systemic view on marketing as a process that progresses within the marketing system – one of the central concepts of macromarketing. The breakthrough of digital innovation has led to the emergence of the digital economy. This paper uses the three-fold structure of the digital economy, which, depending on the extent and purpose of digital technology, outlines the levels of:

- IT sector;
- digital economy;
- digitalized economy.

The digital revolution is so widespread that digital marketing needs to be generalized at the level of the economy as a whole, considering macro perspectives. From this point of view, a process shaped model of a digital marketing system is proposed. The digital marketing system, analysed from the point of the customer journey path is placed under the S-D logic model. Its core is digital platforms, embodying actions and flows, which are specific for marketing in digital channels.

Departing from the tri-fold structure of the concept of the digital economy, this paper proposes a threefold structure of digital marketing, consisting, respectively, of:

- the marketing of the IT sector;
- core digital marketing;
- digitalized marketing.

This classification opens up conceptual room for a deeper study of the conditions of operation, the efficiency and the effectiveness of digital marketing, its connections with offline marketing, as well as its relationships with the development and growth of the economy as a whole. In this context, it is likely that IT marketing and digital marketing would largely contribute to the development of macroeconomic figures such as GDP, GNI, and employment, while the impact of core macromarketing should also be traced by measuring the level of diversity of digital platforms. Such an impact involves the creation and dissemination not only of media and technologies, but also highly specialised knowledge and skills among consumers directly, as well as the development of skills, processes and institutions that condition and facilitate consumer contact and communication with one another within the economic system and with other economic systems. Apparently, these skills include communication skills and emotional intelligence, as well as trust as one of the most important institutions (Hunt, 2012).

New digital technologies are emerging constantly and outline many research directions. As for their impact on marketing strategy elaboration, new forms of customer behaviour and changes in the customer journey path are developing. There are many tactical aspects of using specific digital enabled devices and technology, like the criteria of choosing digital platforms, the impact of wearables in decision making etc. There are also questions of how the development of digital technology influences economic growth through the development of marketing systems; to which extent digital marketing systems determine economic growth; if digital marketing is determined by the development of the digital economy or does it drive that development; and which is the mechanism of interaction between the digital economy and digital marketing. How could digital marketing system growth be regulated, programmed if ever, and institutionalised since advances in technologies make obsolete many traditional regulations of market and consumption? The need for more knowledge of digital marketing system growth and change is widely recognized.

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## FEATURES AND TRENDS IN EXTERNAL MIGRATION IN THE REPUBLIC OF BELARUS

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### Abstract

This study identified the major trends in external migration, typical of the current development stage of the Republic of Belarus and their effect on the economy. The consequences of the global financial and economic crisis had a considerable impact on migration flows around the globe. These processes are reflected in the growing tension in the labour markets in different countries. The basic features of the Belarusian labour market remain the low share of the private sector and excessive state interventionism. For the Belarusian economy, which is in transition, the initial inflow of foreign labour resources at the beginning of the 2000s has transformed into a clear trend towards an outflow of skilled workers. This trend requires a detailed analysis of current processes and identification of the major directions and causes of migration, especially in the depopulation processes observed. The analysis presented in this paper is based on data from the National Statistics Committee of the Republic of Belarus and covers the years 2014-2018.

The comparative statistical analysis method used in the study (creating time series reflecting changes of the phenomenon over time) identified the current trends and characteristic features of internal migration processes in the Republic of Belarus. Moreover, the main directions of population movements were determined as well as the causes of changes in the structure and intensity of migration flows.

## CECHY I TENDENCJE MIGRACJI ZEWNĘTRZNEJ W REPUBLICE BIAŁORUSI

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Słowa kluczowe: procesy migracyjne, emigracja, imigracja, Republika Białorusi.

### Abstrakt

Celem artykułu jest identyfikacja głównych trendów w migracji zewnętrznej, charakterystycznych dla obecnego etapu rozwoju Republiki Białorusi i ich wpływu na gospodarkę. Konsekwencje światowego kryzysu finansowego i gospodarczego wywarły znaczący wpływ na zmiany w przepływach migracyjnych na całym świecie. Procesy te znajdują odzwierciedlenie w rosnącym napięciu na rynkach pracy w różnych krajach. Dla gospodarki białoruskiej początkowy napływ zasobów siły roboczej z zagranicy w 2008 roku przekształcił się w wyraźną tendencję do odpływu wykwalifikowanych pracowników. Trend ten wymaga szczegółowej analizy obecnych procesów oraz identyfikacji głównych kierunków i przyczyn migracji ludności. Analiza przedstawiona w artykule opiera się na danych Krajowego Komitetu Statystycznego Republiki Białorusi i obejmuje lata 2014-2018. Zastosowane w pracy metody porównawczej analizy statystycznej, budowa szeregów czasowych odzwierciedlających zmiany zjawiska w czasie, pozwoliły na zidentyfikowanie aktualnych trendów i charakterystycznych cech dla procesów migracji zewnętrznych w Republice Białorusi. Określono główne kierunki przemieszczania się obywateli oraz przyczyny zachodzących zmian w strukturze i intensywności przepływów migracyjnych.

## Introduction

Globalisation is one of the major features of the modern global economy and it manifests itself in all the spheres of human life. Unification of the international legal system, simplified customs regulations in many countries and liberalisation of trade relations have resulted in lifting borders between countries and regions.

Being an open economy, oriented towards foreign markets and striving for its own position in the system of the international division of labour, the Republic of Belarus is fully exposed to the influence of global trends. The beneficial economic, geographical and geopolitical position of Belarus between rapidly developing global business centres, such as the European Union, the Russian Federation and the Asia-Pacific region are advantageous. The active position of the country as one of the initiators of establishing the Eurasian Economic Union and the Commonwealth of Independent States, close cooperation with countries in Western Europe, and membership of international organisations



largely determine the trends in economic growth. However, they are also accompanied by considerable external migrations (Kulakou & Tsimayeu, 2017, p. 49-60). The socio-economic crisis during the country's economic transformation has further accelerated the negative demographic processes. The basic features of the Belarusian labour market remain the low share of the private sector and excessive state interventionism. With economic integration constantly expanding, labour migration is becoming a real measure of the integration processes and a tool for regulating national and regional labour markets (Pirozhnik, 2016, p. 57).

Migration is one of the most important population issues and is regarded not only as a simple mechanical movement of people but also as a complex social problem which affects many aspects of political, social and economic life (Organiściak-Krzykowska & Machnis-Walasek, 2016, p. 92). This phenomenon should be considered in a broader context. It is a demographic, sociological, political, ecological, culture-related and economic issue (Kuciński, 2004, p. 8-20). The migration process factors can be classified into economic and non-economic. The economic nature of these factors arises mainly from uneven levels of labour force resources in different countries. This, in turn, contributes to the diversification of pay rates, employment opportunities, etc. The economic factors of migration include the will to improve one's standard of living, especially the living conditions (Thomas *et al.*, 2019, p. 1097). Contemporary migration takes the form of liquid migration, which is based on temporariness, flexibility and unpredictability of life trajectories (Engbersen, 2018, p. 63-77). "Liquid migrants" need to adapt to the flexible, deregulated and increasingly transnational labour market, which is associated with specific challenges. One of these challenges is the progressing precarisation of labour (Rodgers, 1989; Trappmann, 2011; Poławski, 2012; Standing, 2014) associated with a constant state of professional uncertainty arising from the lack of stable employment, periodical unemployment or specificity of the form of employment.

Migrations are considered from two points of view: co-development which engages migrants as promoters of development and the main sources of human capital in a country and the theory of dependence, which confirms that migrations deepen poverty in territories of their origin (Loteró-Echeverri & Perez Rodriguez, 2019, p. 141). The outflux of a qualified labour force relatively increases the supply of a low-qualified labour force in the domestic labour market. An oversupply of low-qualified labour force decreases the pay rates in those countries, while the pay rates of highly qualified workers increases, leading – at least in the short term – to the emergence of a "gulf of inequality" (Upreti, 2019).

The beginning of the social, economic and political transformations on the post-Soviet land was a stimulus for boosting the population migrations of the Republic of Belarus. The initial rapid outflow of the population was associated with a crisis in the economy, issues of national identity, political tensions and other factors. The population outflow decreased later, owing to the reforms

and relative stabilisation of the economy. However, the tendencies of the latest years indicate the existence of a number of issues in this area, which require attention from the state.

## Analysis and interpretation of results

The liberalisation of the entry and exit procedures for citizens leaving the country during the initial phase of the sovereign Belarussian state formation became one of the causes of a growing threat of a labour force deficit in the national economy and the intensification of depopulation processes. It resulted in the need to initiate preventive measures by the state administration, with consequent stabilisation of the situation. Therefore, if, according to official data, over 35,000 people left the country in 1995, then the number had dropped five-fold by 2005, to 6,866 (Fig. 1).

