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SYNCHRONISATION OF REGIONAL BUSINESS CYCLES OF EASTERN POLISH PROVINCES WITH THE NATIONAL CYCLE IN THE CONTEXT OF REGIONAL ECONOMIC STRUCTURES

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K e y w o r d s: region, business cycles, structural changes.

A b s t r a c t

The objective of the article is to determine the degree of regional variation among provinces located in so-called Eastern Poland. The criterion for such variation is the structure of the generated GDP and the course of fluctuations in business cycles related to it. The analysis of economy structures in such provinces, as well as application of band-pass filters, used for separating the course of cyclical fluctuations, enabled the evaluation of the degree of structural discrepancies and business cycle discrepancies in five examined provinces. The analysis of cycle morphology in a regional perspective confirmed significant discrepancies in the course of the business cycle fluctuations in comparison to the cycle for Poland in general. The relation between the structure of the generated regional product and its co-convergence with the reference cycle is also visible. Regions characterised by a much higher or much lower share of agriculture in the GDP show different sensitivity to business cycle changes. Furthermore, these regions of Eastern Poland which have industries with a clearly pro-export nature (Warmia and Mazury, Podlasie and Podkarpackie) retain their separate character in the course of the fluctuations of the business cycle, differing from other regions included in the examined area of the country.

SYNCHRONIZACJA REGIONALNYCH CYKLI KONIUNKTURALNYCH WOJEWÓDZTW POLSKI WSCHODNIEJ Z CYKLEM KRAJOWYM W KONTEKŚCIE REGIONALNYCH STRUKTUR GOSPODARCZYCH

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S ł o w a k l u c z o w e: region, cykle koniunkturalne, zmiany strukturalne.

Abstrakt

Celem artykułu jest określenie stopnia zróżnicowania regionalnego województw zaliczanych do tzw. Polski Wschodniej. Kryterium tego zróżnicowania stanowi struktura wytworzonego PKB oraz związany z tym przebieg wahań koniunkturalnych. Analiza struktury gospodarek tych województw oraz zastosowanie filtrów pasmowo-przepustowych służących wyodrębnieniu przebiegu wahań cyklicznych umożliwiły ocenę stopnia rozbieżności strukturalnych i koniunkturalnych pięciu badanych województw. Analiza morfologii cykli w ujęciu regionalnym potwierdziła znaczne odstępstwa przebiegu wahań koniunkturalnych od cyklu dla Polski ogółem. Widoczny jest także związek między strukturą wytworzonego produktu regionalnego a jego zbieżnością z cyklem referencyjnym. Regiony charakteryzujące się znacznie wyższym bądź niższym udziałem rolnictwa w PKB wykazują odmienną wrażliwość na zmiany koniunkturalne. Ponadto te regiony Polski Wschodniej, w których są zlokalizowane branże przemysłu o wyraźnie proeksportowym charakterze (warmińsko-mazurskie, podlaskie, podkarpackie), zachowują odrębność w przebiegu wahań koniunktury gospodarczej – jest on inny niż pozostałych regionów zaliczanych do badanego obszaru kraju.

Introduction

Eastern Poland is the most significant problem area of national importance. Historical, social and economic determinants, system transformation and location along the external border of the European Union have determined the development of this area. It is commonly accepted that the area of five provinces of Eastern Poland is characterised by a low level of economic consistency (measured by the Gross Domestic Product per inhabitant), as well as low social and territorial consistency. Differences in the level of economic development of eastern regions of Poland are also reflected in the course of business cycles, which are also a derivative of the economic structure. A relatively lower degree of industrialisation in comparison to the average value for Poland, and a relatively greater share of agriculture in the GDP, as well as greater significance of trade contacts with the neighbouring countries (the so-called local border traffic) determine the basis for differences in the course of business cycle fluctuations in these regions.

