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### **Industry resistance to the economic crisis – the case of Poland**

#### **Abstract**

Research shows that, in comparison to other European countries, Poland has not suffered from the effects of the world economic crisis. Due to the steady growth rate maintained in 2009, Poland used to be called the „green island”, which means a country with a relatively better pace of economic development than other economies. The main reason for this success is given primarily to capital accumulation combined with adjustments in the labor market (Gradzewicz et al. 2014). However, despite the fact that in macroeconomic perspective Poland performed relatively well, the picture is less homogenous on mesoeconomic level since various industries have been affected by the crisis more strongly than others. The purpose of this article is to identify those industries and to verify, how they overcome (or not) those negative effects. The study period covers the years 2009-2015.

**Keywords:** industries, economic crisis, mesoeconomy.

**JEL CODE:** F14, L60, L80.

### **Odporność branż polskich na skutki działania kryzysu gospodarczego**

#### **Abstrakt**

Jak wynika z badań Polska nie znajdowała się w najtrudniejszej sytuacji ekonomicznej ani w czasie trwania kryzysu, ani bezpośrednio po nim. Ze względu na osiągnięty w 2009 r. wzrost gospodarczy w tym czasie Polskę zwykło się nazywać „zieloną wyspą”, czyli krajem o relatywnie lepszym tempie rozwoju gospodarczego od innych europejskich gospodarek. Jako główną przyczynę tego sukcesu podaje się przede wszystkim akumulację kapitału połączoną z dostosowaniami na rynku pracy (Gradzewicz et al. 2014). Kanały transmisji kryzysu, w Polsce, jak i innych państwach, były zróżnicowane i uzależnione od cech strukturalnych gospodarek oraz występujących w nich powiązań. W przekroju makroekonomicznym Polska nie odnotowała poważniejszych zaburzeń, jednak na niektóre branże kryzys oddziałował silniej niż na inne. Celem niniejszego artykułu jest identyfikacja tych branż, a także ustalenie, jak obecnie – kilka lat po kryzysie gospodarczym – funkcjonują one na globalnym rynku. Okres badania obejmował lata 2007-2015. W badaniu wykorzystane

zostały dane wtórne GUS w przekroju PKD 2007, a zastosowaną metodą badawczą były rankingi.

**Słowa kluczowe:** branże, kryzys gospodarczy, mezoekonomia.

### **Introduction - economic crisis in Poland**

The term „crisis” is derived from the Greek word „crisis”, meaning a decision or settlement (Dzikowska, Trapczynski 2016). Nowadays, this term is identified with the „period of collapse” and refers to many areas of social life. The economic crisis refers directly to the theory of business cycles and it has become an extremely important issue in recent years, due to the unrest it has caused on the global market.

The consequences of the economic crisis initiated by the bursting of the property speculative bubble in the United States in 2007 were very quickly felt in Europe. The crisis was so widespread as a result of the far-reaching internationalisation of activities, as well as global links among financial institutions. Already in 2008, financial institutions had to face the consequences of the events that took place in the United States, and soon afterwards, a significant deterioration of the economic situation was observed not only in the financial field (Komisja Europejska 2009). The consequences of events in the strictly financial sphere were reflected in the real economy. The crisis manifested itself in the form of reduced overall consumption, reduced exports of goods and services, declaration of bankruptcy of numerous economic entities, increased unemployment or increased public debt in many countries (Borowiecki, Siuta-Tokarska 2012). Initially, it was believed that the European economy, which based its development on export revenues and a strong position of companies and individual households, would easily resist the turbulence of financial markets. This erroneous assessment was already verified at the end of 2008, when Lehman Brothers declared bankruptcy, causing panic in the financial markets and stock exchange.

As a global financial and trading player, Europe quickly felt the effects of global excess liquidity. There were three main channels, the changes were transferred through. The first channel was related to pressure on European exchange rates directly related to changes in the U.S. dollar, as well as the Chinese yuan and Japanese yen indirectly. The second channel turned out to be borrowers with liabilities in currencies of countries whose current interest rates and debt service costs were favourable. They contributed to the „spill” of global excess liquidity of capital into European countries. Thirdly, the liberalisation of the capital market enabled the free movement of capital to countries where there was a significant increase in per

capita income. A significant part of this capital was invested in the real estate market, which was highly affected by financial turbulence (Berger, Hajes 2009; Boone, Van den Noord 2008; Dreger, Wolters 2009).