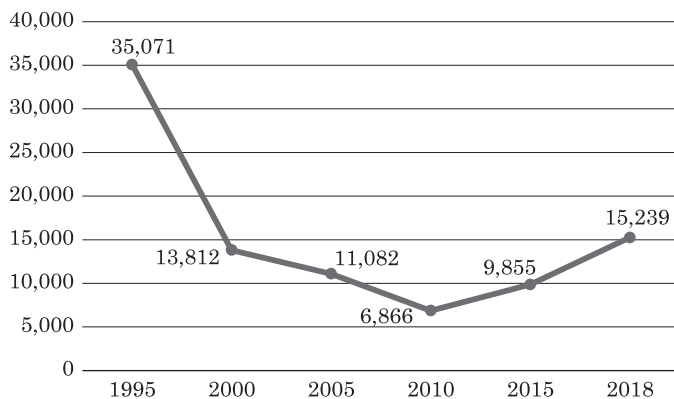


Fig. 1. Changes in the number of emigrants

Source: prepared by the author based on Demographic Yearbook of the Republic of Belarus (2019).

A decrease in the number of people emigrating in the late 1990s and in the early 2000s is explained by the growth of the Belarussian economy, a lower inflation rate and the stabilisation of the labour market. Moreover, economic growth was accompanied by the implementation of the state's social policy towards population groups in a difficult social situation. This resulted in shifting the migration balance to positive values in 1996.

The global financial and economic crisis of 2008 caused the number of migrants returning home to increase. As a result of the liberalisation of legislation governing external labour migration, increased inflows into the labour market have been observed. The law of July 2011 abolished the requirements for licenses to attract foreign labour to the Republic of Belarus

and improved the practice of granting permits to employers (Pirozhnik, 2016, p. 57). In the case of Belarus, it was reflected in a nearly two-fold increase in the positive balance of international migrations, but also in changes in the geographic structure of migratory links. The share of the CIS (particularly Russia) in the structure of immigration decreased, and the share of the Baltic States and non-CIS countries increased. Opposite changes were observed in the emigration structure (Lebedeva & Timošenko, 2010, p. 254).

A new stage of migration of the Belarussian population, with a growing trend in the number of citizens leaving the country, started in 2014.

Entries into and exits out of CIS countries now account for the majority of the migration flow. During the past five years, the group comprised approx. 75% of immigrants and approx. 86% of emigrants (Tab. 1).

Table 1  
Trends in external migrations in the Republic of Belarus

Specification	Years					2018/2014 [%]
	2014	2015	2016	2017	2018	
Influx						
Total	24,941	28,349	21,038	18,961	24,601	98.6
From CIS countries	19,855	22,505	15,615	13,305	17,008	85.7
From non-CIS countries	5,086	5,844	5,423	5,656	7,593	149.3
Outflux						
Total	9,219	9,855	13,098	15,087	15,239	165.3
To CIS countries	5,912	6,679	8,997	9,558	9,829	166.3
To non-CIS countries	3,307	3,176	4,101	5,529	5,410	163.6
Migration balance						
Total	15,722	18,494	7,940	3,874	9,362	59.5
With CIS countries	13,943	15,826	6,618	3,747	7,179	51.5
With non-CIS countries	1,779	2,668	1,322	127	2,183	122.7

Source: prepared by the author based on: Demographic Yearbook of the Republic of Belarus (2019).

When analysing migration flows by destination, one should observe that the peak of the number of people entering the country took place in 2015. It is largely a consequence of the Treaty on establishing the Eurasian Economic Union coming into effect on 1 January 2015, which opened borders between the participating countries (Armenia, Belarus, Kazakhstan, Kyrgyzstan, Russia). The political crisis in Ukraine was also a consequence. Moreover, immigration was seen to decrease during the following two years to 18,961 people, which is associated with the changes in legislation in the country, whose aim was to increase the involvement of the local population in economic activities and, in consequence, resulted in the saturation of the labour market.

An immigration level increase was observed in 2018, which can be attributed to the opening of a number of new enterprises, which – under investment agreements with China – employ foreign labour, especially from China. A 34% increase in the number of immigrants from non-CIS countries who arrived in Belarus in 2018 compared to 2017 contributed to this situation.

In terms of the trend regarding the number of emigrants, it was found to be increasing considerably. A rapid increase took place at the turn of 2015/2016 (from 9,855 to 13,098). This phenomenon is attributed to the synergy effect of two elements: a simplification of the procedure of transfer between countries within the EEA and the instability of the domestic currency market.

There was also a nearly equal growth of emigrants, both in the CIS countries and abroad, with the proportions between the numbers of people leaving for these destinations being approximately the same – 66/34% during the analysed period. The total number of emigrants increased during the past five years by over 65% and amounted to 15,239 people in 2018. These changes resulted in a decrease in the total migration balance by over 40%.

The directions of external migrations include mainly the Russian Federation, Ukraine, Turkmenistan and Kazakhstan (Tab. 2). Despite an increase of 16.8% in 2018 compared to 2017, the total number of those arriving from the Russian Federation decreased by 22.9% in recent years. 7,040 people arrived in Belarus from the Russian Federation in 2018.

Table 2  
Trends in external migration flows in the Republic of Belarus by country

Country	Years					2018/2014 [%]	2018/2017 [%]
	2014	2015	2016	2017	2018		
Influx							
Russian Federation	9,131	7,837	6,611	6,025	7,040	77.1	116.8
Turkmenistan	1,710	1,340	1,567	2,175	4,001	234.0	184.0
Ukraine	6,311	10,571	5,492	3,491	3,404	53.9	97.5
China	465	1,310	1,097	783	1,696	364.7	216.6
Kazakhstan	1,408	1,577	910	712	877	62.3	123.2
other countries	5,916	5,714	5,361	5,775	7,583	128.2	131.3
Outflux							
Russian Federation	4,669	5,137	5,912	6,125	6,732	144.2	109.9
Ukraine	429	893	1,809	1,781	1,411	328.9	79.2
Turkmenistan	371	327	803	1,185	1,118	301.3	94.3
Poland	231	319	318	472	765	331.2	162.1
Israel	275	286	520	788	761	276.7	96.6
other countries	3,244	2,893	3,736	4,736	4,452	137.2	94.0

Source: prepared by the author based on: Demographic Yearbook of the Republic of Belarus (2019).

The number of immigrants from Ukraine increased rapidly in 2015 because of the difficult political situation in the country and of the war. However, as the situation stabilised and various agreements were signed, the migration of Ukrainian citizens towards Belarus decreased and they turned to countries in Western Europe.

Turkmenistan ranked second in 2018 in terms of the number of people coming to Belarus. The majority of migrants from Turkmenistan are students coming to this country for education. There are reasons to believe that 2018 will be a peak year and that we should expect the migration activity in this area to decrease, which is linked to legislative changes in the system of education in Turkmenistan.

The People's Republic of China deserves special attention in an analysis of migration flows. The number of citizens from this country coming to Belarus increased 3.5-fold during the past five years and amounted to 1,696. Although this number fluctuates, there is a clear growing tendency. This can be attributed partly to educational migration. However, this was caused mainly by expanding the investment cooperation between the two countries. China's interest in the Belarussian economy has been increasing since 2014, after the comprehensive strategic partnership between the two countries was established in 2013 and after Belarus joined the "One belt, one road" initiative, through which this country will be included in the "Silk Road economic belt" project (Zajceva, 2019, p. 36). Chinese investments in the Belarussian economy exceeded 1.5 billion dollars during the following five years (Statistical yearbook of the Republic of Belarus, 2019). At the same time, the participation of Chinese fixed assets, labour and services in investment projects should not exceed less than 50% of the total costs of each agreed individual project, which considerably limited the use of local means of production, including labour, by Belarus (Zajceva, 2019, p. 36-44). In consequence, the majority of immigrants are in the labour market.

People leaving Belarus usually go to the Russian Federation, which accounted mainly for an average of 46% of the total number of emigrants during the study period. Although this index increased by 44.2% in absolute values, it decreased by 6.5 p.p. in the relative share of emigrants to Russia. This is a consequence of the fact that Belarussians reoriented to Western Europe and other developed countries, particularly to the United States and Israel (Brunarska *et al.*, 2014). In 2018, 432 Belarussians left for the USA, which is 1.7 times more than in 2014.

External migration flows in the Republic of Belarus comprise mainly economic migration. The percentage of the working-age population entering Belarus and leaving this country was 65.4% and 77.5%, respectively, during the past five years (Tab. 3). Moreover, despite the current downward trend, there are twice as many working-age people entering Belarus than leaving it.