Theoretical Bases of Regional Business Cycles

The issue of regional business cycles is significant for at least two reasons. The first of them is the issue of the subjectivity of regions as independent economic entities within national states. Familiarity with the current status of the economic situation via indications of a regional business cycle barometer provides the regional authorities with a basis for making economic decisions at a regional level. The second reason for the significance of undertaking the issue of regional business cycles is the impact of the fiscal policy conducted at the

national level and the monetary policy conducted at the supra-national level[1]. Lack of coordination between the above-mentioned policies and the course of regional business cycles may lead to the emergence of so-called asymmetric shocks and a negative impact of economic policy on the situation in individual regions.

The literature, with respect to the issues discussed in the article, is not uniform in relation to processes occurring within national states or economically integrated areas. ARTIS and ZHANG (1997) claim that the European business cycles became more synchronised among more developed EMU members (ARTIS, ZHANG 1997, p. 6, BARRIOS, LUCIO 2003, p. 4). Furthermore, there is a process of cyclical convergence among EMU members in comparison to the European periphery (BEINE et al. 2003, p. 229). It was noted that in certain „peripheral" countries, the degree of synchronisation of business cycles increased (MARELLI 2006, p. 158). At the same time, there was an increase in the level of cyclical convergence of the border regions of member states, which is related to the implementation (between 1979 and 1992) of the ERM, whereas the level of regional synchronisation within the scope of the EU member states was lowered (FATAS 1997, p. 6).

The presented results of studies conducted by other authors indicate that there is no uniform evidence with respect to a correlation of cyclical fluctuations in a regional perspective (HARDING, PAGAN 2001, p. 31). An example in this case may be provided by Greek regions, which show a decreasing degree of synchronisation in time (MONTOYA, DE HAAN 2007, p. 12).

The problem of asymmetry of economic shocks experienced by the regions is also one of the optimum currency area criterion. In the literature it is pointed, that business cycles across countries (regions) within an „optimum" currency area should not be out of phase (MCKINNON 2002, p. 343). The aspect of asymmetry of economic shocks, after creating the euro-zone have been studied among euro area member states. The issue of symmetry business cycle fluctuations is important in the context of supra-regional (and national) monetary policy. Moreover, if fiscal policy is subject to strict controls and harmonization at a supranational level, according to the theory of optimum currency areas the effects of the use of such instruments should be predictable and similar to across the common currency area (FRENKEL, NICKEL 2002, p. 6).

From the point of view of the theory and criteria of the OCA, as important as the fact of shock it is the way to respond to any disruption, as determined by effectiveness of the union economic policy instruments. If in one country the

[1] Even though this does not yet refer to Poland, which is still outside of the euro-zone, this issue should be taken into account in the perspective of the introduction of the European currency.

effects of the shock will be positive, otherwise negative, harmonization of economic policies would be senseless (WEIMANN 2003, p. 4).

In the literature on the subject there are two trends in view with respect to the international and intra-regional effects of intensifying economic integration. The first tendency is represented by Marelli, who claims that economic integration leads to symmetrical changes which, in turn, result in more synchronised business cycles, both in the national and in the regional perspective (MARELLI 2006, p. 176). The second concept derives from the work of P. KRUGMAN (1991), who expresses the view that economic integration entails an increase in the regional concentration of industrial activity, which, in turn, leads to sectoral or even regional shocks, increasing the probability of asymmetric shocks and divergent business cycles (CAMACHO et al. 2006, pp. 17–19, KRUGMAN 1991, pp. 483–498, 1993, pp. 242–244).

In his studies, Paul Krugman proves that economic integration in a regional perspective leads, to a greater degree, to a polarisation of development rather than to its unification. This happens as a result of external effects occurring within a single currency area, production scale economy and dynamic, in comparison to the neighbouring areas, and the development of metropolitan areas (KRUGMAN 1991, pp. 486–487). The analysis conducted by Krugman had a comparative nature' EU regions were compared to analogous administrative units in the United States. The main conclusion from Krugman's model is that the introduction of a single currency area may result in an increase in the degree of convergence of business cycles on the level of states, with a simultaneous increase in the range of divergence on the regional scale (CORREIA, GOUVEIA 2013, p. 92).

