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Structural Changes in the Economy in the Light of the Neoclassical Approach. A Case Study: Spain and Poland

Cambios estructurales en la economía a la luz del método neoclásico. Estudio de caso: España y Polonia

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Resumen

Las economías de España y Polonia son comparadas a menudo debido a sus potenciales semejanzas en cuanto a extensión del país, población e importancia del sector rural. Sin embargo, los dos países están separados por una distancia de 18 años de diferencia en su ingreso en la UE. Esta diferencia tiene una influencia definitiva en la formación del mercado libre y sobre todo en la evolución de los cambios estructurales.

El problema que este artículo intenta plantear es la identificación de las trayectorias del desarrollo económico de ambos países teniendo como base la estructura tri-sectorial de las economías según las contribuciones del valor añadido realizadas por los sectores de agricultura, industria y servicios, suponiendo que estas estructuras han sido generalmente y aparentemente similares en la ultima década. También se pueden encontrar fácilmente similitudes en el nivel de paro en algunos periodos. No obstante, las vías para obtener el desarrollo económico fueron bastante diferentes y llevaron a las resultados distintos.

La transformación de la economía española se ha llevado a cabo ante todo a través de los cambios profundos de productividad en agricultura, mientras el motor de la transformación polaca ha sido la industria. En los dos países las relaciones aporte gastos de capital y empleo fueron completamente diferentes, al igual que los cambios de productividad de capital y de trabajo. En definitiva, el desarrollo económico estudiado desde punto de vista de los factores tradicionales muestra un aspecto diferente entre España y Polonia.

Para definir los factores que diferenciaron las dos trayectorias del desarrollo usamos un método neoclásico, teniendo en consideración el lado de la oferta mercantil. El estudio analiza tanto el volumen como la dinámica de los siguientes

parámetros: PIB real, nivel de empleo, inversiones en capital fijo, productividad total de las inversiones medidas por el residuo de Solow, la productividad del empleo y el valor del capital por empleado. En el caso de España el periodo analizado ha sido el comprendido entre los años 1980-2005 y en el caso de Polonia el de 1995-2005. Las series usadas en este estudio fueron obtenidas de las bases de datos del Eurostat y del OECD Economic Outlook.

Palabras clave: Desarrollo económico; Productividad; Estructura económica; Empleo.

Abstract

The Spanish and Polish economies are often compared due to their similar potential, as far as area, population and importance of the agricultural sector are concerned. However, the division created by an 18-year time distance between their EU accession fundamentally influences their experience of the market economy, as well as the extent and pace of structural changes.

The problem, which was posed in this article, in the context of comparative analysis, was identifying the paths of economic development of Spain and Poland, facing the fact that the three-sector structure of both economies, measured by the share in gross value added of agriculture, industry and service sector have been generally and apparently similar in the last decade. It is easy to find similarities, as far as high levels of unemployment are concerned, in some periods. However, their ways of achieving economic development are fairly different and lead to different results of effective character.

The Spanish economic transformation took place mainly as a result of deep, effectiveness changes in agriculture. The Polish economic transformation took place mainly in the industrial sector. In both countries there is a completely different picture of relations between labour and capital inputs, as well as tendencies in changes of labour and capital productivity. As a result, economic growth, if we look at it from the point of traditional growth factors, has a totally different picture in Spain and Poland.

In order to define the factors differentiating the economic development we used a neoclassical approach, taking into account the supply side of the economy. The research covers the dynamics and size of such parametres as: real GDP, employment, gross fixed capital formation, total factor productivity – TFP, measured by the Solow residual, labour productivity and value of capital per one person employed. The researched period comprises the years between 1980-2005 in the case of Spain, and 1995-2005 in the case of Poland. Time series used in the analysis come from the databases of Eurostat and OECD.

Keywords: Economic Development; Productivity; Economic Stucture; Employment.

JEL Classificación: O11; O14.

1. Introduction

In the contemporary global economy research into the paths of economic development of local economies continues to interest both economists and politicians. The Spanish and Polish economies are often compared because of their similar potential in terms of area, population and the importance of agricultural sector. Both countries are divided by a difference of 18 years between their entry to the European Union, which fundamentally influences their experience of the market economy, and the extent and pace of structural changes.

The problem, which was posed in this article, in the context of comparative analysis, was identifying the different paths of economic development of Spain and Poland.

The paper is divided into three parts. The first one focuses on presenting the main similarities and differences in the current economic structure of Poland and Spain, which was measured by the percentage of Gross Value Added of a particular activity in the whole economy. The economy is looked at from the point of view of a three-sectoral division into industry, agriculture and services. In the analysis of time series two time intervals were used: the first one entails 1980-2005, the second one 1995-2005. In the first case the aim is to show the development of the Spanish economy in the long term, in the second one, to make a comparative analysis of Spain and Poland, using the same statistical sources. As is well known, comparing economic data in the long term is not possible from the methodological point of view, since Poland only changed its economic system to a market economy in 1990, and practically since 1995 there has been adjustment of statistical systems to international standards. In the two research periods analysed especially important are time cesures such as: 1986 –Spain's EU accession and 2004– Poland's EU accession. As a background and a point of reference appropriate data for the whole EU for the period of 1995-2005 was used.

The second part focuses on presenting the paths to economic development, taking into account such indicators as: change in real GDP, Gross Fixed Capital Formation, GDP per person employed and TFP (total factor productivity,

measured by the Solow Residual). The choice of these factors is not accidental. Stemming from the neoclassical school, the methodology of calculating the so-called SR (Solow Residual) allows for assessment, in a given economy, of the role of factors other than traditional capital and labour. It is connected not only with widely understood technical progress but also with human capital and other factors, individually appearing in particular economies. Then, the indicators which partly let us interpret the rest of the factors are changes in labour and the capital productivity, and the unemployment rate. The occurrence of significant fluctuations in the unemployment rate in Spain and Poland was a characteristic phenomenon in the period researched. Synthetic indicators of contribution of the capital, the contribution of labour and the TFP growth rate for both countries were shown against the development of related amounts in the EU-25.