Table 3

Trends in external migration flows in the Republic of Belarus by age group

Age groups	Years					2018/2014 [%]
	2014	2015	2016	2017	2018	
Influx						
Pre-working age	4,430	5,346	4,058	3,666	4,040	91.2
Working age	15,831	18,386	13,339	12,293	17,368	109.7
Post-working age	4,680	4,617	3,641	3,002	3,193	68.2
Proportion of working-age people in the total number of people entering Belarus [%]	63.5	64.9	63.4	64.8	70.6	7.1 p.p.
Outflux						
Pre-working age	947	1,129	1,702	1,814	1,914	202.1
Working age	7,266	7,615	10,010	11,953	11,847	163.0
Post-working age	1,006	1,368	1,386	1,320	1,478	146.9
Proportion of working-age people in the total number of people leaving Belarus [%]	78.8	75.3	76.4	79.2	77.7	-1.1 p.p.

Source: prepared by the author based on: Demographic Yearbook of the Republic of Belarus (2019).

People emigrate from Belarus mainly for economic reasons. The labour force moves to countries where income is higher. This is shown by Poland being the fourth most popular emigration destination, where the process of employment, admission to educational facilities and obtaining residence permits for citizens of Belarus is among the easiest in developed countries. As a consequence of this, the number of Belarussians emigrating to Poland has increased 3.3-fold since 2014 (Tab. 2), and the rapidly developing Polish economy needs a larger labour force. There have been immigrants from Ukraine that have been increasing the labour force resources in the Polish labour market for several years (Dluhopolskyi *et al.*, 2019).

The Russian Federation remains the main target country for economic emigrants from Belarus. Factors attracting Belarussians include: stable demand for employees associated with the demographic crisis in Russia, higher wages, no visa-related regime, low cost of transport and cultural and language similarity (Artûhin & Puškevič, 2014, p. 129).

It should also be noted that the official data concerning citizens of Belarus emigrating abroad do not reflect reality, because only a small portion of people emigrating to work in other countries are registered by the relevant authorities.

According to Lučenok and Kolesnikova (2015), the outflux of unregistered economic migrants from Belarus is more than 30 times larger than the registered economic migration; it is estimated to be more than 150 thousand a year. This study is based on statistical data for the period up to 2010, but it can be claimed

that the situation has not changed considerably. This fact is confirmed indirectly by a decrease in the number of people employed in the Belarussian economy.

An analysis of the areas of employment of the people who leave Belarus shows that majority of Belarussians leaving their jobs under agreements are employed in professions where only low qualifications are required, which include mainly manual work. The most frequent types of activities done by migrants include jobs in construction, transport, agriculture, service and recreation.

However, this has changed in recent years. Studies have shown that the number of unqualified workers has decreased by half (Tihonova & Krasinec, 2015, p. 18).

Approximately 40% of the people leaving the Republic of Belarus are university graduates. When increased by those with secondary education, their number will account for 67% (Tab. 4). Not all of them work abroad, but the outward trend in the movement of highly educated and qualified people is noticeable.

Table 4  
Trends in external migration flows in the Republic of Belarus by education level

Level of education	Years					2018/2014 [%]
	2014	2015	2016	2017	2018	
Influx						
University	6,052	6,858	4,914	4,347	5,369	88.7
Secondary special	5,674	7,163	4,683	3,313	3,839	67.7
Vocational – technical	1,144	1,284	868	605	633	55.3
Lower than vocational	7,641	7,698	6,515	7,030	10,720	140.3
Proportion of university graduates in the total number of people entering Belarus [%]	29.5	29.8	28.9	28.4	26.1	-3.4 p.p.
Outflux						
University	3,465	3,322	4,431	5,310	5,489	158.4
Secondary special	1,824	2,435	3,347	4,294	3,311	181.5
Vocational – technical	269	417	556	532	547	203.3
Lower than vocational	2,714	2,552	3,062	3,137	3,978	146.6
Proportion of university graduates in the total number of people leaving Belarus [%]	41.9	38.1	38.9	40.0	41.2	-0.7 p.p.

Source: prepared by the author based on: Demographic Yearbook of the Republic of Belarus (2019).

Until 2016, the negative impact on the Belarussian market was compensated for by citizens – university graduates arriving in this country; however, a negative balance has been observed in regard to this index (Fig. 2).

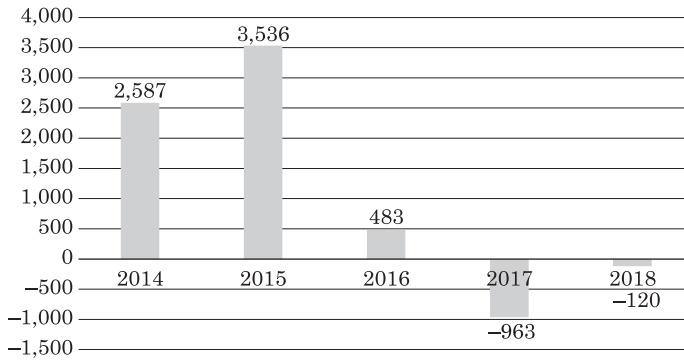


Fig. 2. Trends in the balance of university graduates

Source: prepared by the author based on: Demographic Yearbook of the Republic of Belarus (2019).

This trend can be attributed partly to the intensive development of the IT industry in the Republic of Belarus, which supplies foreign markets not only with software but also with programmers. Belarussian programmers are highly valued in Western Europe and in the USA and they account for a considerable part of the number of professionals leaving this country. This is caused mainly by a significant difference in the wage level. Poland, Germany, Israel, the USA and China were the most attractive non-CIS countries for emigration among university graduates leaving Belarus in 2018 (Fig. 3). Their participation in the overall structure of migration flow exceeded 60% by the end of the year.

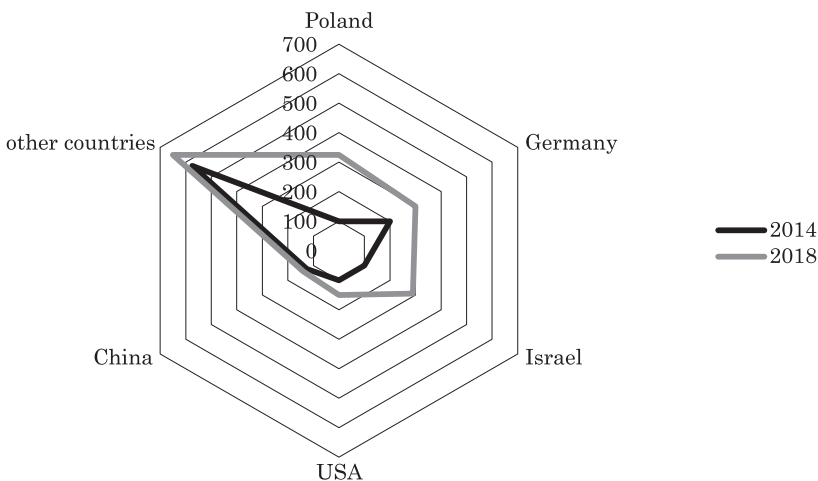


Fig. 3. Emigration preferences among university graduates, %

Source: prepared by the author based on: Demographic Yearbook of the Republic of Belarus (2019).



The structure of emigration flows differs considerably from the structure of immigration flows. Foreigners accounted for approx. 47% of all emigrants from Belarus. This group usually includes foreigners who graduated from universities and economic emigrants whose labour contracts expired, etc. Of the 1,118 people who left for Turkmenistan in 2018, 1,112 were citizens of this country, a definite majority of whom graduated from university in Belarus (Demographic Yearbook of the Republic of Belarus 2019).

## Summary

Efforts observed in the contemporary world to unify and to liberalise relationships between countries have a considerable impact on a number of areas of social and economic life, including on migration processes. The analysis conducted in this study has identified a number of key trends in the Republic of Belarus at the current stage of development. Despite changes in the structure and directions of migration flows, CIS countries, particularly the Russian Federation, remain strategic partners of the Republic of Belarus in this sector, which is attributed to the historical relations between these countries as well as to the foreign policy of Belarus.

Migration flows can be divided into three main groups: economic migration, educational migration and refugees from regions where the political situation is difficult. An increase in economic migration from China should be identified within common business projects carried out in Belarus.

Income difference is the main reason for citizens emigrating. Over 77% of people leaving the country are of working age, which indicates that for the majority of them it is economic migration. This resulted in an increase in the number of Belorussian emigrants being interested in developed countries of the European Union, Israel and the USA. In terms of this parameter, Poland is ranked first among the European countries and fourth in general, which can also be attributed to the historical, geographic and cultural closeness of these countries.