According to the second concept, proposed by FRANKEL and ROSE (1996), as a result of the elimination of economic barriers among countries and regions of a single currency area, the trade exchange intensifies. A direct effect of this process is, in the opinion of the authors, an increase in the level of synchronisation of cyclical fluctuations. An additional factor contributing to synchronisation of the course of business cycle fluctuations is the implementation of a common economic policy in an integrating area. The difference in the approach to the effects of the created optimum currency area consists in the formulation of the opinion that positive results in this respect will be revealed ex-post, i.e. as a result of the conduct of a common currency policy or the introduction of a single currency (FRANKEL, ROSE 1996, p. 21).

The review of the literature presented above shows that the behaviour of regional economies is not universal, and depends on the specific nature of the countries and regions that function within them. Thence, a question emerges about the course of the discussed process in Polish regions functioning as NUTS 2 areas (provinces) in the EU nomenclature.

Study Methodology of Regional Business Cycles in Eastern Poland Between 2000 and 2015

The objectives of the study are the morphological features of regional business cycles, represented by 16 administratively separate local government units, i.e. provinces. The point of reference is provided by the business cycle morphology for the country in general. The time range of the analysis encompasses a dynamics series of industrial production in a monthly cross-section for the period from January 2000 to May 2015. The selection of such a range is dictated by the availability of comparable statistical data. The period of 16 years also offers the possibility of separating several complete business cycles, as well as the possibility of evaluating differences in their morphological structure.

The bases of research in this study are growth cycles (DROZDOWICZ-BIEĆ 2012, p. 15). This method allows for the identification of business cycles in a situation when there is a period of extended growth and the amount of statistical data is limited.

An important aspect related to the empirical analysis of business cycle fluctuations is the optimum selection of indices which form a basis for evaluating the morphology of economic cycles. In relation to this, the literature indicates two main criteria to which economic variables should be subjected, i.e. the economic significance of variables, and formal and statistical features of time series (ZARNOWITZ, BOSCHAN 1997, p. 7, BARCZYK, KRUSZKA 2003, p. 40).

Taking the above determinants into account, data regarding industrial production and employment were used for the empirical analysis' in the literature on the subject such data are treated as key variables for analysing business cycle fluctuations of the phenomenon. Furthermore, the analysed empirical series comply with the second postulate formulated in the literature, i.e. (BARCZYK, KRUSZKA 2003, p. 41, MATKOWSKI 1998, p. 69).

– publication frequency: analysis of business cycle morphology requires data in monthly or quarterly intervals;

– sensitivity to business cycle changes and representativeness for the analysed area of the economy (sectoral or synthetic data);

– comparability of data in time: refers to uniform rules of aggregation of synthetic variables and uniformity of index construction methods.

The first stage of the analysis of business cycle fluctuations is the elimination of seasonal fluctuations from raw time series. Among the most commonly used methods of seasonal levelling is the TRAMO/SEATS method, recommended by Eurostat (GRUDKOWSKA, PAŚNICKA 2007, pp. 8, 9).

For the purpose of separating a cyclical factor from the previously deseasonalised empirical data with the use of the TRAMO/SEATS method, the