The third part shows the connection of sectoral analysis with the analysis of chosen indicators which were regarded as representative for the explanation of differences in the paths of development of Spain and Poland. Among those indicators we include: added production in industry, agriculture and services, labour productivity per person employed in industry, agriculture and services, employment in industry, agriculture and services and gross fixed capital formation per person employed. All the indicators were presented as total change for separate subperiods. The related quantities were also presented for the EU-25. The analysis of those quantities in a sectoral way and in division into subperiods lets us draw conclusions both about the differences in the use of particular growth factors in Spain and Poland, and about differences and time shifts. This in turn is a basis to identify the process of convergence. The above mentioned research approach has its advantages and limitations. On the one hand it enables us to use a single research method, regardless of the historical and political circumstances in both economies. On the other hand, there are limitations to the deepened interpretations which take into account specific development factors which occurred both in Spain and in Poland. Due to this fact the article is basically of a diagnostic character in the light of the use of a single procedure and research tool.

2. STRUCTURAL CHANGES AND CURRENT STRUCTURE OF ECONOMY IN SPAIN AND POLAND

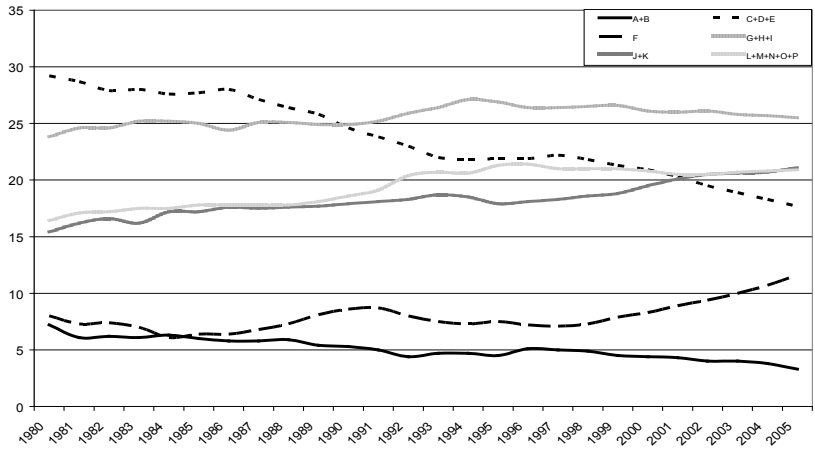
To analyse the sectoral structure of the Spanish and Polish economies, a measure of the percentage share of gross value added (GVA) in a particular sector activity was used. The sector division was done on the basis of Eurostat data. Statistical data is in accordance with NACE –Classification of Economic Activities in the European Community. To the preliminary analysis we agreed on the following division:

- A + B: Agriculture, hunting, forestry and fishing;
- C + D + E: Mining and quarrying + Manufacturing + Electricity, gas and water supply;

- F: Construction;
- G + H + I: Wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods + hotels and restaurants + transport, storage and communication;
- J + K: Financial intermediation + real estate, renting and business activities;
- L + M + N + O + P: Public administration and defence, compulsory social security + education + health and social work + other community, social and personal service activities + private households with employed persons;

The structure of economies analysed by such a methodology is presented in figures 1-3, where the first two figures relate to Spain in the long term (1980-2005) and the short term (1995-2005), and the third figure relates to Poland (1995-2005).

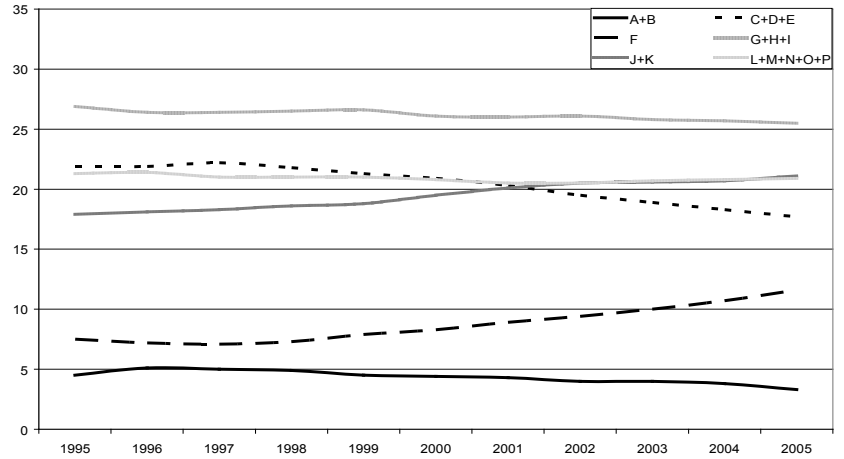
Figure 1: Percentage share of gross value added in Spain in years 1980-2005 –Six branches breakdown



Source: Own calculations based on Eurostat database.

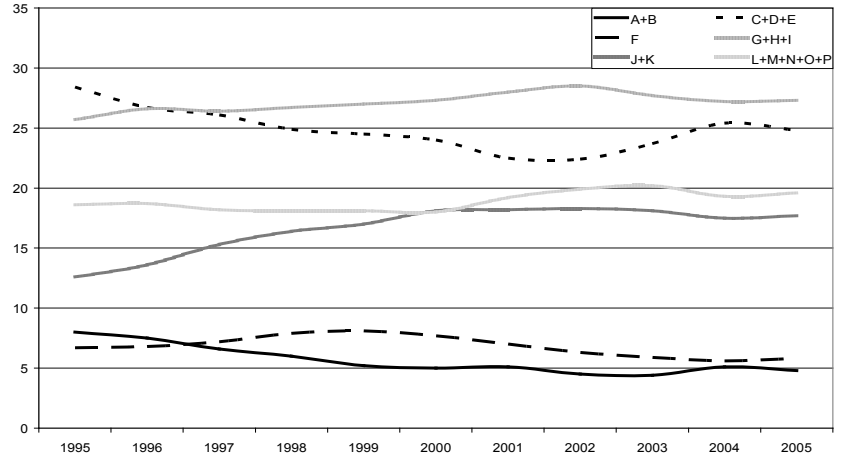
The analysis of GVA, generated by the six kinds of activities in the 25-year period, clearly shows that the more significant structural changes took place only after Spain's EU accession. It concerns mainly multidirectional changes in the construction industry (increasing trends) and in agriculture (decreasing trends). There is also a very clear constant falling trend of industry share, from about 30% in 1980 to around 17% in 2005. The other forms of activity are characterised by average larger dynamics of changes in the first decade after joining the EU, and then stabilisation of their position in creating total value added in the economy.

FIGURE 2: PERCENTAGE SHARE OF GROSS VALUE ADDED IN SPAIN IN YEARS 1995-2005 –SIX BRANCHES BREAKDOWN



Source: Own calculations based on Eurostat database.

FIGURE 3: PERCENTAGE SHARE OF GROSS VALUE ADDED IN POLAND IN YEARS 1995-2005 –SIX BRANCHES BREAKDOWN



Source: Own calculations based on Eurostat database.