Looking back, economists believe that Poland was not in the most difficult economic situation either during or immediately after the crisis. Due to the economic growth rate achieved in 2009, Poland used to be called a „green island”. Gradzewicz et al. (2014) claim that the main reason for this growth was the accumulation of capital combined with adjustments in the labour market. Capital investments in Poland came to a large extent from European funds, the long-term nature of which guaranteed the continuity of investment projects. Adjustments in the labour market were mainly limited to a reduction in the number of hours worked, but were not of a permanent nature.

While it is quite obvious that the economic crisis had a much smaller impact on Poland's economic situation than on other European economies, some researchers (e.g. Gradzewicz et al. 2014) prove that the existence of such a dependence cannot be determined at all. In their opinion, there are no permanent effects of the crisis on the country's development measured, for example, by the use of production capacity utilization or total factor productivity. It should be remembered, however, that due to the relatively short time that has elapsed since the beginning of the crisis, these results may change, because:

- in the following years, Poland may „fall” into an average income trap (Aiyar et al. 2013) slowing down convergence towards more developed countries,
- the impact of the crisis may manifest itself in indicators other than those analysed (e.g. permanent unemployment rate),
- the impact of the crisis may not be noticeable at macroeconomic level, but at sectoral level, which is difficult to quantify in the case of aggregated data analysis.

Hence, the aim of this study is to extend the analysis of the effects of the crisis in Poland to include a sectoral analysis. Based on selected economic indicators, a study was carried out on whether and, if so, to what extent Polish industries were affected by the economic slowdown and how they coped with this problem in the following years. The applied research method were rankings based on indicators responsible for the characteristics of the structure of the industry and its effectiveness. The analysis was based on CSO data broken down by PKD 2007 for the years 2009, 2011, 2013 and 2015. These periods were to illustrate the changes that took place during the economic crisis, immediately after its completion, as well as in the recent period.

### **Industry as a unit of analysis of the effects of the economic crisis**

Over the years, economic sciences have evolved and changed, emphasizing different levels of analysis. The flagship division of analysis units is the division into micro – and macro-economic levels referring to enterprises and to the economy as a whole, respectively. However, there are also intermediate levels – such as, for example, mesoeconomics focusing its attention on industries and regions, the micro-micro level, which refers to individual decisions of individuals (e.g. agents in the company), and its reverse pole, i.e. the global level. Mesoanalysis makes it possible to combine the micro- and macroeconomic perspective, while at the same time distinguishing the common parts called industries that function parallel to each other, creating the whole economy (Gorynia 1995). As it often happens when defining phenomena and terms, it is difficult to find an unambiguous definition of an industry in the literature. Separation of the *industry* is connected with the concept of *delimitation*, i.e. defining of boundaries forming a certain part of the economic system (Jankowska 2002).

Referring delimitation to the notion of industry, its vertical and horizontal dimension should be recalled. In the vertical dimension, delimitation will mean the location of the industry between micro and macroeconomic analysis. In this understanding, industry is a certain subsystem of the national economy, integrating enterprises and other market actors, e.g. institutions. On a horizontal level, delimitation causes more controversy. Quite apart from geographical issues, which can be solved in a rather logical and obvious way<sup>1</sup>, Marshall (1972) declared that differentiation should be based on the homogeneity of production technology. Over time, however, it turned out that a purely supply-side view may not be sufficient. There are substitutable products on the market which are not produced using the same technology. Looking at the industry from the demand side, it is emphasized that they should be created by those companies that offer a product or service satisfying the same need, regardless of the technological process (Jankowska 2002).

The delimitation of the industry becomes more difficult as the boundaries between industries become blurred with technological progress. Thus, it is difficult to determine whether a given company belongs to one or the other industry, or is in fact present in several industries at the same time, because its products are intended for different purposes.

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<sup>1</sup> There are three main geographical divisions: administrative, physico-geographical and economic-spatial (Secomski 1982). The administrative criterion refers to territorial units distinguished in a given country. The physico-geographical criterion is based on common natural features of a given region regardless of administrative affiliation. The economic and spatial criterion refers to the historical context or social development.

Therefore, it is difficult to find unambiguous criteria for defining and distinguishing industries in various studies and statistical databases.

