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Nowcasting Quarterly GDP Dynamics In The Euro Area – The Role Of Sentiment Indicators

Abstract

The paper compares the most closely watched sentiment indicators with respect to their ability to nowcast quarterly GDP dynamics in the Euro Area and its biggest economies. We analyse cross-correlations and out-of-sample forecast errors generated from equations estimated by rolling regressions in fixed-length window. The results show that models employing PMI Composite perform best in the cases of the Euro Area, Germany, France and Italy, whilst Spanish GDP dynamics is best nowcasted using ESI-based models. PMI-based models generate the most accurate nowcasts at the beginning of the quarter, as well as during periods of high volatility of GDP growth rates.

Keywords: *nowcasting, sentiment indicators*

1. Introduction

Prompt and accurate data on GDP dynamics are crucial not only for investors and financial markets, but also from an economic policy viewpoint. They can, at least to some extent, reduce the problem of lags associated with monetary and discretionary fiscal policy. No single variable available on a monthly basis can be considered a satisfactory substitute for GDP. Data on industrial

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production is perhaps the best candidate, but it is subject to substantially higher volatility and it is also released with a considerable delay.

The first official GDP quarterly data in the Euro Area are released with a two-month delay, and a flash estimate is published approximately two weeks earlier (see Figure 1). However, making use of the higher-frequency data, including cyclical polls on economic activity, it is possible to nowcast the GDP dynamics before those releases. There are a number of soft (sentiment) indicators available in the market which are designed to mirror GDP dynamics. Some of them are closely watched by investors and policymakers, whilst others do not enjoy much popularity.

The aim of the paper is to test the performance of the most popular sentiment indicators in their ability to provide accurate nowcasts of quarterly GDP dynamics. The test group consists of the Euro Area as an aggregate as well as its four largest member states (Germany, France, Italy and Spain).

At the Euro Area level we have the following three most important indicators to choose from:

Markit PMI *Composite* – Purchasing Managers' index is based on monthly surveys of private sector companies, directed to purchasing managers from the manufacturing and services sectors.

€-coin – an indicator constructed in cooperation between Banca d'Italia and CEPR, based on a large dataset of mixed-frequency economic data, processed by a dynamic factor model.

Economic Sentiment Index (ESI) – a European Commission index based on monthly surveys conducted in companies and households. It consists of a weighted average of four sub-components, describing confidence in three economic sectors (manufacturing, construction, and retail trade) and among consumers.

At the country level, the situation is diversified. The economic situation in the two largest economies (Germany and France) is covered by more indicators than in other countries, which reflects investor interest in them. The release of German GDP data is usually a stronger market mover than that of Italy or Spain. Several indicators are published for more than just one country, which offers the possibility to compare them. Except for PMI and ESI, which are available for all the four biggest countries in the Euro Area, we have:

ZEW (Germany, France, Italy) – an indicator synthesizing surveys conducted among financial analysts regarding subjective assessments of current and future (but short-term) macroeconomic perspectives.

IFO *business situation* (Germany, France) – another indicator based on surveys conducted in enterprises. It is a sub-index of IFO *business climate*, which also incorporates IFO *business expectations*.

Insee (France) – a survey-based indicator, utilizing sentiment of company CEOs from all sectors. The indicator refers to the current situation and short-term expectations.

Figure 1 visualizes the timeline of data releases for the Euro Area as a whole. The paper is structured as follows. Section 2 contains a synthetic review of the research, section 3 presents initial results obtained from the cross-correlation analysis, and section 4 presents econometric results. Section 5 contains conclusions.

2. Literature review

Sentiment indicators in recent years have become widely used for the purpose of forecasting GDP. They found their well-established position in datasets used for building dynamic factor models (DFMs, see: Giannone, et. al., 2009, Bańbura et. al., 2011), bridge models (e.g. French OPTIM, see: Irac and Sédillot, 2002), or DSGE models (see e.g. Červená and Schneider 2010). Červená and Schneider (2010) explicitly test the usability of business indicators for improving the quality of forecasts. Based on Austrian data they find that DSGE-based forecasts can significantly benefit from taking those indicators into account with no loss for the created economic context whatsoever. Giannone et. al. (2009) and Antipa et. al. (2012) confirm the significant role of sentiment indicators for improving the GDP forecast accuracy of factor models, applied to the Euro Area and Germany respectively. The latter study reveals a particularly noticeable benefit from using sentiment indicators at the beginning of the quarter, when the stock of available economic hard data is still modest. A similar conclusion is reached by, *inter alia*, Mitchell et. al. (2010) and Keeney et. al. (2012).