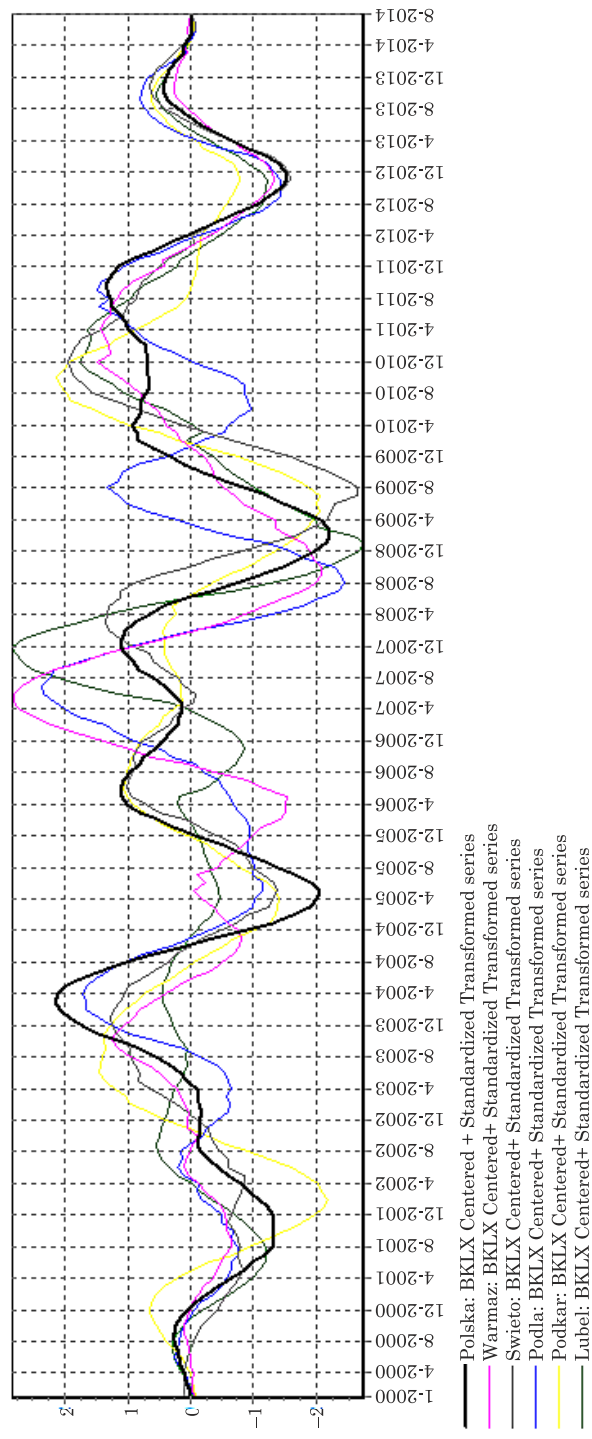

Fig. 1. Cyclical fluctuations in researched regions in the context of Poland business cycle

Source: own elaborations based on: Monthly reports on the socio-economic situation of dolnośląskie, kujawsko-pomorskie, lubelskie, lubuskie, łódzkie, małopolskie, mazowieckie, opolskie, podkarpackie, podlaskie, pomorskie, śląskie, świętokrzyskie, warmińsko-mazurskie, wielkopolskie and zachodniopomorskie voivodship, Local Data Bank, Regional Statistical Office.

Christiano-Fitzgerald asymmetrical filter was used, which enables the procurement of cycle evaluation at the beginning and at the end of a time series (ADAMOWICZ et al. 2008, p. 12), whereas the process of marking turning points relies on the Bry-Boschan method (ADAMOWICZ et al. 2008, p. 13). Analysis of the morphological features of business cycles utilizes measures of variability and dispersion, i.e. the measure of the length of individual phases and cycles, standard deviation, the variability factor, amplitude and intensity factors, and analysis of cross correlations. On the basis of the obtained results, an analysis of the morphological features of industrial production and employment was conducted in five regions of Eastern Poland.

Table 1

Added gross value according to types of activity and selected provinces in 2012 (in %)

Provinces	Total	Agriculture, forestry, hunting, fishing	Industry	Construction	Trade, repairs, transport, accommodation	Financial and insurance activity	Other
POLAND	100	3.1	26.2	7.9	29.8	8.8	24.3
Lublin	100	5.9	20.7	7.4	28.8	9.9	27.3
Podkarpacie	100	1.9	28.2	8.1	28.5	8.2	25.1
Podlasie	100	7.8	20.3	7.6	28.9	8.7	26.7
Świętokrzyskie	100	4.1	26.1	9.4	28.1	7.6	24.7
Warmia and Mazury	100	6.9	24.7	7.9	25.4	8.2	26.8

Source: *Gross Domestic Product...* 2014, p. 66, 67.