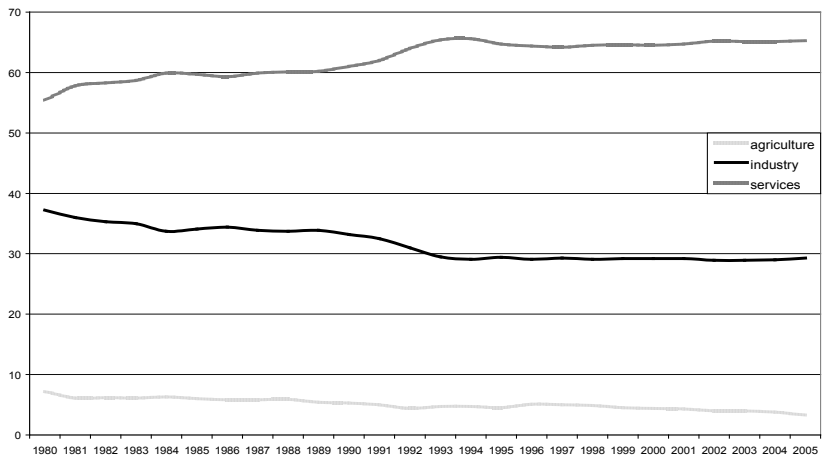
The same quantities for Spain related to a relatively shorter period, i.e. such which can be, due to statistical reasons, directly compared with the Polish

economy, indicate a more stable view of the structure. The most dynamic increase in the share of added production during this period was observed in the construction industry, while industry and agriculture showed a further, though slower, downward trend.

Against the background of changes in the Spanish economy, the changes in Poland, taking place in an analogous period were characterised by larger dynamics and fluctuations. Initially visible rising tendencies in the construction industry were hampered, and the falling trends of agriculture share stopped. There is no doubt that this is connected with the economic breakdown which occurred in Poland at the turn of the century, where the most spectacular example is the fall of industry share in creating this value. The improvement of economic conditions took place only in 2003, which coincided with the near prospect of Poland's EU accession in 2004.

In order to give the analysis a clearer character, in a further part we decided to join particular kinds of activities, shown in Figures 1-3, with the intention of a three-sectoral division of the economy into industry, agriculture and services. To do that, we aggregated the data from sectors A + B and called them the agriculture; sectors C+D+E+F and called them industry, while the rest of the sectors were included in the service sector.

Figure 4: Percentage share of gross value added in Spain in years 1980-2005 – Three sectors breakdown



Source: Own calculations based on Eurostat database.

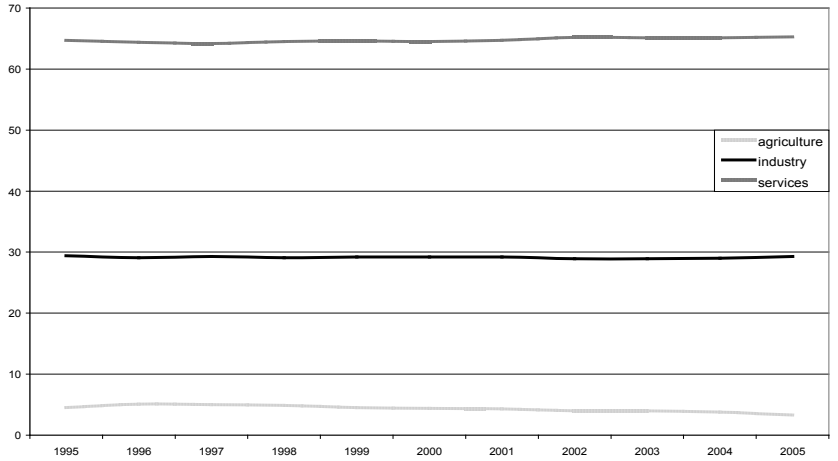
The structure with the share of industry, agriculture and services is shown in Figures 4-7. The sequence of presentation and analysis is similar as in the above analysis. Firstly, the short and long term changes in the Spanish economy are presented, followed by the Polish economy. The chosen point of reference

was data relating to average quantities for the EU-25 in the comparable period of 1995-2005.

Long term analysis conducted for Spain shows that the structure of its economy at the beginning and at the end of the researched period is different. In the whole period analysed there was an increase and general stabilisation (there still is a slight rising trend) of the service sector share, a fall and stabilisation of industry's share, while agriculture's share still shows a small but systematical decrease. One should notice that a clearer change in tendency was outlined only after 4 to 5 years after joining the EU, and the threshold changes took place in 1993/1994, starting its visible stabilisation. From this point of view, the Spanish economy can be seen as clearly a service economy with a systematic decrease of agriculture share in the total of value added.

In such a situation, it is obvious that taking the shorter period (1995-2005) will show exceptional stability of this structure and its shifts from industry sector and agriculture to the service sector (Figure 5).

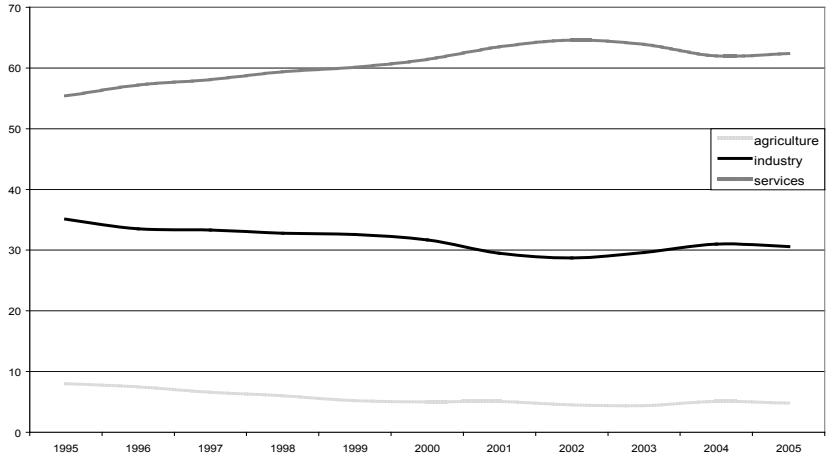
FIGURE 5: PERCENTAGE SHARE OF GROSS VALUE ADDED IN SPAIN IN YEARS 1995-2005 –THREE SECTORS BREAKDOWN



Source: Own calculations based on Eurostat database.