Papers aimed at comparing results obtained while employing different sentiment indicators for short-term GDP forecasting and nowcasting are less frequent. One of them is a study by Camacho and García-Serrador (2011), who present evidence that substituting PMI with ESI in the factor model they used for forecasting quarterly GDP in the Euro Area reduces standard forecast errors. In most other studies PMI is generally found to be well-suited for the purpose analysed and tends to outperform other indicators (Insee 2008, European Commission 2012). The European Commission (2012) admits that the construction of ESI makes this index more useful for predicting annual rates of GDP changes, but that the forecast accuracy of quarterly GDP is inferior compared to models

based on PMI. This explains why the European Commission is currently working on releasing a new sentiment index, based on surveys conducted in firms and households, which could give better results in tracking quarterly GDP dynamics. Other evidence of improvements in forecast accuracy by employing the PMI index can be found in the studies of Liedo and Muñoz (2010), Godbout and Jacob (2010) and Rossiteer (2010). Lombardi and Maier (2011) explicitly show that simple PMI-based models generate surprisingly good results in the case of many Euro Area countries in times of both low and high volatility of GDP growth rates. It is not uncommon for these models to achieve lower forecast errors than those generated from large and sophisticated dynamic factor models. De Bondt (2012) goes one step further by claiming that PMI *Composite* is better at forecasting quarterly GDP dynamics in the Euro Area than the flash estimates released by the European Commission.

To the best of our knowledge, the literature does not offer independent studies comparing a broader spectrum of sentiment indicators in their forecasting or nowcasting the performance of quarterly GDP. This paper aims at filling this gap. It also compares the changing forecast accuracy generated by the described sentiment indicator-based models over time.

3. Correlation analysis

Analysing cross-correlations is a good starting point for evaluating nowcasting performance, as it enables drawing initial conclusions regarding both contemporaneous statistical dependencies and their possible time-shifts. Our exercise is performed for the period 1999Q1 – 2012Q4. Exclusion of the last few quarters eliminates the bulk of GDP measurement error resulting from the (frequent) revisions of GDP data which take place at the end of a sample. Table 1 shows that the highest contemporaneous correlation coefficients with quarterly GDP are achieved for the PMI index. As intuition would suggest, with every monthly inflow of new data and new releases of sentiment indicators, the dependency becomes stronger, although this is more evident in the case of €-Coin and ESI, and less so in the case of PMI. Consequently, in the last month of a quarter both €-Coin and PMI indicators achieve similar contemporaneous correlation coefficients with quarterly GDP dynamics. ESI performs slightly worse here, and it also reveals higher correlation with lagged (by one quarter) GDP growth rate. A common feature, found in all three cases, is a rising correlation with future GDP dynamics. As can be observed from Table 1, none of the indicators can be referred to as a strictly leading indicator; statistical

dependency with lagged and current GDP dynamics was always found to be higher than the correlation with its lead growth rate.

The statistical dependency between GDP dynamics and sentiment indicators is noticeably lower in Germany. But also in this country PMI outperforms other indicators, including the two released by German institutes (ZEW and IFO), which are also inferior to ESI. Both ZEW and IFO indicators reveal a stronger dependency on lagged GDP dynamics. It generally seems that both carry a similar information loading – the contemporaneous correlation coefficients between them is as high as 0.93-0.94.[1]

France confirms the pattern found in both the Euro Area and Germany. The highest contemporaneous correlation coefficient with quarterly GDP growth rates is found for PMI indicator. The remaining indicators show noticeably stronger relationships with lagged GDP dynamics. There is a striking similarity between contemporaneous and cross-correlations of ESI and Insee indicators. Indeed, the relationship between these two is found to be very high, which is reflected by correlation coefficients reaching 0.98-0.99.

Contemporaneous correlation coefficients with quarterly growth rates of GDP in the Italian economy are again the highest in the case of PMI. This is especially evident in the second and third month of a quarter. Similarly as with France, ESI and ZEW indicators reveal a stronger statistical relationship with lagged growth rates of GDP.

Compared with the cross-correlation analysis results presented above, Spain clearly stands out. While there are only two sentiment indicators available which track economic activity in this country, their relationship with GDP dynamics seems to be very strong. The first finding is that the release of additional monthly PMI indicators does not translate into a rising correlation coefficient, while this is the case with ESI. As a result, ESI was more strongly correlated with quarterly GDP dynamics in the second and third month of a quarter. Interestingly, ESI was also found to reveal a relatively high (higher than PMI) dependency with future GDP growth rates.