In the European Union, a common classification based mostly on the Marshall definition has been introduced. On the basis of this classification, aggregates with four levels of detail have been created. The classification of economic activities is done by means of NACE Rev. 2 codes and previously NACE Rev. 1.1. It consists of 21 activities identified by alphabetical letters. Within each section, detailed breakdowns, including divisions, groups and classes are distinguished. It is mandatory for all members of the European Union, but national equivalents of the NACE classification may be introduced. Poland has a PKD 2007 classification based on NACE. In this context, the classes correspond to Marshall's understanding of the industry.

Assuming that the effects of the economic crisis were not significant at the macroeconomic level, it is worth looking at whether they are visible at the lower level of analysis of the industries. The fact that the economy as a whole has not been affected by the crisis does not mean that industry conditions have remained unchanged. Therefore, the analysis of these interdependencies at the mesoeconomic level has been carried out in further deliberations.

## **Methodology**

This analysis presents a replica of a quantitative study on the impact of the economic crisis on the situation of Polish industries (Dzikowska, Gorynia, Jankowska 2016). The original research was conducted on the basis of the Central Statistical Office database and was conducted both at the macroeconomic and partially mesoeconomic level (only section C of the PKD). The replica of these studies at the level of all industries is aimed at detailing the results obtained, as it will cover all sections of economic activity and not only section C, and it will concern not divisions according to PKD 2007, but classes, which in this publication are identified with industries<sup>2</sup>. One change was applied in relation to the original study - the year 2009 was chosen for the year representing the economic crisis, but year 2011<sup>3</sup> was chosen for the prosperity instead of 2012. The aim of this change was to check how quickly individual industries managed to combat the negative effects of the crisis. The analysis was also

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<sup>2</sup> The data was obtained courtesy of the owner of the PontInfoGospodarka database, who aggregates the data of the Central Statistical Office (GUS) to the level of economic activity grouped in accordance with PKD 2007.

<sup>3</sup> In 2011, there was a clear economic growth and a halt to the rise in the unemployment rate in Poland.

supplemented by two further time points, namely 2013 and 2015, to verify whether the effects of the weakening were of a long-term or short-term nature.

The classification of facilities was carried out using a synthetic measure including the following single variables (cf. Dzikowska, Gorynia, Jankowska 2016):

- number of employees expressed in thousands,
- revenues from all activities expressed in millions of zlotys,
- value of export revenues expressed in millions of PLN,
- net financial result expressed in millions of PLN.

These measures reflected the scale of the business, the efficiency of the industries and their level of internationalization. Variables were transformed as a percentage deviation from the initial state of year 2007, and only in the case of the net financial result as a difference in relation to the state in 2007<sup>4</sup>. The analysis was carried out for 338 classes<sup>5</sup> of activity, due to the lack or incomplete information in the case of other facilities. The survey covered 161 manufacturing industries, 105 service industries and 72 other industries.

### **Resistance of Polish industries to the effects of the economic crisis – research results**

In order to create a synthetic measure, the coefficient of variation of individual variables was checked, which exceeded the threshold of 0.2. Variables were considered as destimulus, and then transformed and standardized.

As a result of the rankings, it is possible to determine which industries have been hardest/weakly affected by economic turbulence (2009) and which industries have experienced the biggest/lowest problems returning to the situation before the economic crisis (2011). The analysis of dependencies in subsequent years (2013, 2015) made it possible to assess the short or long-term nature of these turbulences. Aggregation of data at the level of classes rather than divisions allows to determine whether there are significant differences within given groups, and the additional inclusion of services builds a more complete picture of the situation of the whole economy. Table 1. presents rankings (first 10 positions) for the situation in time and in the years following the end of the crisis. The presented data cover industries affected by the crisis both the most and the least. The higher the value of the index (in the range  $<0;1>$ ), the greater the scale of the impact of the crisis or adjustment difficulties.

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<sup>4</sup> Due to negative net financial results in some industries.

<sup>5</sup> In some cases, a group was used instead of classes because not all economic activities are fully disaggregated and the groups were the last possible reference point.