It is clearly visible that there is some difference between Spain and Poland. Comparing data from Figure 5 and 6 we can assume that basically, in the same research period between 1995-2005 there were more significant changes in Poland although also aiming at the service market economy model. The main changes in Poland took place in a several year period, before the EU accession.

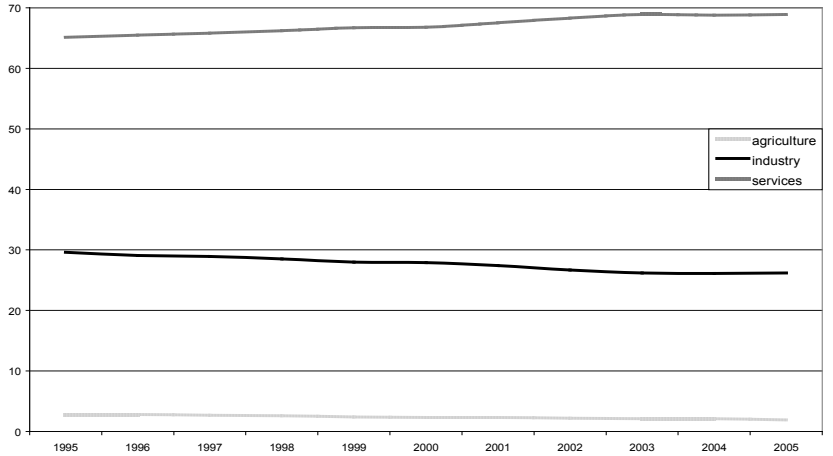
FIGURE 6: PERCENTAGE SHARE OF GROSS VALUE ADDED IN POLAND IN YEARS 1995-2005 –THREE SECTORS BREAKDOWN



Source: Own calculations based on Eurostat database.

Comparison of change tendencies from the sectoral point of view shows that agriculture sector share in creating GVA is distinctly weaker in Poland than in Spain and in the recent years it has been restrained.

FIGURE 7: PERCENTAGE SHARE OF GROSS VALUE ADDED IN EU-25 IN YEARS 1995-2005 –THREE SECTORS BREAKDOWN



Source: Own calculations based on Eurostat database.

It is the result of the extensive divergence of farms and of avoiding radical reforms of this sector for political reasons.

Comparing the change tendencies observed in Spain and Poland to the average quantities for the whole EU-25 (Figure 7) it is noticeable that in the EU as a whole in 2005, the share of particular sectors is similar as in Spain and Poland, in case of service and industrial sectors, the largest share being the service sector (around 70%), with much less in industry and a marginal share for the agriculture.

From a structural perspective, agriculture has a marginal role, but it is worth mentioning that in 2005, the percentage share of agriculture in GVA was twice as much in Poland as in Spain. The changes that we observe suggest the limit of increases in the share of service is being approached.

The analysis is supplemented by Table 1, which contains data relating to the share of particular sectors in Gross Value Added in Spain, Poland and the EU-25 in the analysed periods, taking into account important turning points connected with Spanish and Polish entry to the EU.

Comparing the moment of Poland's and Spain's EU accession (an 18-year difference) one can conclude that the share of agriculture in this crucial period in both countries was identical, and in Poland the share of the service sector was even larger than in Spain.

TABLE 1: PERCENTAGE SHARE OF GROSS VALUE ADDED ACROSS ECONOMIC SECTORS IN CHOSEN YEARS AND SELECTED ECONOMIES

	Spain			*Poland*			*EU-25*		
	A	I	S	A	I	S	A	I	S
1980	7,3	37,3	55,4	-	-	-	-	-	-
1986	5,8	34,6	59,6	-	-	-	-	-	-
1995	4,8	30,1	65,1	8,4	35,5	55,7	3,6	30,4	66
2004	3,8	30,6	65,6	5,8	31,7	62,7	2,7	26,7	69,5
2005	3,3	30,8	65,9	5,5	31,3	63,1	2,6	26,9	69,7

Source: Own calculations based on Eurostat database.

In 1995 in Poland, the share of agriculture was relatively high compared to the EU-25 average, with a low service sector share and a high level of industry share, however, the changes similar to the tendencies occurring in the EU took place.

In the dynamic approach, the most important differences relate to the period when important structural changes took place. In Spain it was a few years after entering the EU, and in Poland a few years before entering the EU. Really, the most spectacular changes (increase of service sector and decrease of industry share in GVA) were initiated in Poland with a ten-year delay, compared

to Spain. However, while in Spain the tendencies stabilized in time, in Poland there was a tendency to a recurring increase of the industry sector share and a decrease in service sector importance (Figure 6). This does not contradict with the fact that in 2005 the share of the service sector was higher than in 1995 and the share of the industrial sector was lower than in 1995.

3. Factors influencing economic growth and development in Spain and Poland

Change of economic structure in the direction of a service economy takes place in certain economic conditions under the influence of traditional and modern growth factors. In modern economies, in addition to capital and labour formation, tan increasing role is played by technological progress and changes in labour productivity.

In order to make a comparative analysis of Spain and Poland in the context of sources of growth and the strength of their occurrence in the researched period, we took into account the following indicators:

- real GDP,
- GFCF-Gross Fixed Capital Formation,
- Labour Productivity,
- TFP – total factor productivity, i.e. technological progress measures by the Solow residual;
- Standardised Unemployment Rate.

Solow Residual was defined from the following formula (Barro y Sala-i-Martín, 2003: 433-435):

$$TFP = \dot{Y}/Y - \alpha(\dot{K}/K) - (1-\alpha)(\dot{L}/L)$$

where:

Y – real GDP (in 1995 prices)

K – Gross Fixed Capital Formation, (in 1995 prices)

L – Labour formation in 1000 people

α- capital share

$1-\alpha$- labour share

Labour share was estimated from data concerning the share of employee compensation in GDP, taking that we use the theorem of J.B. Clarke which says that production factors are compensated according to their marginal product.