Both these specific features can be attributed to one major difference between the design of both sentiment indicators. While ESI is largely influenced by the developments in the construction sector, this sector is absent in PMI.[2] And construction was a particularly important driving force of the Spanish GDP, both before the crisis and even more so after 2008, when the real estate bubble burst in Spain. Nowhere else in the analysed group of countries was construction so important for GDP dynamics.

[1] Correlation coefficients between particular sentiment indicators are not reported to save space.

[2] Polls conducted for the purpose of constructing PMI are not distributed in construction enterprises.

Construction is also known to slightly lead the business cycle, which is reflected in high correlation between ESI and lead GDP growth in Spain. To a lesser extent, this regularity can be observed in other countries too.

4. Performance of sentiment indicator-based models to nowcast quarterly GDP growth rates in the Euro Area

The nowcasting performance of the indicators introduced above will be assessed in a simple empirical framework. The equation considered is of the form:

$$y_t = \alpha + \beta X_t + \varepsilon_t \tag{1}$$

Where y_t is quarterly GDP dynamics in quarter *t*, and X_t is the sentiment indicator value in the same quarter. Because indicators are released at a monthly frequency (which is their biggest advantage), the dependent variable will consist of the value from the first month, and an average from two and three months in subsequent months of a quarter. In this way, the increasing information loading is accounted for as the quarter progresses.

Parameters are then estimated based on the rolling regression with fixed estimation window of 32 quarters between the 1st quarter of 1999 and the 4th quarter of 2012. As was already mentioned, the last quarters available at the moment of performing the exercise are intentionally excluded because they are often subject to revisions and might potentially introduce bias in the results. In the second stage a one quarter out-of-sample forecast is generated from each equation. Forecast errors and root mean square errors are used to compare the nowcast performance of alternative models.

Table. 6 compares root mean squared errors obtained through one period out-of-sample predictions for every quarter in the period 2007Q1 – 2012Q4, based on the estimated value of parameters, in line with the method described above. A reference benchmark is an AR(1) model, as is usual in these types of exercises.

The benchmark AR(1) model is generally outperformed by all indicator-based models for the Euro Area. The main reason is the relatively high errors generated in times of high uncertainty and volatility of GDP in the Euro Area, encompassing the period between 2008Q4 and 2009Q3. Among the sentiment indicator-based models, the PMI model generates the lowest errors. Nevertheless, in times of a relatively stable macroeconomic environment (e.g. years 2007 and 2012), the superiority of PMI model is mitigated.

Figure 1 shows empirical and theoretical GDP dynamics in the Euro Area and Table 7 presents results of the Diebold-Mariano significance tests of differences between nowcast errors generated from sentiment indicator-based models. It turns out that PMI is especially useful for nowcasting GDP in the Euro Area at the beginning of the quarter. Errors are then significantly lower than those generated from ESI-based and €-Coin-based models. Irrespective of time, €-Coin is found to produce significantly lower errors than ESI.

Compared to the Euro Area aggregate, all indicator-based models produce significantly higher errors for the German economy, which can hardly come as a surprise, given the low contemporaneous correlation coefficients which were shown in the previous section (see Table 2). Nevertheless, it is again the PMI index which stands out in terms of nowcast performance. The remaining models generated very high errors in 2008 and (especially) 2009. This picture is somewhat spoilt by the relatively poor performance of the preferred model in 2012, which results from overly pessimistic nowcasts in the first three quarters. As a result, the ESI model outperformed its PMI counterpart in 2012.

A general superiority of PMI models in the case of Germany is confirmed by the Diebold-Mariano test (see Table 9). In the entire period, errors produced by the PMI model were significantly lower than errors obtained from any other model used for comparison, irrespective of the number of months which elapsed since the beginning of the quarter.

Generally, French quarterly GDP dynamics in the analysed period could have been nowcasted with much more accuracy (lower errors) compared to the German GDP. The lowest average errors were produced by the PMI-based model, mostly owing to its high accuracy in the years 2007-2010. In 2011, the nowcasting performance of all compared models was similar (especially in the second and third month of a quarter), while 2012 brought a sharp deterioration of results generated by PMI-based models (as was the case in the Euro Area and Germany). In contrast, the errors in the remaining models declined substantially in 2012 and reached levels lower than in 2007.