The analysis of the regional product structure allows for evaluating the scale of variation among profiles of regional economies of the examined provinces. Typically, agricultural regions include: Podlasie, Warmia and Mazury, and Lublin. Podlasie and Lublin are also provinces with a definitely lower share of industry in the GDP. In the GDP structure of the Lublin Province, the mining and chemical industry is dominant, whereas in Podlasie – the agricultural and food industry, timber and the machine industry. In the Świętokrzyskie Province, the share of agriculture is similar to the national average, whereas the share of the construction industry is higher in comparison to other examined regions. On the other hand, in Podkarpacie, the share of agriculture is smallest, whereas the share of industry is greatest among the provinces of Eastern Poland. The following industries are dominant: aviation, electrical machines, chemicals and food. The above list may constitute an assumption for clarifying the diversified course of business cycle fluctuations in the examined regions. The analysis of the morphology of business cycle fluctuations allows for the evaluation of the sensitivity of individual provinces of Eastern Poland to changes in the international and domestic business outlook.

Analysis of Business Outlook in Eastern Polish Regions Between 2000 and 2015

As mentioned above, the analysis of changes in the business cycles of Eastern Poland's economy is determined in the dimension of the country's functioning in the present administrative division, thence since 1999. Up to the present moment (i.e. the beginning of 2015), there have been three interesting events, from the point of view of morphological analysis, which have influenced changes in the business cycle in the regions. The first event was a short-term recession between 2001 and 2002, which occurred all over the world. The second event, this time with the nature of a positive shock, was Poland's accession to the European Union. The last, but the most visible in the course of the economic activity of the country and the regions was the world economic and financial crisis between 2008 and 2013.

Table 2
Statistics of cyclical factor in industrial production in Eastern Polish regions in relation to the reference series of industrial production of Poland

Time series	Coherence ratio	Mean delay	Cross correlation		
			r_0	r_{max}	t_{max}*
Lublin	0.48	0.14	0.68	0.70	1
Podkarpacie	0.58	-0.02	0.75	0.75	-1
Podlaskie	0.31	0.31	0.54	0.60	2
Świętokrzyskie	0.62	-0.23	0.77	0.82	-2
Warmia and Mazury	0.32	0.31	0.54	0.65	4

* Explanation: values + (-) mean lead (lag) expressed in months in relation to the reference series.
Source: author's elaborations based on: Monthly Reports on the socio-economic situation of dolnośląskie, kujawsko-pomorskie, lubelskie, lubuskie, łódzkie, małopolskie, mazowieckie, opolskie, podkarpackie, podlaskie, pomorskie, śląskie, świętokrzyskie, warmińsko-mazurskie, wielkopolskie and zachodniopomorskie voivodship, Local Data Bank, Regional Statistical Office, http://stat.gov.pl/bdl/, download date: 11.05.2015.

In reference to the first of the above-listed periods, i.e. the years 2001–2002, observations of fluctuations in industrial production in the examined regions testify to their diversified sensitivity to this period of world recession. This refers to the length of the slowdown and its depth. Among Eastern Polish provinces, i.e. Warmia and Mazury, Podlasie, Lublin, Podkarpacie, and Świętokrzyskie, no recession was recorded in the first and the last of the above-listed provinces[2]. In other regions the dynamics of industrial production

[2] In line with the definition, the period of recession means a drop in production for at least two consecutive quarters. Cf. Drozdowicz-Bieć (2008, p. 9).

were negative for at least several months, yet it may be said that the recession had a rather shallow and short-term nature.

Table 3

Intensity of industrial production series in individual provinces of Eastern Poland between 2000 and 2015

Time series	Standard deviation [points]	Variability index [%]	Average amplitude [%]		
			of growth stages	of drop stages	of cycles
POLAND	8.0	7.4	23.6	21.5	2.1
Lublin	25.2	23.1	39.4	35.1	4.3
Podkarpacie	9.8	9.2	23.6	21.1	2.5
Podlasie	8.7	8.0	16.1	17.3	-1.2
Świętokrzyskie	17.2	15.9	27.4	25.1	2.3
Warmia and Mazury	13.1	12.2	23.0	24.9	-1.9

Source: As in table 2.

In Eastern Polish provinces where no drop in industrial production was recorded between 2001 and 2002, but only a slow-down in the growth rate, the Podlasie Province characterised the highest growth dynamics[3]. On the other hand, the greatest drops in the volume of production in the analysed period were recorded in Lublin and Podkarpacie.