In recent years, highly qualified professionals have tended to emigrate. Approximately 40% of emigrants are university graduates. It is partly a consequence for the demand for Belorussian IT professionals in the European labour market. It has also been found that the official statistics concerning people leaving Belarus do not reflect reality because not all emigrants are registered by the relevant authorities.

It is important for the Republic of Belarus to take a number of social and economic policy measures that will allow for a positive economic effect through moderate labour migration and the retention of highly qualified professionals.

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## CHANGES IN THE SECTOR EMPLOYMENT STRUCTURE OF THE SILESIAN VOIVODESHIP BETWEEN 2009 AND 2017

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### Abstract

Transformations of employment structures reflect changes in the economic structure. This structure is closely related to economic development. The importance and complexity of this field make structural changes one of the most important areas of scientific research. Detailed recognition and deepening of knowledge about sectoral transformations of employment structures, as well as current and future trends in this area, are necessary for finding optimal solutions that will accelerate changes in the economy. The purpose of the study is to identify and evaluate changes in the sectoral employment structure in the Silesian Voivodeship in the years 2009-2017, with particular emphasis on intra-sectoral changes in the service sector. In connection with this, an analysis of structural changes was carried out in the Silesian Voivodeship in the examined period. The research was based on data obtained from the Local Data Bank. The analysis of structural changes in employment was conducted using structure and dynamics indicators as well as one of the known measures of structure diversity. The results of the analysis allowed this study to recognize and assess changes within the sectoral employment structure within the studied region.

## ZMIANY SEKTOROWEJ STRUKTURY ZATRUDNIENIA W WOJEWÓDZTWIE ŚLĄSKIM W LATACH 2009-2017

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Kody JEL: E2, E24.

Słowa kluczowe: sektory, struktura zatrudnienia, województwo śląskie.

### Abstrakt

Przeobrażenia struktur zatrudnienia odzwierciedlają zmiany, jakie zachodzą w strukturze gospodarki. Struktura ta jest ściśle związana z rozwojem gospodarczym. Waga i wielowątkowość tej problematyki sprawiają, że przemiany strukturalne są jednym z najważniejszych obszarów badań naukowych. Szczegółowe rozpoznanie i zgłębienie wiedzy na temat sektorowych przeobrażeń struktur zatrudnienia oraz obecnych i przyszłych tendencji w tym zakresie jest niezbędne do szukania rozwiązań przyspieszających zmiany strukturalne w gospodarce. Celem opracowania jest rozpoznanie i ocena zmian w sektorowej strukturze zatrudnienia w woj. śląskim w latach 2009-2017, ze szczególnym uwzględnieniem zmian wewnątrz sektora usług. W związku z tym przeprowadzono analizę przemian strukturalnych w woj. śląskim w badanym okresie. Badania oparto na danych pozyskanych z Banku Danych Lokalnych. Analizę zmian strukturalnych zatrudnienia przeprowadzono z wykorzystaniem wskaźników struktury i dynamiki oraz jednego ze znanych mierników zróżnicowania struktur. Wyniki analizy pozwoliły rozpoznać i ocenić zmiany w sektorowej strukturze zatrudnienia w badanym regionie.

## Introduction

The structure of the economy is of key importance to the fostering of the national or regional development and its stability. The structure of the economy depends on many factors, among which global megatrends play a special role. Progressing globalisation processes, the universal character of methods guiding contemporary economies, and above all new information and communication technologies define the direction and rate of structural changes in the economy. These in turn cause changes in the structure of employment viewed according to sectors, divisions, branches and qualifications. The role of particular sectors in the economic development is changing as well.

The traditional division of economy into three sectors (according to C. Clark, A. Fisher and J. Fourastie) is losing importance (Łukaszewicz & Karpiński, 2001), as borderlines between the three sectors are becoming increasingly difficult to define (sectors overlap), and structural modifications as well as new phenomena appear in all sectors. In highly developed countries, the sector of services has become the dominant one in terms of employment (70%-80%). There are also

fundamental shifts in its internal structure (both with respect to employment and regarding its contribution to GDP) towards more modern types of services.

Although the sector-wise transformation of the Polish economy has induced significant alternations in its structure (which has been manifested by the direction of changes in the employment in individual sectors), and although transformations in the sector-related structures of employment in Poland demonstrate the features of the worldwide structural changes – they are still far from the level seen in contemporary developed economies.

Despite the ongoing discussions about the theory of three sectors, this concept is still broadly applied in analyses of transformations in employment structures, which aim to demonstrate any regularity occurring in them.

This article undertakes to discuss the problem of structural transformations in the Province of Silesia (województwo śląskie), which for years has been dominated by heavy industry and is therefore now under strong pressure to undergo structural transformations.

The aim of this study has been to uncover and evaluate changes in the sectoral structure of employment in the Province of Silesia which occurred in the years 2009-2017, and to assess the development stage of individual sectors, with special attention paid to intrasectoral changes within the sector of services. To this purpose, an analysis of structural transformations in the Province of Silesia during the mentioned time period has been made.

The first part of the paper contains a general description of the economic structure of the province, making numerous references to the results of our analyses, presented in the second part of the article, where transformations in the structure of employment according to sections were investigated. The authors decided that this would be a more readable presentation of the research considering the large number of tables and graphs contained in the article.

### **General characteristics of structural changes in the province of Silesia in 2009-2017**

The Province of Silesia is Poland's most industrialised region. There are all branches of mining and processing industries located in this province. The dominance of industrial structures in the region was a consequence of the dynamic growth of coal mining, smelting, power generation and other sectors. This structure of industries, with the prevalence of heavy industry (especially the fuel and energy segment) was the key factor in turning the region into Poland's industrial backbone. The state transformation in Poland activated processes of structural changes. The restructuring of industries, especially some traditional branches (coal mining, smelting, textile industry), initiated the process of transformations in the employment structure in the Province

of Silesia, a process that is bound to continue for many years to come (Kotlorz, 2004; Tkocz & Pukowska-Mitka, 2008).

The Province of Silesia will undergo the largest transformations in the structure of industries, the links between production and development of modern services, and the intensification of research and development activities (Bukowski *et al.*, 2015). This will be accompanied by the gradual abandonment of old segments of industry (coal mining, coke industry, steel industry, manufacture of machinery and equipment for coal mining, smelting and power generation) for modern, technologically advanced segments. These include the motor industry, which is now thriving in Poland (GIG 2009).

The number of employed people in the Province of Silesia in 2017 was 500,854. In the same year, the number of persons employed in the sector of 'coal mining and excavation' was 84,833, which corresponded to 16.95% of all people employed in industry in this province. In 2017, the 'industrial processing' sector employed 378,672 people, which made up 75.61% of the total workforce in industry in the Province of Silesia. Relative to data in 2009, when this section employed 327,644 people, which equalled 65.42% of total employment in industry, this meant a rise of 10.99 percentage points. The share of employment in industrial processing relative to total employment in the Province of Silesia is high. Unfortunately, the structure of industries is not very modern.

The sector of services in the Province of Silesia is developing dynamically. In each year throughout the time period analysed, the percentage of persons employed in services in the Province of Silesia was maintained at around 60%. In 2017, those employed in services made up 59.34% of the total number of employees in the Province of Silesia. During the entire time period analysed, the percentage of people working in services remained higher.

The intrasectoral structure of employment in the sector of services points to considerable differentiation in the percentage of employees in particular services.

It is worth underlining that modern business services (modern structure of employment) play a significant role in regional development, and such services are developing rapidly in the Province of Silesia (ABSL Report 2019). For example, there are 102 centres of modern business services, with a total workforce of 23.5 thousand people, seated in Katowice and elsewhere in the whole metropolitan area of Upper Silesia and Zagłębie. They are among the major centres of this type in Poland, with the labour force representing 8% of the total population working in the sector of modern business services in Poland. The services they offer most frequently belong to the IT sector, available in 54 out of 102 operating centres. They generate more than half (51%) of the employment in this branch. Over the past three years, the employment rate in service centres in the metropolitan area of Silesia and Zagłębie has reached 43% (i.e. over 7,000 new places of work).



It has been implicated that specialisation in the provision of services for industry is among the most highly valued industries. The demand for business services (assumed engineering works) will continue to grow as technology progresses. This will occur as specialisation of the services for industry and the technological aspect of industries is acknowledged. A visible trend in the development of services is the specialisation in services for financial institutions (Górecki *et al.*, 2013).

### **Analysis of changes in the structure of employment divided into sectors in the province of Silesia in 2009-2017**

The analysis of structural changes in employment was performed with the help of one of the known measures of the differentiation of structures (Kukuła, 1996), in addition to measures of the structure and indicators of dynamics.