The results of the Diebold-Mariano test statistics, lead (contrary to the case of Germany) to softening the conclusions about the superiority of PMI models as far as French GDP is concerned (see Table 11). The errors produced by these models do not appear significantly lower than the errors generated from ZEW, ESI and Insee-based models at reasonable significance levels. Nowcasts for the Italian economy were constructed with the help of three sentiment indicators.[3] A general conclusion, which can be drawn from Table 12, is that

[3] Italian statistical office releases the IESI *Composite*, which could potentially be used for our exercise, but time series are only available for subcomponents of this indicator.

average nowcast errors obtained for Italy are higher compared to Euro Area aggregate and France, but lower than in Germany. Again, taking into account the root mean squared error criterion, the supremacy of PMI-based models is visible. Compared to ESI and ZEW-based models, PMI had better nowcasting results in all years except 2011. Contrary to the countries analysed earlier, this good overall performance did not deteriorate in 2012. Significance tests for differences between various errors confirm the statistically superior performance of PMI-based models over alternative models after one, two and three months of a quarter (Table 13).

Table 14 confirms the earlier findings from the correlation analysis, i.e. that Spain is an exceptional case in the researched group of countries. There ESI-based models generally outperform models based on PMI, the only alternative sentiment indicator available. In 2007, when the Spanish GDP was growing at a stable quarterly rate of 0.7-0.9%, nowcasts generated by ESI-based models only marginally differed from official (and, importantly, final) data. But the advantage of ESI was even more pronounced in 2009, which can be linked to a better utilization of data from the collapsing construction sector, which was pushing GDP down.

The high quality of ESI-based nowcasts is confirmed by the Diebold-Mariano test (see Table 15). Irrespective of the number of monthly indicators available, ESI generates significantly lower errors than does PMI.

5. Summary

This paper attempts to compare popular sentiment indicators' ability to nowcast current GDP growth rates before any official estimates or data are available. There are various indicators constructed with the aim of tracking changes in economic activity. These indicators differ in terms of methodology, economic sectors, as well as the countries covered. This study shows that some of them carry similar information loading, whilst other are more complementary.

Among the available sentiment indicators, PMI is generally found to reveal the strongest statistical relationship with quarterly growth rates of GDP, and also to perform best as a basis for a model for nowcasting purposes. However, several caveats apply. First of all, ESI gains over PMI if construction is known to be an important sector driving GDP changes, as the example of Spain shows. Second, a stable macroeconomic environment also tends to decrease PMI's advantage over alternative indicators.

The results show, that PMI-based models generate the most accurate forecasts at the beginning of the quarter and in times of elevated uncertainty and volatility of GDP growth rates.

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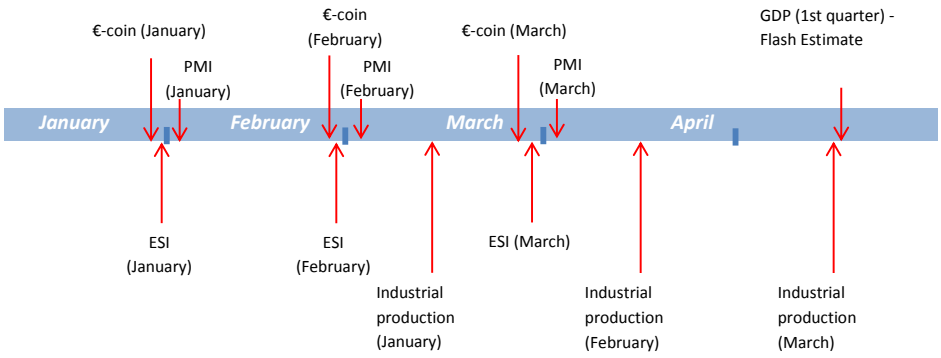
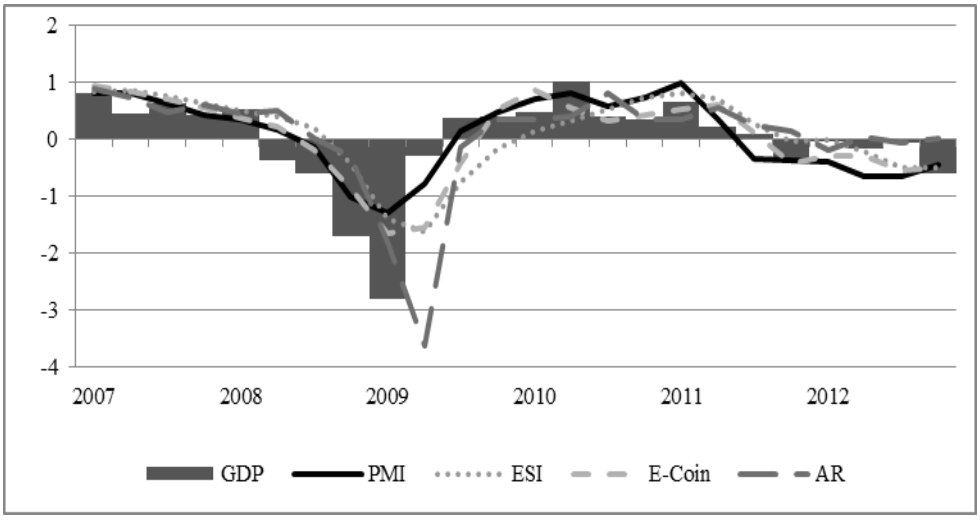
Annex