When analysing the first period of the economic crash between 2001 and 2002, it is possible to perceive a delay of Eastern Polish regions with respect to the general results for Poland as far as the beginning and the end of this crisis is concerned. Among the discussed provinces, the first symptoms of the crisis reached Lublin the earliest. On the other hand, the effects of the slowdown were manifested latest in Warmia and Mazury, and Świętokrzyskie. Podlasie was the Eastern Polish province where the end of the drop stage was recorded first.

The values of the coherence index provide information about the level of the adjustment of cyclical variability of industrial production in the analysed regions to the course of the analogous time series in the scale of the entire country[4]. Eastern provinces are characterised by an average level of adjustment within the scope of cyclical fluctuations. Podkarpacie and Świętokrzyskie had the highest indices. The remaining provinces, i.e. Warmia and Mazury,

[3] To evaluate the effects of the crisis between 2001 and 2002, the increase in industrial production was measured with respect to its value in January 2000.

[4] The value of the coherence index determines the value of R^2 adjustment in regression between two time series.

Podlasie, and Lublin, were characterised by the lowest level of adjustment to the reference series. This can be justified by the structures of regional economies, which are most divergent with respect to the national average, with a high share of agricultural production and agricultural and food processing. Świętokrzyskie, presenting the highest level of adjustment to the national cycle, has a high share of construction articles production, whereas Podkarpacie is a region where agricultural production is supplemented by high technology industries located in the Mielec Special Economic Zone.

Analysis of convergence in business cycle fluctuations was also conducted with the use of the simultaneous correlation index and the phase shift with respect to the reference series. For the examined regions, the value of the correlation index oscillated around the level of 0.5, with the value of 0.8 for provinces most correlated with the average value for the country. It is also worth drawing attention to the value of lead or lag with respect to the reference series. All the examined provinces showed phase shifts with respect to the reference series. In the case of Świętokrzyskie and Podkarpacie, there was a 1-month lag on average. The other regions showed leads ranging from 1 (Lublin), 2 (Podlasie) to 4 months (Warmia and Mazury). The two last regions have strong economic relations with the EU countries as a result of the export of a significant part of the regional production.

The second visible period in the change of the business cycle was the growth period directly resulting from Poland's accession to the EU in May 2004 and the decrease phase recorded afterwards. In the scale of the country, the growth effect was noticeable in the period between July 2003 and March 2004, whereas afterwards there was a drop in economic operation lasting until May 2005; however, the overall effect of the so-called „EU shock" was positive.

Table 4

Analysis of industrial production series in provinces in relation to the reference series between 2000 and 2015

Average duration of phases and cycles (in months)				
Reference series	PT	PP	TP	TT
POLAND	12.8	32.75	20.75	32.75
Lublin	12.83	24.20	14.20	26.40
Podkarpacie	24.00	38.64	15.67	42.33
Podlasie	11.80	27.00	15.20	26.20
Świętokrzyskie	16.75	27.00	14.75	30.75
Warmia and Mazury	15.00	29.75	17.50	32.75

Explanations: PP – a business cycle defined by upper turning points, TT – a business cycle defined by bottom turning points, TP – the upward phase of the cycle, PT – the downward phase of the cycle.
Source: As in table 2.

In spite of the positive impact of accession to the EU, not all provinces recorded a positive increase in industrial production dynamics. In three out of the five examined provinces it is not possible to observe the so-called „EU effect" in the form of higher industry dynamics. These were the following regions: Lublin, Podkarpacie, and Podlasie. Agricultural regions of Eastern Poland were not marked by positive reactions at the moment of accession on account of the smaller significance of the industry, which was present earlier in the form of export on the markets of third countries. In the majority of provinces which showed the shock effect of joining the EU the growth phase resulting from acceleration of production was higher than the slowdown phase as a result of the disappearance of the discussed effect. In Warmia and Mazury, where the EU shock effect was smallest, an increase of production was recorded at the level of 12%, and later there was a similar drop in production in the recession phase.

The third period analysed in the article which is visible in the amplitude of fluctuations of industrial production was the global economic and financial crisis which began in 2008. Even though in the analysis of turning points it is described in a two-phase form, on account of a short gap between two troughs and a relatively slight recovery in 2011, it may be treated as one period of the collapse of industrial production in the economy.