The research was based on data from the Local Data Bank. A detailed analysis of changes in the structure of employment in the Province of Silesia was carried out in line with the division into sectors/sections:

- agriculture, forestry and fisheries,
- industry and construction industry,
- commerce, repair of motor vehicles, transport and warehousing, accommodation and catering, information and communication,
- finances and insurance, servicing the real estate market,
- other services.

The sector of industry and construction industry comprises:

- mining and excavation of minerals,
- industrial processing,
- generation and transmission of electric power, gas, water steam, hot water and air for air conditioning,
- water supply, wastewater and sewage management, environmental rehabilitation,
- construction industry.

The sector of other services includes:

- professional, research and technical activities,
- administrative and support activities,
- public administration, national defence, mandatory social insurance,
- education,
- health care and social welfare,
- activities connected with culture, entertainment and recreation.

Statistics illustrating the number of employed persons are presented in Figure 1 and Table 1.

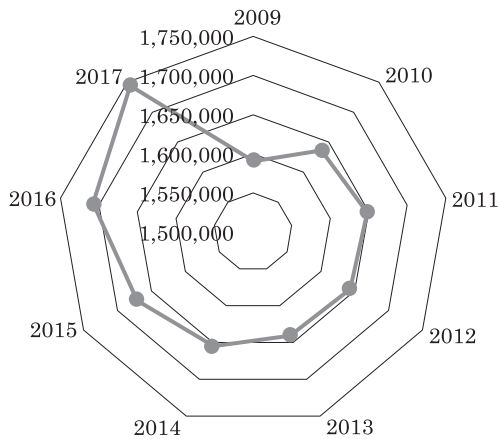


Fig. 1. Number of employed persons in the Province of Silesia in 2009-2017  
Source: developed by the authors, based on data from Bank Danych Lokalnych (2019).

The number of the employed in the Province of Silesia in 2009-2017 increased on average by 1.15% yearly. Figure 2 illustrates detailed dynamics of change in employment in each year relative to the base year.

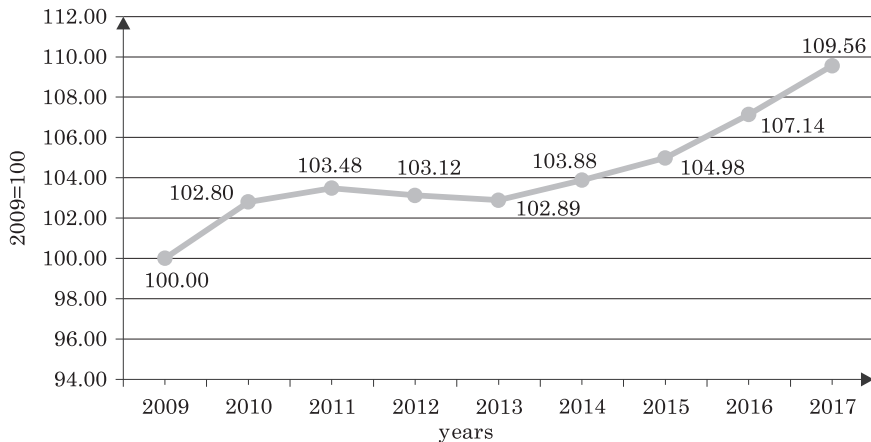


Fig. 2. Dynamics of changes in employment in the years 2009-2017  
Source: developed by the authors, based on data from Bank Danych Lokalnych (2019).

In order to demonstrate changes in the structure of employment over the analysed time period, simple dynamic measures were applied. First, indicators of the structure of employment according to the division applied in the Polish Classification of Activities (PKD) in 2007 were calculated (cf. Tab. 2, 3).

Table 1  
 Number of employed persons in the Province of Silesia in total (actual place of work),  
 divided into sections

Sector	Year										
	2009	2010	2011	2012	2013	2014	2015	2016	2017		
Agriculture, forestry and fisheries	69,032	102,514	102,537	102,104	101,963	102,324	102,191	102,363	102,554		
Industry and construction industry	603,598	600,781	608,505	602,182	586,968	587,234	586,668	593,945	606,962		
Services, including: Commerce, repair of motor vehicles, transport and warehousing, accommodation and catering, information and communication; finances and insurance; services in the real estate market; other services.	920,038	933,980	937,073	938,141	949,726	964,948	983,119	1,010,035	1,035,381		
In total for the Province of Silesia	1,592,668	1,637,275	1,648,115	1,642,427	1,638,657	1,654,506	1,671,978	1,706,343	1,744,897		

Source: developed by the authors, based on data from Bank Danych Lokalnych (2019).

Table 2

Structure of employment in 2009-2017 according to the PKD  
(Polish Classification of Business Activities) division of 2007

Sectors	Year								
	2009	2010	2011	2012	2013	2014	2015	2016	2017
Agriculture, forestry and fisheries [%]	4.33	6.26	6.22	6.22	6.22	6.18	6.11	6.00	5.88
Industry and construction industry [%]	37.90	36.69	36.92	36.66	35.82	35.49	35.09	34.8	34.78
Services in total [%]	57.69	57.05	56.86	57.12	57.96	58.33	58.80	59.20	59.34
including: – commerce, repair of motor vehicles, transport and warehousing, accommodation and catering, information and communication [%]	26.28	25.72	25.60	25.58	25.59	25.65	25.85	26.16	26.24
– finances and insurance; services in the real estate market [%]	3.91	3.85	3.84	3.89	3.97	3.88	3.78	3.72	3.62
– other services [%]	27.58	27.48	27.42	27.65	28.40	28.80	29.17	29.32	29.48
Total of the columns [%]	100	100	100	100	100	100	100	100	100

Source: developed by the authors, based on data from Bank Danych Lokalnych (2019).

The data collated in Table 3 show that the highest share of the employed in the sector ‘agriculture, forestry and fisheries’ occurred in 2010, in the sector ‘industry and construction industry’ – in 2009, and the highest share of employment in the sector of services (in the following sections: ‘commerce, repair of motor vehicles, transport and warehousing, accommodation and catering, information and communication’ and ‘other services’) was reached in 2017, while the section ‘finances and insurance, service of real estate market’ achieved the highest share of employment in 2013. There is a distinct shift in the number of employed persons from the sector ‘industry and construction industry’ to the sector ‘services’.

Having gained a more detailed insight into the employment within the services sector, and distinguishing two separate sections: industry and construction industry, it was then possible to observe evident changes in the structure of the employed population, i.e. a shift from industry to services, especially to the subsequent sections:

- professional, scientific and technical activity,
- activity in administration and support activity,
- health care and social welfare,
- transport and warehousing,
- information and communication.

Table 3

Structure of employment in 2009-2017 inclusive of a detailed breakdown into sections in the services sector

Specification	2009	2010	2011	2012	2013	2014	2015	2016	2017
Agriculture, forestry and fisheries [%]	4.33	6.26	6.22	6.22	6.22	6.18	6.11	6.00	5.88
Industry [%]	30.81	29.85	29.81	29.75	29.37	29.23	28.98	28.76	28.70
Construction industry [%]	7.09	6.85	7.11	6.91	6.45	6.26	6.11	6.05	6.08
Professional, scientific and technical activities [%]	3.49	3.45	3.65	3.69	3.93	4.14	4.15	4.19	4.24
Activities in administrative and support services [%]	3.52	3.88	3.70	3.66	3.86	3.93	4.26	4.32	4.56
Public administration, national defence; mandatory social security [%]	3.86	3.82	3.77	3.81	3.85	3.86	3.82	3.76	3.68
Education [%]	7.87	7.66	7.58	7.61	7.68	7.72	7.72	7.65	7.65
Health care and social welfare [%]	5.99	5.90	5.88	6.07	6.14	6.22	6.26	6.31	6.31
Culture, entertainment and recreational activities [%]	1.30	1.28	1.29	1.24	1.12	1.14	1.13	1.14	1.11
Activities in the financial and insurance sector [%]	2.32	2.27	2.28	2.32	2.36	2.28	2.21	2.12	2.02
Provision of services to the real estate [%]	1.59	1.58	1.57	1.56	1.61	1.59	1.58	1.60	1.60
Wholesale and retail commerce; repair of motor vehicles, including motorcycles [%]	17.01	16.82	16.54	16.36	16.33	16.39	16.47	16.37	16.01
Transport and warehousing [%]	5.72	5.68	5.82	5.80	5.75	5.65	5.71	5.91	6.20
Activities connected with accommodation and catering [%]	2.03	1.75	1.71	1.81	1.80	1.77	1.73	1.77	1.86
Information and communication [%]	1.52	1.47	1.53	1.62	1.71	1.83	1.94	2.11	2.17
Other services [%]	1.55	1.48	1.54	1.57	1.82	1.79	1.83	1.93	1.93
Total of columns [%]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: developed by the authors, based on data from Bank Danych Lokalnych (2019).