Figure 1. Publication of sentiment indicators, industrial production and GDP in the first quarter



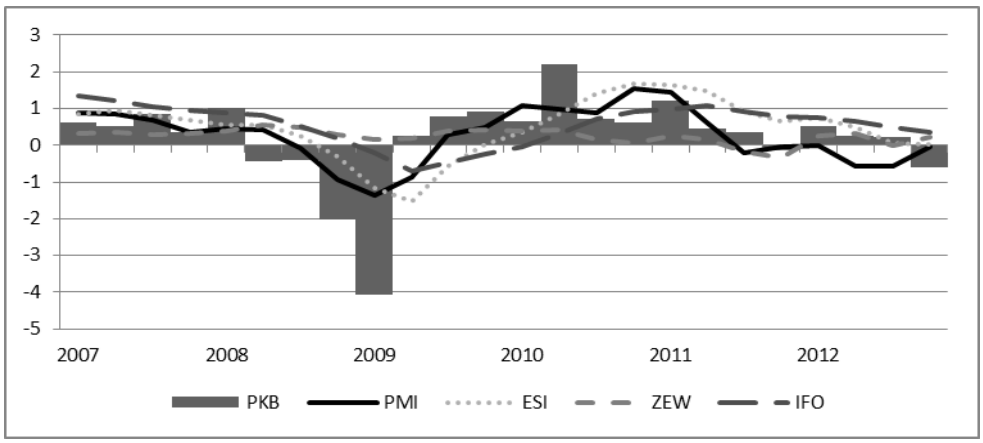
Source: own compilation, based on Eurostat, Markit, CEPR.

Figure 2. Actual and nowcasted quarterly dynamics of GDP in the Euro Area



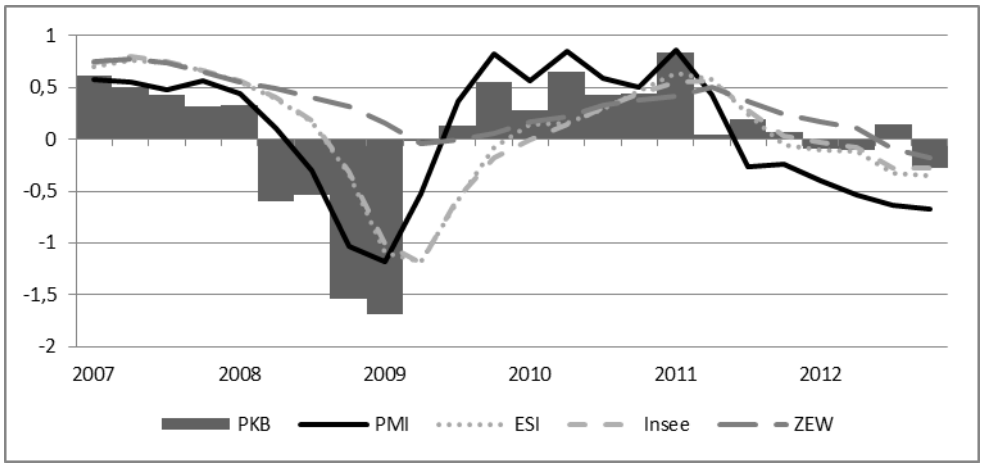
Source: Eurostat, own calculations.