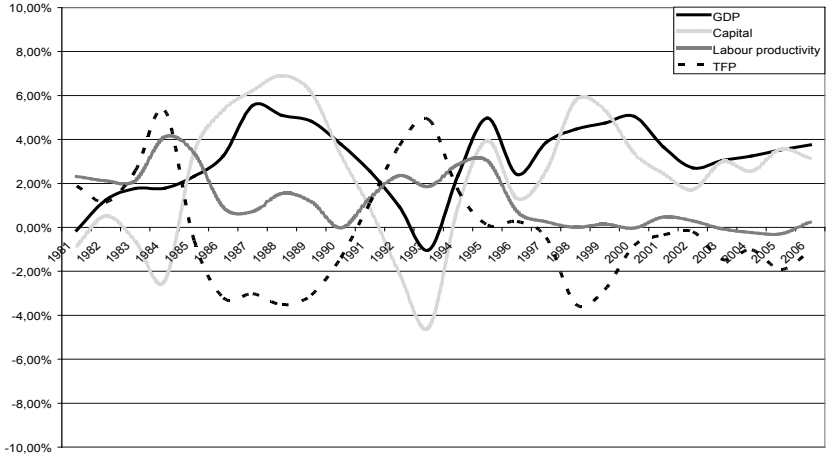
The pace of changes of the first four mentioned indicators was presented in the Figures 8-12. Figure 12 additionally shows the rate of unemployment for Poland and Spain and generally the following sequence of analysis is used:

- The change of indicators for Spain in the long term (1981 – 2006).
- The change of indicators for Spain in the short term (1996 – 2006).
- The change of indicators for Poland in the short term (1996 – 2006).

- The change of indicators for the EU-25 in the short term (1996–2006).
- Changes in the unemployment rate for Spain and Poland.

Figure 8 shows the indicators for Spain over a 25-year period.

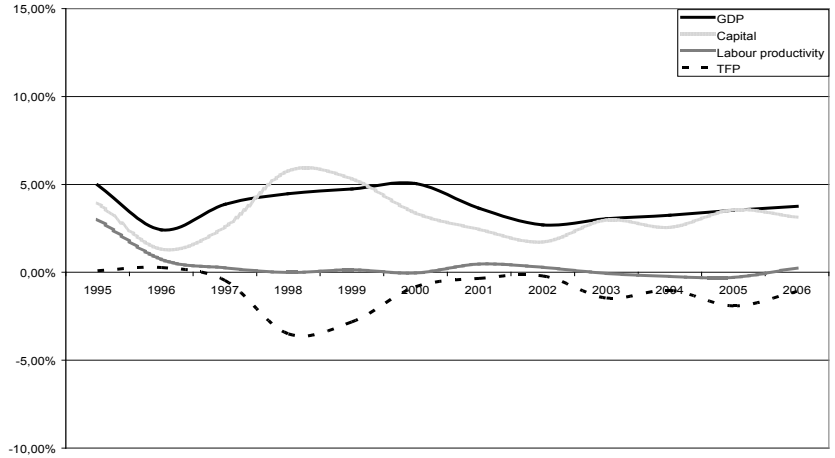
FIGURE 8: DYNAMICS OF GDP, GFCF, LABOUR PRODUCTIVITY AND TFP IN SPAIN (1981-2006)



Source: Own calculations based on Eurostat database.

As shown, the presented values are characterised by significant changeability in their relations over time. The basic indicator of GDP growth pace reflected large fluctuations but was characterised by positive values (except for the turn of 1993/1994 when it was negative), and approached 6% in some periods. This concerned the period immediately after joining the EU and the first decade of the present century. In both cases it coincided with large capital formation and relatively low values of the Solow Residual. The influence of technological progress could be observed cyclically in the mid-1980s and at the beginning of the 1990s. The increase of capital formation was preceded by an increase in labour productivity. Generally, the latter years were characterised by a relatively smaller amplitude of fluctuations. From 2002 there has been a significant stabilisation of all four indicators. We could say that the impulse from technological progress initially stimulated the increase in labour productivity and consequently the increase in capital formation. The latter one shows the highest relationship with the rate of GDP growth. The same amounts, compared to the shorter period (1996-2006), allow for a clearer presentation of the shift from a period of more dynamic change to the phase of a mature market economy, characterised by much greater stability of relations between particular indicators. This is presented in Figure 9.

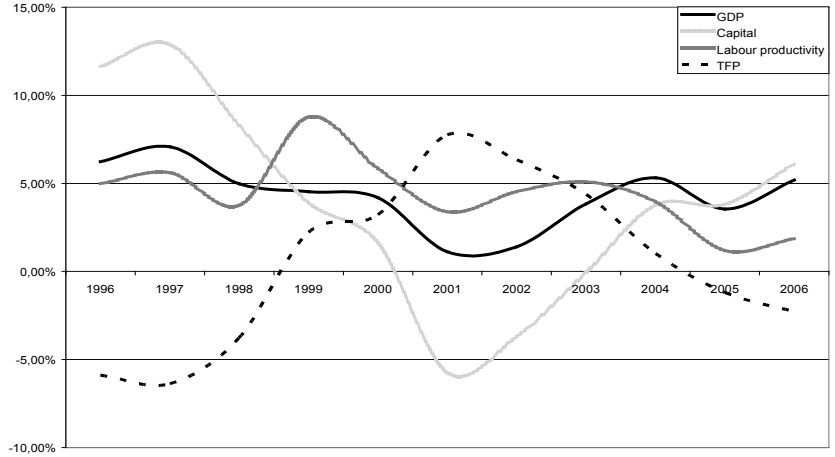
Figure 9: Dynamics of GDP, GFCF, Labour productivity and TFP in Spain (1996-2006)



Source: Own calculations based on Eurostat database.

Against this background, the data for Poland, over the same period and presented on the same scale, indicate significant differences when compared with Spain (figure 10).

Figure 10: Dynamics of GDP, GFCF, labour productivity and TFP in Poland (1996-2006)



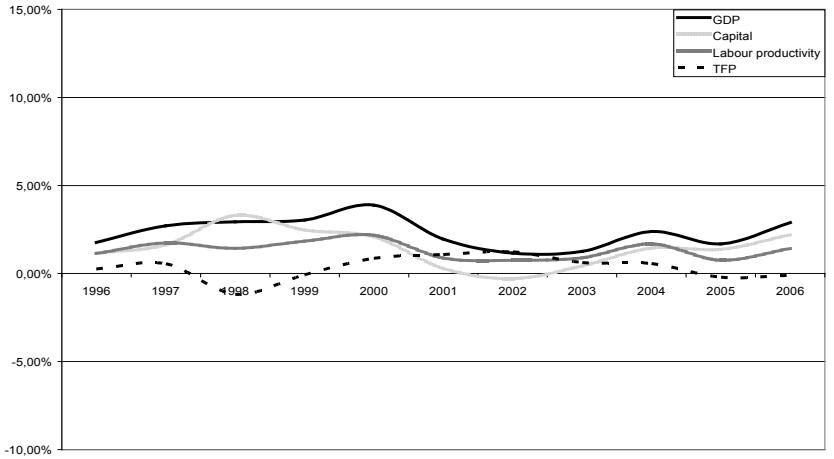
Source: Own calculations based on Eurostat database.