Table 4

## Intrasectoral structure of employment in services

Specification	2009	2010	2011	2012	2013	2014	2015	2016	2017
Professional, scientific and technical activity [%]	6.04	6.04	6.42	6.47	6.77	7.10	7.05	7.09	7.15
Activity in the scope of administration and support activities [%]	6.10	6.81	6.50	6.41	6.65	6.73	7.24	7.30	7.69
Public administration and national defence; mandatory social security [%]	6.68	6.70	6.64	6.67	6.65	6.61	6.49	6.35	6.20
Education [%]	13.62	13.43	13.33	13.33	13.25	13.24	13.13	12.93	12.89
Health care and social welfare [%]	10.36	10.35	10.35	10.62	10.60	10.67	10.65	10.67	10.63
Culture, entertainment and recreational activities [%]	2.26	2.25	2.27	2.17	1.93	1.96	1.93	1.93	1.87
Activities in the financial and insurance sector [%]	4.01	3.98	4.00	4.07	4.07	3.91	3.75	3.58	3.40
Provision of services to the real estate [%]	2.76	2.77	2.76	2.73	2.78	2.73	2.68	2.70	2.70
Wholesale and retail commerce; repair of motor vehicles, including motorcycles [%]	29.45	29.49	29.10	28.64	28.18	28.10	28.01	27.66	26.98
Transport and warehousing [%]	9.90	9.96	10.23	10.15	9.91	9.69	9.71	9.98	10.44
Activities connected with accommodation and catering [%]	3.51	3.06	3.01	3.16	3.11	3.04	2.94	2.99	3.14
Information and communication [%]	2.63	2.58	2.68	2.83	2.95	3.14	3.30	3.57	3.66
Other services [%]	2.69	2.59	2.72	2.75	3.14	3.07	3.12	3.27	3.26
SUM OF COLUMNS [%]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Market services – in total [%]	52.26	51.84	51.78	51.59	51.00	50.62	50.39	50.48	50.32
Non-market services – in total [%]	47.74	48.16	48.22	48.41	49.00	49.38	49.61	49.52	49.68

Source: developed by the authors, based on data from Bank Danych Lokalnych (2019).

The share of employees in industry was decreasing during the analysed time period (Tab. 3). There was a shift from industry to services, which can be clearly seen in Figure 3.

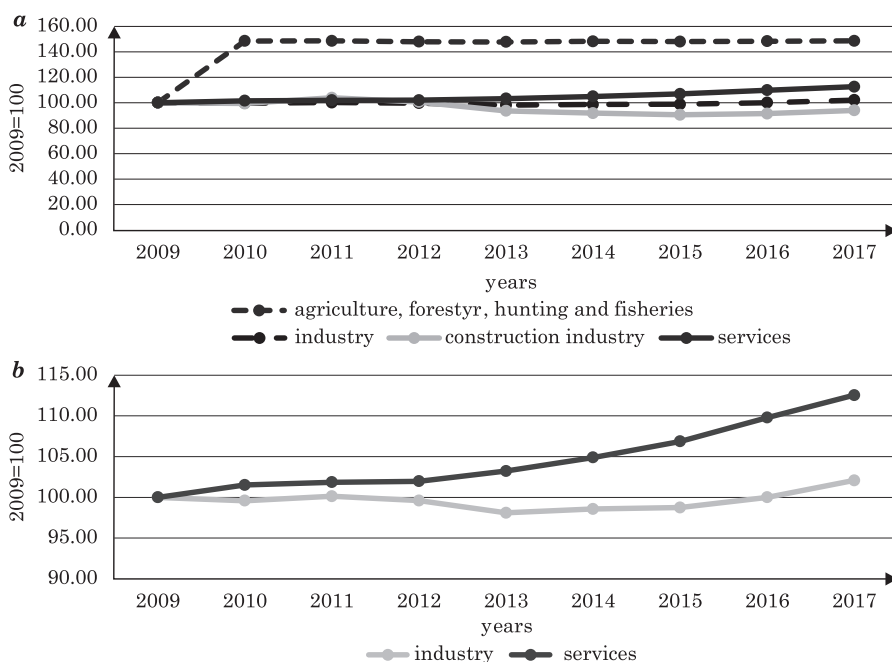


Fig. 3. Dynamics in the sectoral structure of employment in 2009-2017

Source: plotted by the authors, based on data from Bank Danych Lokalnych (2019).

Figures 4 and 5 show comparative analyses of the dynamics in the share of persons employed in industry with the dynamics of those working in selected sections of the services sector. The choice of the sections of the services sector presented in this study was not incidental but it was dictated by the results discussed above, which demonstrated the biggest flow of the employed from industry is to the services depicted in Figures 4 and 5.

It needs to be mentioned that the number of persons employed in the selected sections of the services sector in 2017 was as follows (cf. Tab. 1-5):

- in the section of professional, scientific and technical activity, the employment in 2017 equalled 133.36% of the employment in this section of the services sector in 2009. The average annual increase was 3.46%;

- in the section of administrative and support services, it constituted 141.83% of the number of persons hired in this services sector section in 2009. The number of employees in this section increased by an annual average of 2.85%;

- in the section of health care and social welfare, it equalled 115.47% of the employed in this section of the services sector in 2009. The number of persons employed in this services section increased by an annual average of 1.64%.

– in the section of transport and warehousing, the number of persons employed in 2017 corresponded to 118.9% of the employees in this section in 2009. The number of persons employed in this section increased by an annual average of 1.90%;

– in the section of information and communication, the number of employees in 2017 equalled 156.73% of the analogous number of employees in 2009; the number of employees in this section increased by an annual average of 5.84%.

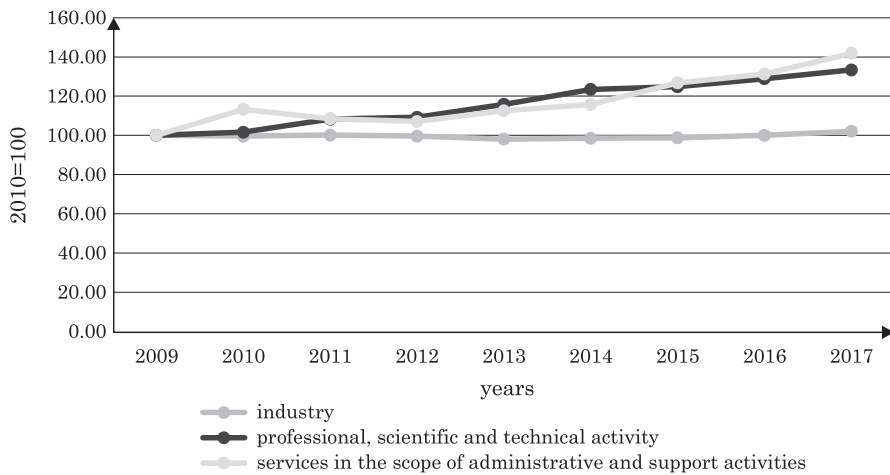


Fig. 4. Dynamics in the structure of numbers of employees in industry and in the sections: professional, scientific and technical activities, activities in administration and support services in 2009-2017

Source: plotted by the authors, based on data from Bank Danych Lokalnych (2019).

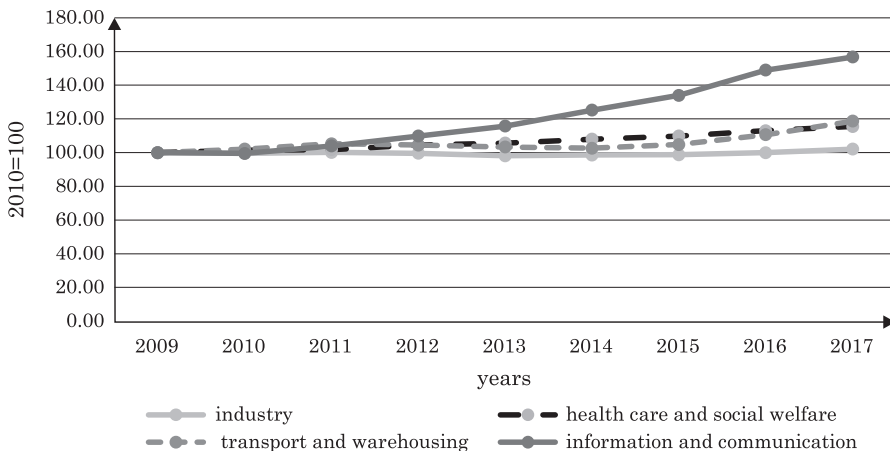


Fig. 5. Dynamics of the structure of employees in industry and in the sections: health care and social welfare; transport and warehousing; and information and communication in 2009-2017

Source: plotted by the authors, based on data from Bank Danych Lokalnych (2019).