Figure 3. Actual and nowcasted quarterly dynamics of GDP in Germany



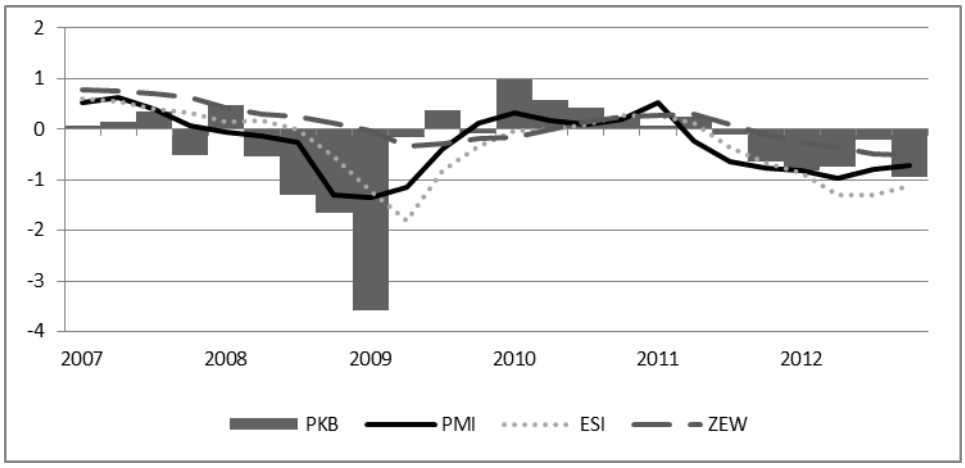
Source: Eurostat, own calculations.

Figure 4. Actual and nowcasted quarterly dynamics of GDP in France



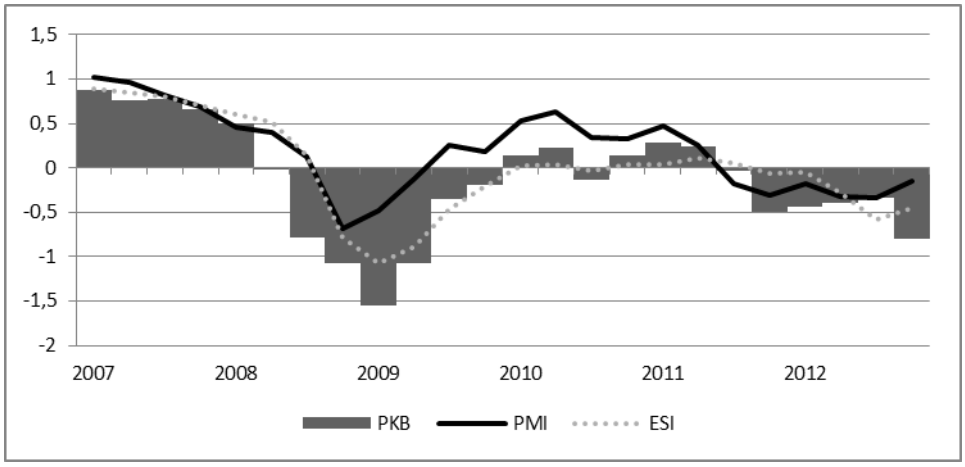
Source: Eurostat, own calculations.

Figure 5. Actual and nowcasted quarterly dynamics of GDP in Italy



Source: Eurostat, own calculations.

Figure 6. Actual and nowcasted quarterly dynamics of GDP in Spain



Source: Eurostat, own calculations.

Table 1. Cross-correlations between quarterly GDP Dynamics and selected sentiment indcators in the Euro Area, 2000Q1 – 2012Q4*

		PMI		ESI		€- Coin	
	quarters	lag	lead	lag	lead	lag	lead
1 month	0	0.87	0.87	0.69	0.69	0.82	0.82
	1	0.64	0.79	0.39	0.82	0.54	0.87
	2	0.33	0.59	0.14	0.80	0.27	0.72
	3	0.11	0.34	-0.05	0.66	0.08	0.42
	4	-0.04	0.14	-0.17	0.48	-0.06	0.13
2 months	0	0.88	0.88	0.73	0.73	0.85	0.85
	1	0.69	0.78	0.44	0.82	0.60	0.86
	2	0.39	0.57	0.17	0.78	0.31	0.68
	3	0.16	0.32	-0.03	0.63	0.11	0.38
	4	0.00	0.11	-0.16	0.45	-0.04	0.11
3 months	0	0.88	0.88	0.76	0.76	0.87	0.87
	1	0.74	0.76	0.50	0.83	0.65	0.84
	2	0.44	0.53	0.20	0.76	0.36	0.64
	3	0.21	0.28	-0.01	0.59	0.14	0.33
	4	0.03	0.07	-0.14	0.42	-0.01	0.07

* In Tables 1-5 the columns *lead/lag* show correlation coefficients between the GDP growth rate and the sentiment indicator led/lagged by the given number of quarters.

Source: own calculations.