In the perspective of the entire economy, the period of the last financial and economic crisis became visible in the greatest drop in the volume of industrial production which, in relation to the long-term trend, amounted to 9% in February 2009, whereas in comparison to the value from the most favourable business situation, it remained at the level of 20%. The beginning of the drop phase in the scale of the entire country was recorded in December 2007. Similarly to previous crises, there was diversification among provinces with respect to the beginning of the collapse and the period of transfer from the drop phase to the recovery phase.

The period of decrease in the industrial production dynamics occurred first in Podkarpacie, where the drop phase began as early as in mid-2006 and lasted until mid-2009. In Warmia and Mazury and in Podlasie, the beginning of the drop phase began five months before the change in the reference cycles, shortly after the brief recovery related to the „EU effect", and lasted until the 4th quarter of 2008. In Świętokrzyskie, the breakdown period started with a three-month delay, whereas in Lublin – simultaneously with the reference cycle.

The greatest breakdown in industrial production took place in the Lublin Province. In comparison to the long-term trend, production dropped by 22%, whereas in comparison to the value for the peak of prosperity, which happened in December 2007, there was a drop in production by 62%. Among the other examined provinces, which showed the greatest sensitivity to the global

economic crisis, one can include Świętokrzyskie (-14%), Podkarpacie (-9%), and Warmia and Mazury (-8%). On the other hand, the economy of Podlasie (-5%) showed the greatest resistance to the drop in prosperity related to the last global economic and financial crisis.

Recapitulation

Analysis of the variability of the economic situation in individual regions has great importance in the context of introducing a proper regional policy that stimulates equal development of the entire region. It is also important during the redistribution of EU funds in a territorial layout. If the decentralisation process of economic policy is going to increase, monitoring the course and the specific nature of business cycle fluctuations enables proper reactions to changes in business cycles in regions.

When evaluating the course of business cycle fluctuations in regions between 2000 and 2015, it is possible to formulate the conclusion that this course is not uniform and is subject to various determinants. Regions show diversified sensitivity to „shocks" occurring in the economy, both positive and negative. In spite of a few exceptions, it is possible to observe a correlation between the low level of the region's development and the degree of sensitivity to the above-mentioned economic disruptions. The regions of Eastern Poland, with their different structure of regional production, show numerous divergences with respect to the reference cycle. This is confirmed by the analysis of cycle morphology in the regional perspective. The example of the analysed provinces also shows the relation between the location of the region and its convergence with the reference cycle. In general, it may be stated that regions located in the eastern part of the country show a lesser synchronisation with the business cycle of Poland. This results from a higher share of agricultural production, which is subject to specific business cycle fluctuations, and lower sensitivity of the agricultural and food industry to drops in demand. Furthermore, those regions of Eastern Poland that have industries with a clearly pro-export nature (Warmia and Mazury, Podlasie, Podkarpacie), retain their separate nature during the course of the business cycle fluctuations. On average, it is also possible to observe lower development dynamics of regions that are economically less diversified; in an economic crisis, such regions are exposed to a greater degree to production drops, not only in the relative perspective, but also the absolute one. Lublin Province was such a province among the discussed regions.

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Annex 1

Analysis of turning points of Eastern Polish regions in relation to the reference series (industrial production in Poland)

Time series	Peak	Bottom	Peak	Bottom	Peak	Bottom	Peak	Bottom	Peak	Bottom	Number of additional cycles
POLAND	M8-2000	M9-2001	M3-2004	M5-2005	M6-2006	M4-2007	M12-2007	M2-2009	M10-2011	M11-2012	
Lublin	-1	-2	+1	-1	-2	-5	0	-1	-10	0	1
Podkarpacie	+4	+5	-9	-1	0	–	–	+3	-12	0	-1
Podlasie	–	-2	+1	0	–	–	-5	-6	-1	-1	0
Świętokrzyskie	–	+8	-2	0	0	+2	+3	+5	-10	0	-1
Warmia and Mazury	+2	0	-5	-6	–	-11	-6	-4	-10	0	0

Source: As in table 2.