Table 5

Dynamics of changes in employment in 2010-2017 in some sections  
of the services sector Base year 2009

Year	Professional, scientific and technical activity [%]	Administration and support services [%]	Health care and social welfare [%]	Transport and warehousing [%]	Information and communication [%]
2009	100.00	100.00	100.00	100.00	100.00
2010	101.59	113.27	101.38	102.08	99.52
2011	108.25	108.50	101.74	105.24	103.93
2012	109.24	107.09	104.55	104.50	109.82
2013	115.83	112.56	105.60	103.33	115.74
2014	123.40	115.75	107.99	102.61	125.20
2015	124.85	126.78	109.82	104.74	133.93
2016	128.88	131.31	113.01	110.61	148.95
2017	133.36	141.83	115.47	118.64	156.73

Source: developed by the authors, based on data from Bank Danych Lokalnych (2019).

The analyses and calculations made in this research suggest that the rate of change in the structure of employment changed by an annual average of 0.15%, which means that the number of employed persons increased by an annual average of 0.15%.

However, the number of persons employed in the services sector increased by an annual average of 1.49% (by 1.13% in the section: commerce; repair of motor vehicles including motorcycles; transport and warehousing; accommodation and catering; information and communication; by 0.18% in the section: finances and insurance; real estate market services; and by 1.99% in the other services). In the sector: industry and construction industry, the number of persons employed increased by an annual average of 0.07%, compared to an annual average increase of 0.26% in the section of industry (cf. Tab. 6).

Table 6

Rate of changes in number of employed persons

Sector	Agriculture, forestry and fisheries [%]	Industry [%]	Construction industry [%]	Services [%]
Rate of changes in 2009-2017	5.07	0.26	-0.77	1.49
Rate of changes in 2010-2017	0.01	0.35	-0.79	1.48

Source: developed by the authors, based on data from Bank Danych Lokalnych (2019).

## Evaluation of structural changes in the workforce in the province of Silesia in 2009-2017

The traditional mode of comparative analysis applied to the structure of employment, which relies on statistical data, enables one to gain only a superficial understanding of the extent and direction of changes. When comparing changes in the structure over some time period, it is impossible to identify unambiguously at what point of time these changes were more intensive and when they were relatively small.

Below, we present an analysis of structural changes in the workforce in 2009-2017, based on the measure of differentiation among structures (Kukuła, 1996; Kotlorz, 2004). The structure differentiation measure applied to assess the degree of structural changes is calculated from the following equation:

$$V_{t,t+\tau} = \frac{\sum_{i=1}^k |\alpha_{it} - \alpha_{i,t+\tau}|}{2},$$

where:

$$\alpha_{it} = \begin{pmatrix} \alpha_{10} & \alpha_{11} & \dots & \alpha_{1n} \\ \alpha_{20} & \alpha_{21} & \dots & \alpha_{2n} \\ \vdots & \vdots & & \vdots \\ \alpha_{k0} & \alpha_{k1} & \dots & \alpha_{kn} \end{pmatrix},$$

$$\tau = 1, 2, 3, \dots, n-1, \quad i = 1, 2, 3, \dots, k, \quad t = 1, 2, 3, \dots, n.$$

The differentiation measure  $V_{t,t+\tau}$  equals zero when the compared structures are identical. In turn, the greater the difference between structures, the higher the value of the measure will be, i.e. it will be closer to the value of 1.

### Analysis 1

The structure analysed in our case is composed of  $k = 6$  component elements, i.e.

- agriculture, forestry and fisheries;
- industry;
- construction industry;
- commerce; repair of motor vehicles; transport and warehousing; accommodation and catering; information and communication;
- finances and insurance; services provided in the real estate market;
- other services.

The matrix column vectors  $\alpha_{it}$  represent the structure of the workforce in individual years.

Values of the measure of differentiation among structures of employment calculated for two years indicate that differences between the structures intensify (cf. Fig. 6-9, Tab. 7). Thus, structures tend to be increasingly more distant from

Table 7

Values of the differentiation measure describing changes in the structures of employment

Period	2009/2010	2009/2011	2009/2012	2009/2013	2009/2014	2009/2015	2009/2016	2009/2017
Value of the measure	0.0374	0.0372	0.0386	0.0550	0.0610	0.0669	0.0676	0.0684
Period	-	2010/2011	2010/2012	2010/2013	2010/2014	2010/2015	2010/2016	2010/2017
Value of the measure	-	0.0053	0.0055	0.0210	0.0271	0.0364	0.0455	0.0504
Period	-	-	2011/2012	2011/2013	2011/2014	2011/2015	2011/2016	2011/2017
Value of the measure	-	-	0.0055	0.0222	0.0293	0.0401	0.0492	0.0540
Period	-	-	-	2012/2013	2012/2014	2012/2015	2012/2016	2012/2017
Value of the measure	-	-	-	0.0169	0.0243	0.0357	0.0448	0.0497
Period	-	-	-	-	2013/2014	2013/2015	2013/2016	2013/2017
Value of the measure	-	-	-	-	0.0091	0.0206	0.0297	0.0345
Period	-	-	-	-	-	2014/2015	2014/2016	2014/2017
Value of the measure	-	-	-	-	-	0.0114	0.0205	0.0254
Period	-	-	-	-	-	-	2015/2016	2015/2017
Value of the measure	-	-	-	-	-	-	0.0091	0.0140
Period	-	-	-	-	-	-	-	2016/2017
Value of the measure	-	-	-	-	-	-	-	0.0054

Source: developed by the authors, based on Bank Danych Lokalnych (2019).

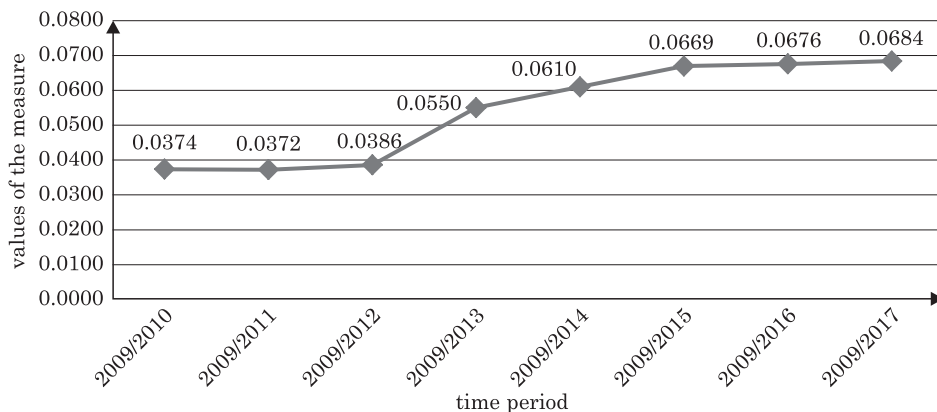


Fig. 6. Values of the differentiation measure revealing the course of changes in structures of employment relative to the base structure in 2009

Source: plotted by the authors, based on data from Bank Danych Lokalnych (2019).

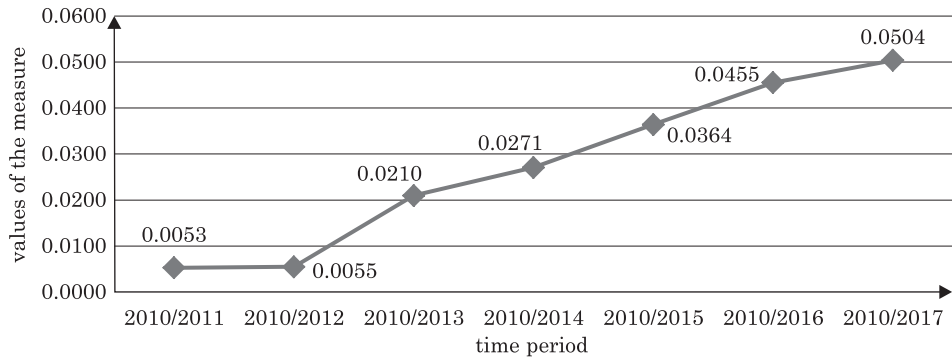


Fig. 7. Values of the differentiation measure revealing the course of changes in structures of employment relative to the base structure in 2010

Source: plotted by the authors, based on data from Bank Danych Lokalnych (2019).