Table 2. Cross-correlations between quarterly GDP Dynamics and selected sentiment indcators in Germany, 2000Q1 – 2012Q4

		PMI		ESI		ZEW		IFO	
	quarters	lag	lead	lag	lead	lag	lead	lag	Lead
1 month	0	0.74	0.74	0.52	0.52	0.27	0.27	0.27	0.27
	1	0.49	0.67	0.22	0.66	0.05	0.43	0.01	0.47
	2	0.14	0.40	0.00	0.65	-0.14	0.54	-0.15	0.56
	3	-0.04	0.26	-0.17	0.54	-0.26	0.56	-0.23	0.57
	4	-0.11	0.08	-0.21	0.42	-0.33	0.52	-0.27	0.50
2 months	0	0.74	0.74	0.56	0.56	0.30	0.30	0.31	0.31
	1	0.54	0.66	0.27	0.67	0.09	0.46	0.05	0.50
	2	0.20	0.42	0.02	0.63	-0.10	0.54	-0.14	0.57
	3	0.01	0.25	-0.15	0.51	-0.24	0.55	-0.24	0.56
	4	-0.10	0.05	-0.21	0.40	-0.31	0.52	-0.29	0.49
3 months	0	0.74	0.74	0.59	0.59	0.32	0.32	0.35	0.35
	1	0.59	0.62	0.33	0.68	0.12	0.48	0.10	0.52
	2	0.25	0.41	0.05	0.61	-0.09	0.54	-0.10	0.57
	3	0.03	0.23	-0.13	0.49	-0.23	0.54	-0.23	0.55
	4	-0.08	0.01	-0.21	0.37	-0.30	0.51	-0.28	0.47

Source: own calculations.

Table 3. Cross-correlations between quarterly GDP Dynamics and selected sentiment indcators in France, 2000Q1 – 2012Q4

		PMI		ESI		ZEW		Insee	
	quarters	lag	lead	lag	lead	lag	lead	lag	Lead
1 month	0	0.82	0.82	0.63	0.63	0.34	0.34	0.61	0.61
	1	0.54	0.78	0.31	0.77	0.09	0.52	0.32	0.77
	2	0.39	0.60	0.03	0.81	-0.12	0.66	0.04	0.82
	3	0.10	0.34	-0.13	0.69	-0.26	0.64	-0.12	0.69
	4	-0.04	0.10	-0.22	0.50	-0.35	0.56	-0.23	0.53
2 months	0	0.84	0.84	0.66	0.66	0.38	0.38	0.65	0.65
	1	0.60	0.76	0.35	0.79	0.14	0.56	0.37	0.80
	2	0.40	0.57	0.07	0.79	-0.08	0.66	0.08	0.81
	3	0.16	0.31	-0.11	0.67	-0.24	0.63	-0.10	0.68
	4	-0.02	0.09	-0.21	0.48	-0.34	0.54	-0.21	0.51
3 months	0	0.84	0.84	0.70	0.70	0.41	0.41	0.68	0.68
	1	0.65	0.74	0.39	0.80	0.17	0.58	0.40	0.81
	2	0.44	0.53	0.10	0.78	-0.06	0.66	0.11	0.79
	3	0.23	0.27	-0.09	0.64	-0.22	0.62	-0.08	0.66
	4	0.01	0.05	-0.20	0.45	-0.33	0.53	-0.20	0.49

Source: own calculations.

Table 4. Cross-correlations between quarterly GDP Dynamics and selected sentiment indcators in Italy, 2000Q1 – 2012Q4

		PMI		ESI		ZEW	
	quarters	lag	lead	lag	lead	lag	lead
1 month	0	0.76	0.76	0.63	0.63	0.40	0.40
	1	0.63	0.72	0.39	0.71	0.18	0.49
	2	0.31	0.66	0.18	0.72	-0.01	0.58
	3	0.17	0.39	0.06	0.57	-0.17	0.58
	4	0.01	0.22	-0.11	0.37	-0.32	0.49
2 months	0	0.78	0.78	0.65	0.65	0.43	0.43
	1	0.66	0.73	0.43	0.72	0.23	0.52
	2	0.36	0.63	0.20	0.70	0.02	0.59
	3	0.21	0.34	0.06	0.55	-0.15	0.57
	4	0.05	0.16	-0.09	0.36	-0.30	0.48
3 months	0	0.80	0.80	0.68	0.68	0.44	0.44
	1	0.69	0.72	0.47	0.73	0.26	0.54
	2	0.43	0.59	0.23	0.69	0.04	0.60
	3	0.26	0.32	0.07	0.52	-0.12	0.56
	4	0.07	0.13	-0.07	0.35	-0.28	0.47

Source: own calculations.