Poland is a country where the market economy has a short history and this has a direct influence on the fluctuations in the most important macroeconomic indicators.

In the analysed period, very high fluctuations could be observed both in capital formation and in the Solow Residual. The initial impulse of high capital formation from the mid-1990s has not yet happened again, although economic forecasts predict a high level of investment in Poland in 2007 and subsequent years. The very changes in GDP growth rate, in contrast with Spain, are not connected with the capital and labour formation but with labour productivity. The pace of change in labour productivity in Poland is significantly higher than in Spain, which could suggest the connection with the high unemployment rate. After Poland's entry to the EU the first symptoms of stabilising of relations between analysed indicators appeared, which could mean Poland is shifting towards a more mature market economy.

The changes of the Spanish and Polish economies were compared with the changes in the EU-25 countries; the European Union is treated as one economic area, which has an influence on the pace of change of discussed indicators. The researched period and the scale of figures are the same as in Figures 9-10. Comparative data for the EU-25 is presented in Figure 11. The main conclusion which can be drawn from the figure concerns the definitely greater stability of all presented indicators and the logical interrelations of the analysed quantities.

FIGURE 11: DYNAMICS OF GDP, GFCF, LABOUR PRODUCTIVITY AND TFP IN EU-25 (1996-2006)



Source: Own calculations based on Eurostat database.

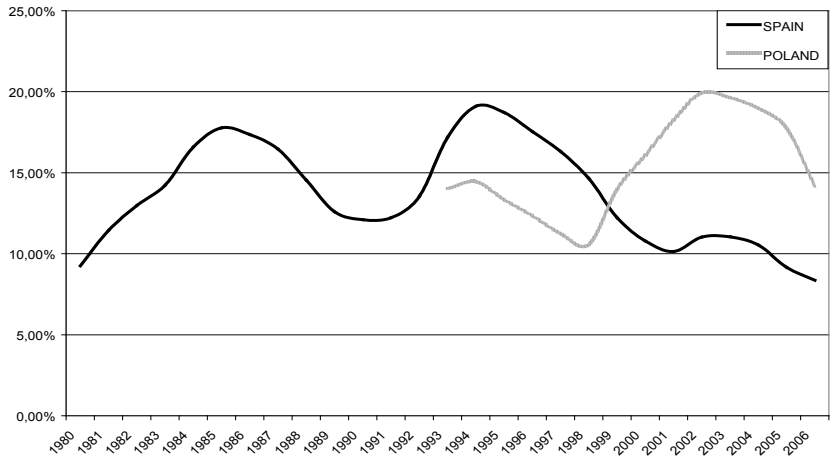
Labour and capital formation are intertwined and technological impulses appear cyclically, resulting simultaneously and complementarily in increase

of both capital and labour formation. The pace of real GDP increase both in Poland and Spain is, however, higher than the average observed during the last 10 years in the EU-25. The Solow Residual oscillates around 1% annually, which is a standard value for a developed economic area, so the main sources of growth are in the capital and labour formation and only partly in their productivity.

In the light of the above four indicators, one can see crucial differences in the situation of Spain, Poland and the average for EU-25, as far as the main growth factors are concerned. In Spain capital input has a key role in economic development, whilst in Poland labour productivity is far more important.

The connections between capital and labour formation and their productivity, not taking into account other factors, influence the unemployment rate. Comparison of the unemployment rate in Spain (1980-2006) and Poland (1993-2006) is presented in Figure 12. The longest available time series for Poland were used in the presentation.

Figure 12: Standarised Rate of Unemployment in Spain and Poland



Source: Own calculations based on OECD Outlook database.

Looking at unemployment rate in Poland from the perspective of Spanish experience, one can see the similarity of a high unemployment rate in both countries in the period of EU entry. The rate of unemployment was 18% in Spain in 1986 and around 20% in Poland in 2004. In both Spain and Poland, the peak of unemployment rates connected with accessing European Union structures were preceded by a two to three-years lead of high Solow Residual and the process of increase in capital formation (Spain) or labour productivity (Poland). The Spanish example shows that after-accession shock and a return to a lower unemployment rate does not have to be a permanent phenomenon.

Another technological impulse which took place in Spain in 1993 (second peak of the Solow Residual) resulted with a two-year delay in an even higher unemployment rate than in the period of EU entry.

In this case there was an accumulation of two rising trends: capital formation and labour productivity. Only after 15 years of being in the EU did Spanish economy managed, as it seems permanently, to limit the unemployment rate to around 10% and keep its falling trend. In Poland's case the currently observed fall of unemployment rate is more the result of significant migration (it is estimated that two million of Poles have left) and not the finishing of mature market economy adjustment processes. However, the expected and forecasted increase in capital formation in the following years will probably not be so substitutional in relation to capital formation, due to the sharp increase in labour productivity which took place in 1999/2000 and its further natural limitations. There is also the big role of the above mentioned employee migration.

The conclusion of the presented course of chosen growth indicators can be assessment of their contribution to the rate of growth of both researched economies. Here was used the idea created by Barro and Sala-i-Martin, where they attempt to define the sources of economic growth, using as an analysis tool the Solow growth model with a neoclassical production function of the Cobb-Douglas type and constant production scale. In Table 2 input of capital, labour and TFP growth rates were presented for Spain, Poland and the average for the EU-25 with the division into different periods. The important element of this research was the use of certain elasticities (defined as α) which inform of capital factor elasticity in relation to GDP. For Spain α was on the level of 0.51; for Poland the capital factor share is higher and α is 0.59; while for the whole of Europe α is 0.45, which means that the labour factor is more important.

TABLE 2: GROWTH ACCOUNTING ANALYSIS FOR SPAIN, POLAND AND EU-25

Country	*Period*	*GDP growth rate*	*Contribution of Capital*	*Contribution of Labour*	*TFP growth rate*
SPAIN	1980-2006	3.07%	2.38%	0.91%	-0.22%
α = 0.51			77.44%	29.79%	-7.23%
	1995-2006	3.79%	3.23%	1.67%	-0.005
			85.22%	44.01%	-13.20%
POLAND	1995-2006	4.31%	3.87%	-0.04%	0.49%
α = 0.59			89.66%	-1.02%	11.36%
EU-25	1995-2006	2.33%	1.46%	0.54%	0.33%
α = 0.45			62.68%	23.23%	14.08%

Source: Own calculations based on Eurostat database, Barro, Sala-i-Martin, *Economic Growth,* 2003.