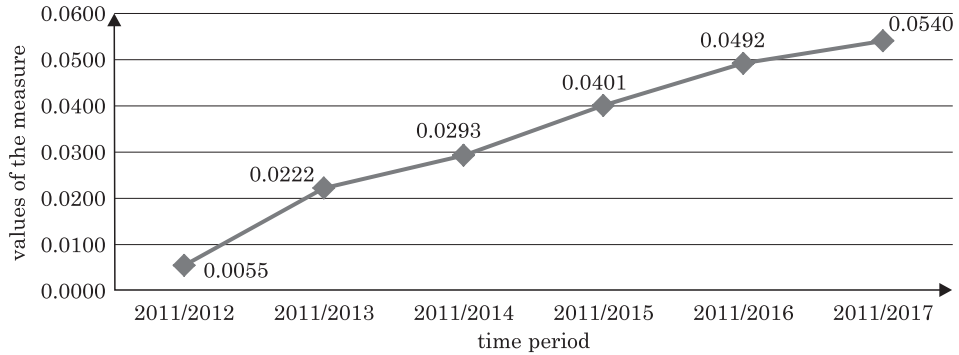


Fig. 8. Values of the differentiation measure revealing the course of changes in structures of employment relative to the base structure in 2011

Source: plotted by the authors, based on data from Bank Danych Lokalnych (2019).

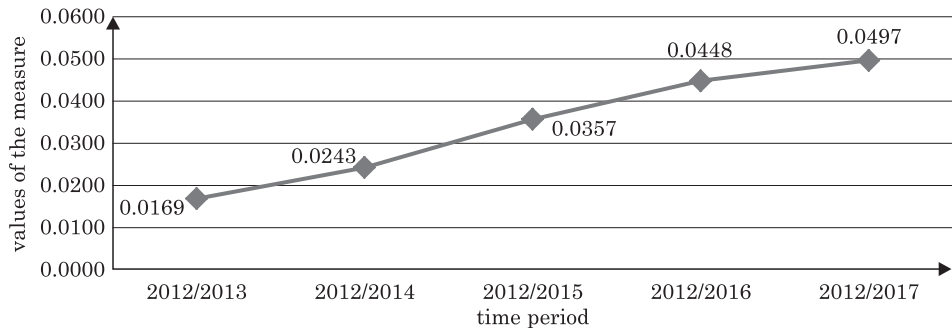


Fig. 9. Values of the differentiation measure revealing the course of changes in structures of employment relative to the base structure in 2012

Source: plotted by the authors, based on data from Bank Danych Lokalnych (2019).

one another. The closer the compared structures are to each other, the less differentiation there is between them, and with time the differences in structures grow deeper. These changes are illustrated in Figures 6-9. The results confirm our previous analyses.

## Analysis 2

The analysed structure in this case is composed of  $k = 6$  component elements, i.e.:

- industry,
- professional, scientific, and technical activity,
- administration and support activities,
- health care and social welfare,
- transport and warehousing,
- information and communication.

Values of the structure differentiation measure calculated for two years indicate that differences between the structures grew larger (cf. Fig. 10, Tab. 8). Thus, there is an ongoing process of structures becoming more distant from one another. This means that there is a flow of employees from industry to the services included in the model. The results confirm previously conducted analyses.

Recapitulating, the performed analyses clearly reveal a gradual flow of workforce from the industrial sector to the sector of services. When calculating chain indices for the sectors of industry and of services, increasingly larger differences are manifested (Fig. 11).

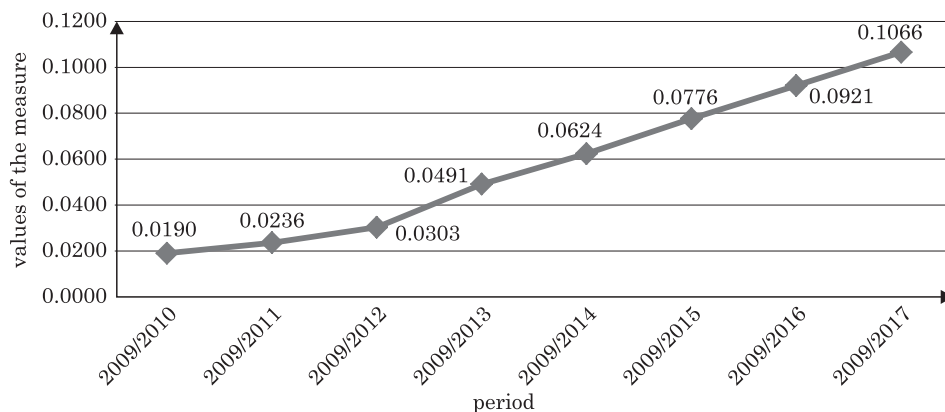


Fig. 10. Values of the differentiation measure describing the course of changes in the structure of employment versus the base structure of 2009

Source: plotted by the authors, based on data from Bank Danych Lokalnych (2019).

Table 8

Values of the differentiation measure describing the course of changes in the structure of employment

Period	2009/2010	2009/2011	2009/2012	2009/2013	2009/2014	2009/2015	2009/2016	2009/2017
Value of the measure	0.0190	0.0236	0.0303	0.0491	0.0624	0.0776	0.0921	0.1066
Period	-	2010/2011	2010/2012	2010/2013	2010/2014	2010/2015	2010/2016	2010/2017
Value of the measure	-	0.0144	0.0221	0.0336	0.0474	0.0620	0.0739	0.0884
Period	-	-	2011/2012	2011/2013	2011/2014	2011/2015	2011/2016	2011/2017
Value of the measure	-	-	0.0109	0.0304	0.0465	0.0617	0.0709	0.0833
Period	-	-	-	2012/2013	2012/2014	2012/2015	2012/2016	2012/2017
Value of the measure	-	-	-	0.0215	0.0376	0.0529	0.0620	0.0763
Period	-	-	-	-	2013/2014	2013/2015	2013/2016	2013/2017
Value of the measure	-	-	-	-	0.0161	0.0313	0.0430	0.0578
Period	-	-	-	-	-	2014/2015	2014/2016	2014/2017
Value of the measure	-	-	-	-	-	0.0170	0.0317	0.0484
Period	-	-	-	-	-	-	2015/2016	2015/2017
Value of the measure	-	-	-	-	-	-	0.0155	0.0324
Period	-	-	-	-	-	-	-	2016/2017
Value of the measure	-	-	-	-	-	-	-	0.0175

Source: developed by the authors, based on data from Bank Danych Lokalnych (2019).

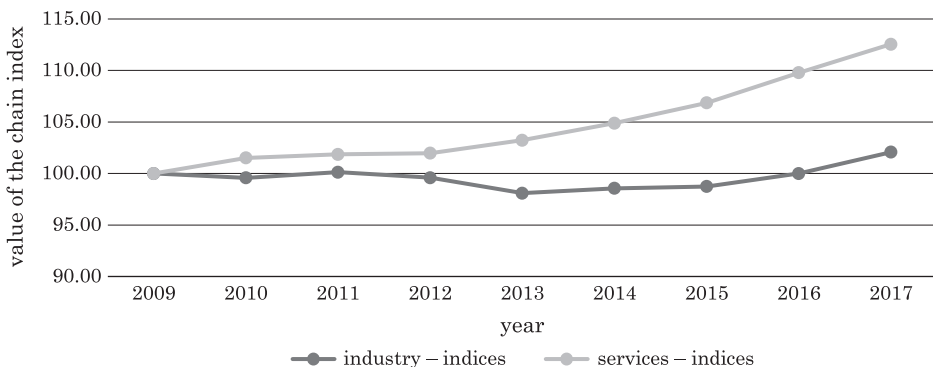


Fig. 11. Values of the measure of differentiation describing the course of changes in the structure of employment versus the base structure of 2009

Source: plotted by the authors, based on data from Bank Danych Lokalnych (2019).

## Conclusion

The research justifies several detailed conclusions concerning the specific research problem. These are discussed alongside the tables and diagrams presented above.

However, the entire research and overall considerations raised in this article lead to several more general conclusions, such as:

1. Changes occurred in the Province of Silesia over the analysed time period in the sectoral structure of employment. Most importantly, the employment in the services sector increased significantly, while decreasing in industry, where since the year 2010 it remained at the same level as in agriculture.

2. There were no significant changes in the employment structure in industry during the analysed years. The section 'mining and excavation of minerals' continues to make a large contribution, as it corresponds to nearly 17% of the total number of employed persons in the province's industry. The structure of employment in industry is not modern and continues to reflect the outdated structure of industry and the slow rate at which it is being restructured.

3. The economy of the Province of Silesia needs more rapid transformations in the industrial sector, and more widespread implementation of modern technologies. The economy needs to be more innovative and the research and development sector should develop more intensively.

4. The Province of Silesia should accelerate the development of the services sector, as the employment in this sector, rather than being a mere consequence, can act as a stimulant for socio-economic growth.

5. The notion of a three-sectorial economy is being exhausted, and new alternative divisions are being searched for, including new classifications, while different directions and dynamics in intrasectoral changes suggest that it is necessary to conduct research and analyses on lower levels of aggregation, with special attention paid to market services.

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