**Table 1. Situation of Polish industries during and after the crisis - industry rankings**

Year	2009		2011		2013		2015	
Industries least negatively changed compared to the pre-crisis period								
	PKD 2007	Indicator	PKD 2007	Indicator	PKD 2007	Indicator	PKD 2007	Indicator
1	72.2	0,21	72.2	0,39	72.2	0,19	72.2	0,17
2	01.19	0,38	26.12	0,57	75.0	0,58	75.0	0,57
3	64.99	0,45	52.21	0,58	52.21	0,63	52.21	0,59
4	75.0	0,55	64.99	0,59	64.99	0,66	74.1	0,64
5	28.96	0,58	75.0	0,61	95.21	0,67	82.99	0,65
6	52.1	0,65	35.14	0,62	72.1	0,68	62.02	0,66
7	60.2	0,65	82.99	0,64	74.3	0,68	31.03	0,68
8	10.85	0,69	74.3	0,65	82.99	0,69	74.3	0,68
9	72.1	0,69	31.03	0,65	26.12	0,69	26.12	0,69
10	66.22	0,69	46.52	0,66	74.1	0,69	72.1	0,69
Industries most negatively changed compared to the pre-crisis period								
	PKD 2007	Indicator	PKD 2007	Indicator	PKD 2007	Indicator	PKD 2007	Indicator
1	52.23	0,90	50.2	0,91	52.23	0,90	18.11	0,89
2	26.11	0,89	46.24	0,90	26.11	0,90	28.11	0,88
3	20.15	0,85	26.11	0,89	10.85	0,90	52.23	0,87
4	23.11	0,85	18.11	0,88	46.23	0,90	21.1	0,87
5	24.51	0,85	52.23	0,88	50.2	0,89	46.23	0,87
6	13.93	0,85	23.62	0,88	09.9	0,89	10.85	0,87
7	14.14	0,85	63.99	0,88	38.31	0,89	19.1	0,86
8	28.91	0,84	43.32	0,87	08.12	0,89	09.9	0,86
9	50.2	0,84	14.14	0,87	46.43	0,88	23.32	0,86
10	24.34	0,83	46.41	0,87	21.1	0,88	10.42	0,86

Source: own elaboration based on PontInfoGospodarka data.

Academic research and development work in the field of social sciences and the humanities were the least affected by the crisis in the whole analysed period. (72.2). More differentiation could be seen in the subsequent ranking positions where, during the crisis (in 2009), 'other non-perennial agricultural crops' were ranked. (01.19), but which in subsequent years had problems returning to the state of 2007 (the values of indices are 0.73; 0.79; 0.76, respectively). Among the industries doing well both during and after the crisis, non-production industries prevailed (except for the production of printed circuit boards 26.12).

In the second part of the ranking of the industries most affected by the crisis and struggling to counteract its effects was dominated by manufacturing industries, although the most „affected” industry in 2009 turned out to be the „service activity supporting air transport”. (52.23). There were also visible significant difficulties of the industry in combating the effects of the crisis both in the prosperity period (2011), as well as in 2013 and 2015. Interestingly, although in 2009 the crisis affected the most manufacturing industries (8 out of 10 positions in the ranking), in subsequent years these industries managed to

significantly improve their position at the expense of non-production industries. In 2011 and 2013, only 2 manufacturing industries were identified in the ranking of the worst-performing industries, and 3 manufacturing industries were identified in 2013.

## Summary

Although Poland, as an economy, has not experienced many negative effects of the economic crisis, which could be observed in other European countries, the consequences of the economic slowdown are much more visible in terms of the industry. In 2009, the crisis mainly affected manufacturing sectors, and in smaller ones other types of activity. However, combating the effects of the crisis on these manufacturing sectors did not turn out to be very burdensome. „Production of electronic components” was relatively the most problematic. (26.11), which in the analysed period was among the top 20 industries most affected by economic turbulence.

Depending on the type of industry, some factors influenced them differently (e.g. number of employees, net financial result). The generated net financial result significantly deteriorated, which pertained to about 70% of service and manufacturing industries, causing a decrease by 15% and over 30% in relation to 2007. Other industries experienced a slight increase in this ratio, which amounted to about 3%. The export revenues were positive, they increased on average by 2% in the whole economy. The number of employees decreased by approx. 6% in manufacturing industries, increased by approx. 4% in the service industries, and the remaining employees remained at the level of 2007. In the analyzed period, revenues grew in the whole economy – by about 5% in manufacturing industries, by about 11% in service industries, and by as much as about 17% in the remaining industries. In the following years, practically all analysed ratios improved, with the highest positive change in export revenues of manufacturing industries and the lowest in net profits generated.

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