From the charts it can be concluded that the average rate of economic growth in Spain was an average 3.07% p.a. in the period 1980 - 2006, while in the last decade it was 3.79. Against this background the rate of GDP growth in Poland can be estimated as relatively high.

Analysing the sources of economic growth, it can be seen in all cases that capital formation has a dominant role. Its relations with labour formation are, however, different in the three researched cases in the compared period (1995-2006). In relation to the EU average, Spain as far as labour input in economic growth is concerned, has a fair advantage, while Poland has worse results. In Poland it was compensated in the researched period by the influence of technological and organisational progress. It can be equally important that the contribution of the labour force in Poland can be underestimated as some employment may not be included in official statistics.

Analysing the impact of productivity in economic growth, it is visible that only in Spain this indicator was negative which means that behind economic growth there is very high production factors formation. On the other hand, in Poland and the EU input of TFP exceeds 10%. While in the case of the EU this indicator does not increase unemployment, then in Poland such a large share was a result of decreasing labour formation.

Summing up, both the Spanish and Polish economy, during the pre- and after-accession period, went through dramatic changes in their capital and labour inputs and their productivity. The influence of particular factors on economic growth was, however, different in the two countries.

In the comparable period of 1995-2005, with the high capital contribution to economic growth, which took place both in Spain and in Poland, the inputs of labour factor were completely different. Poland compared to the EU-25 and Spain seems to present itself in a negative light because the economy does not fully use the labour factor. However, due to extensive economic immigration, it has been changing into a growth barrier.

4. Selected growth factors in sectoral depiction

To sum up the comparative analysis of economic development in Spain and Poland, we will connect selected factors which influence and measure economic growth, dividing the economy into three sectors –agriculture, industry and services.

So far the analysis of the rate of change in particular indicators in both economies has shown the trends and connections between labour and capital formation and the Solow Residual with the rate of GDP changes, but it has not shown the economic strength of those economies. In this kind of analysis equally important are the absolute numbers, especially those *per capita* related ones, which let us assess the economic distance between the countries and the convergence processes.

It was additionally assumed that in comparative estimation an important role was played by structural changes resulting from the changes in particular sectors.

As measures of estimation we used:

- production measured by Gross Value Added;
- level of employment in particular sectors;
- labour productivity in sectors;
- capital per one person employed in sectors.

The above presented values were shown in Tables 3-6 where each of them has the same form of data presentation. Every table shows the analysed values for Spain, Poland and finally the average for the EU-25 used as a point of reference. Absolute numbers were presented for the chosen years of analysis, i.e. 1995 and 2005, or additionally for Spain in 1980. Besides, there were presented relative changes for the whole separate periods. All elements of this analysis are related to the three selected sectors. Table 3 shows changes in Gross Value Added.

TABLE 3: QUANTITY AND CHANGES OF GROSS VALUE ADDED IN CHOSEN COUNTRIES –THREE SECTORS BREAKDOWN

		Gross Value Added (millons euro)		
		Agriculture	*Industry*	*Services*
Spain	1980	16064.4	98206.7	191121.1
	1995	18953.7	123697.2	278261.6
	2005	24042.4	174044.3	392012.3
1980-1994	total change	26.1%	24.8%	45.1%
1995-2005	total change	26.8%	40.7%	40.9%
1980-2005	total change	49.7%	77.2%	105.10%
Poland	*1995*	*7507.7*	*32977.2*	*53284.6*
	2005	*8817.3*	*51311.5*	*78613*
1995-2005	*total change*	*17.4%*	*55.6%*	*47.50%*
EU-25	1995	177298.1	1851154	4210942
	2005	197251.3	2171734	5440530
1995-2005	total change	11.3%	17.3%	29.2%

Source: Own calculations based on Eurostat database.

Comparing Gross Value Added from the long-term perspective in Spain and Poland, it can be seen that in all three sectors this value was higher in Spain in 1980 than in Poland in 2005. The 25-year difference lets us understand that Spain had a different, higher starting point for development. Taking into account the compared period of 1995-2005 for Spain and Poland, it can be concluded from calculations that Gross Value Added in 1995 was 2.5 times higher in agriculture in Spain than at the same time in Poland, and respectively 3.8

times more in industry and 5.2 more in services. Respective relations for 2005 are: 2.7 in agriculture, 3.4 in industry and 5.0 in services. It can be assumed that in the mentioned period of 10 years, economic distance between Poland and Spain, measured by GVA, decreased only, and to a very small degree, in industry, while agriculture may show a process of divergence.

Table 4 shows changes in employment. Comparing the number of the employed from a long-term perspective in Spain and Poland, it can be seen that in each of the three sectors dependencies were different. In agriculture this number was lower in Spain in 1980 than in Poland in 2005 which supports the thesis of the lack of effective changes in agriculture in Poland. In industry the current number of those employed in Poland is lower than in Spain in 1980, and in services only slightly higher. The 25-year difference lets us understand that in Spain there was a shift from agriculture to industry and services, and in Poland the structure, including a high share of employment in agriculture, was strengthened.

Table 4: Quantity and changes of Employment in chosen countries –three sectors breakdown

		Employment (thousands)		
		Agriculture	*Industry*	*Services*
Spain	1980	2091	4179	6120
	1995	1070	3826	8673
	2005	1001	5668	12544
1980-1994	total change	-46.60%	-11.1%	38.7%
1995-2005	total change	-6.4%	48.1%	44.6%
1980-2005	total change	-52.1%	35.6%	105.0%
Poland	1995	2845	3974	7973
	2005	2715	3792	7609
1995-2005	total change	-4.6%	-4.6%	-4.6%
EU-25	1995	11961	51736	121107
	2005	9991	50115	142804
1995-2005	total change	-16.5%	-3.1%	17.9%

Source: Own calculations based on Eurostat database.

Taking into account the compared period of 1995-2005 for Spain and Poland, it can be assumed from the calculations that the employment rate in Poland in 1995 was 2.6 fold higher in agriculture, comparable in industry, and around 10% lower in services in comparison with Spain. Respective data for 2005 is: 2.7 times more employed in agriculture in Poland, 1.5 times more employed in industry in Spain and 1.6 times more employed in services in Spain. It can be concluded that within ten years the economic distance between Poland and Spain, measured by the size of employment in agriculture,

deepened. It is characteristic that Spain, also in relative depiction, experienced a breakthrough in agriculture in 1980-1994.

Table 5 shows changes in labour productivity. Comparing Labour Productivity (GDP/L) from a long-term perspective in Spain and in Poland, it can be observed that in all three sectors the value was higher in Spain in 1980 than in Poland in 2005. The 25-year difference lets us understand that Spain started from relatively high economic position.

TABLE 5: QUANTITY AND CHANGES OF LABOUR PRODUCTIVITY IN CHOSEN COUNTRIES –THREE SECTORS BREAKDOWN

		Labour Productivity (euro)		
		Agriculture	*Industry*	*Services*
Spain	1980	7682.64	23500.05	31228.94
	1995	17713.74	32330.68	32083.66
	2005	24018.38	30706.47	31250.98
1980-1994	total change	136.1%	40.4%	4.6%
1995-2005	total change	35.6%	-5.0%	-2.6%
1980-2005	total change	212.6%	30. 7%	0.07%
Poland	1995	2638.91	8298.239	6683.131
	2005	3247.624	13531.51	10331.58
1995-2005	total change	23.1%	63.1%	54.6%
EU-25	1995	14823.02	35780.77	34770.43
	2005	19742.9	43335	38097.89
1995-2005	total change	33.2%	21.1%	9.6%

Source: Own calculations based on Eurostat database.

Taking into account the compared period of 1995 - 2005 for Spain and Poland, it can be assumed from calculations that Labour Productivity in 1995 was about 6.7 times higher in agriculture in Spain than in the same year in Poland, and respectively 3.9 times higher in industry and 4.8 times higher in services. Respective data for 2005 is: 7.4 in agriculture, 2.3 in industry and 3.0 in services. It can be concluded that within 10 years the economic distance between Poland and Spain, measured by Labour Productivity decreased nearly by a half in industry and one third in servies, while in agriculture we have more of a divergence process. The difference in Labour Productivity in this sector became even bigger.

Table 6 presents changes in GFCF per employee. The data is not available for the services sector, hence the comparison relates only to the agriculture and industry sectors. Comparing GFCF per one person employed from a long-term perspective in Spain and Poland, it can be observed that in both the analysed sectors this value was higher in Spain in 1980 than in Poland in 2005. The

difference is enormous in case of agriculture and relatively small in the case of industry. Generally, it can be noted that the value is always higher in industry than in agriculture.

Table 6: Quantity and changes of Gross Fixed Capital Formation per one person employed in chosen countries –three sectors breakdown

		GFCF per employee (euro)	
		Agriculture	*Industry*
Spain	1980	175.33	5623.37
	1995	155.51	8450.26
	2005	481.22	5417.52
1980-1994	total change	-21.7%	58.0%
1995-2005	total change	209.4%	-35.9%
1980-2005	total change	174.5%	-3.7%
Poland	1995	20.84	4726.3
	2005	15.36	8250.61
1995-2005	total change	-26.3%	74.6%
EU-25	1995	320.97	26316.24
	2005	379.55	36722.97
1995-2005	total change	18.3%	39.5%

Source: Own calculations based on Eurostat database.

Taking into account the compared period 1995-2005 for Spain and Poland, it can be concluded from calculations that GFCF per employee in 1995 was 7.8 times higher in agriculture in Spain than in the same year in Poland and respectively 1.2 times higher in industry. Respective data for 2005 is: 32.1 in agriculture and 1.5 in industry for Poland. It can be concluded that within ten years the economic distance between Poland and Spain, measured by GFCF per employee decreased quite substantially in industry, but in agriculture, from this point of view, we observe an enormous step backwards in Poland.

Summing up, it is worth discussing generalised tendencies taking place in the area of analysed economic indicators in the whole EU-25, and the level of coincidence or departure from it in the Spanish and Polish economies.

In the decade of 1995-2005, as far as changes in Gross Value Added are concerned compared to the EU-25, positive changes were faster both in Spain and in Poland.

As far as changes in Employment are concerned, the classical model of limiting employment in agriculture and industry for the sake of increasing employment in services, which can observed in the EU as a whole, had its modifications both in Spain and in Poland. In Spain there was a decrease of employment in agriculture, but it increased not only in services but also visibly in industry. In Poland employment fell on an identical scale in all three sectors.

In labour productivity in the EU-25, positive changes took place on the highest scale in agriculture, and then in industry and services. In Spain the increase of this indicator occurred only in agriculture, while in industry and services Labour Productivity decreased slightly. In Poland we observed the opposite trends to in the EU as a whole, since labour productivity sharply increased in industry and services, while in agriculture this increase was the smallest.

In GFCF per employee on average, in researched period twice the size of increase took place in industry than in agriculture. In this case the Spanish economy is an exception because the increase in technical equipment in agriculture exceeded, in the researched period by the increase in the EU-25 more than ten times. In industry, however, there was the opposite direction of change than in the EU. In Poland, on the contrary, there was a fall of the indicator in agriculture, while positive changes in industry exceeded twice the changes in the whole EU.

5. CONCLUSIONS

- Despite differences during EU accession, the Spanish and Polish economies are far from the main tendencies concerning growth factors observed in the EU as a whole, and they have realised different transformation programmes of their economies.
- A basic difference in the effectiveness of change concerns agriculture; Spain has undergone an intensive reconstruction of this sector and Poland have moved backwards.
- Characteristic are also the changes in industry; Poland substantially increased labour productivity in this sector, with smaller capital formation, and Spain increased employment, with high capital formation. Economic growth, looked at from the perspective of traditional factors, has a different picture in Spain and Poland.
- From the perspective of a convergence process, understood as the rate of levelling the differences between countries, in this case Poland and Spain, there is some progress of those processes, chiefly in industry and then in the service sector. However, the distance in agriculture constantly increases.
- The observed economic relations, concerning labour and capital inputs and their effciencies and the tendencies taking place in various sectors have their source partly in history but mainly in economic policy.
- Poland's convergence processes in relation to Spain's can be seen as more decisive only in industry, with characteristic different development of the sector. Agriculture is more characterised by divergence.

- The analysis confirms the economic importance of basic growth factors, such as labour and capital, but also poses questions relating to the influence of economic policy on those factors used and the consequences for levelling differences between countries. There also arises a question about the importance of other growth factors, connected with entrepreneurship, human capital and new information technologies. A lot of such considerations and research, in relation to OECD countries, and Poland and Spain can be found in publications discussing economic growth. However, if we wanted to take them into account, it would exceed the size of this article.

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