Table 5. Cross-correlations between quarterly GDP Dynamics and selected sentiment indcators in Spain, 2000Q1 – 2012Q4

		PMI		ESI	
	quarters	lag	lead	lag	lead
1 month	0	0.90	0.90	0.91	0.91
	1	0.83	0.75	0.85	0.87
	2	0.72	0.61	0.74	0.80
	3	0.57	0.44	0.61	0.68
	4	0.43	0.29	0.52	0.56
2 months	0	0.89	0.89	0.92	0.92
	1	0.86	0.73	0.87	0.87
	2	0.75	0.59	0.75	0.79
	3	0.62	0.42	0.62	0.67
	4	0.47	0.27	0.52	0.55
3 months	0	0.88	0.88	0.93	0.93
	1	0.88	0.72	0.88	0.86
	2	0.78	0.56	0.76	0.77
	3	0.65	0.39	0.64	0.65
	4	0.50	0.25	0.53	0.54

Source: own calculations.

Table 6. Nowcast root mean squared errors (RMSE) of quarterly GDP dynamics in the Euro Area

	PMI			**ESI**			**€-Coin**			**AR**
	1M	2M	3M	1M	2M	3M	1M	2M	3M	
2007-2012	**0.45**	**0.45**	**0.46**	**0.73**	**0.68**	**0.64**	**0.58**	**0.53**	**0.49**	**0.84**
2007	0.17	0.17	0.17	0.22	0.24	0.24	0.23	0.22	0.21	0.19
2008	0.61	0.56	0.50	0.99	0.93	0.84	0.69	0.62	0.55	0.88
2009	0.72	0.76	0.80	1.36	1.25	1.15	1.14	1.03	0.94	1.76
2010	0.27	0.24	0.27	0.40	0.43	0.43	0.25	0.28	0.31	0.37
2011	0.31	0.26	0.28	0.37	0.34	0.31	0.26	0.23	0.20	0.35
2012	0.39	0.40	0.43	0.16	0.20	0.23	0.25	0.28	0.29	0.34

*1M, 2M and 3M in Tables 6 - 15 refer to errors generated from a model based on the indicator value in (respectively) first month of a quarter, average in first and second month of a quarter, and average in all three months of a quarter.

Source: own calculations.

Table 7. Results of the Diebold-Mariano significance test of nowcast error differences in the Euro Area (loss function based on MSE)

	PMI-ESI	PMI- €-Coin	€-Coin - ESI
1M difference	-0.33	-0.13	-0.19
p-value	0.05	0.10	0.02
2M difference	-0.27	-0.08	-0.18
p-value	0.06	0.17	0.02
3M difference	-0.20	-0.03	-0.17
p-value	0.11	0.54	0.02

Source: own calculations.

Table 8. Nowcast root mean squared errors (RMSE) of quarterly GDP dynamics in Germany

	PMI			ESI			ZEW			IFO		
	1M	2M	3M	1M	2M	3M	1M	2M	3M	1M	2M	3M
2007-2012	**0.83**	**0.84**	**0.83**	**1.09**	**1.06**	**1.03**	**1.12**	**1.14**	**1.16**	**1.22**	**1.21**	**1.20**
2007	0.21	0.22	0.23	0.27	0.27	0.28	0.33	0.33	0.33	0.62	0.61	0.59
2008	0.88	0.84	0.77	1.20	1.14	1.07	1.33	1.35	1.38	1.43	1.40	1.35
2009	1.47	1.52	1.51	2.06	1.97	1.88	2.06	2.11	2.13	2.20	2.19	2.16
2010	0.81	0.81	0.80	0.89	0.91	0.95	0.93	0.95	0.99	1.03	1.03	1.02
2011	0.37	0.36	0.32	0.70	0.71	0.73	0.57	0.58	0.58	0.58	0.60	0.64
2012	0.59	0.59	0.70	0.33	0.36	0.36	0.50	0.43	0.44	0.52	0.53	0.53

Source: own calculations.

Table 9. Results of the Diebold-Mariano significance test of nowcast error differences in Germany (loss function based on MSE)

	PMI-ESI	PMI-ZEW	PMI-IFO	ESI-ZEW	ESI-IFO	ZEW-IFO
1M difference	-0.50	-0.58	-0.81	-0.07	-0.31	-0.23
p-value	0.01	0.04	0.02	0.66	0.15	0.00
2M difference	-0.42	-0.60	-0.77	-0.18	-0.35	-0.17
p-value	0.01	0.04	0.02	0.38	0.11	0.00
3M difference	-0.36	-0.65	-0.74	-0.29	-0.37	-0.08
p-value	0.03	0.06	0.02	0.25	0.08	0.00

Source: own calculations.

Table 10. Nowcast root mean squared errors (RMSE) of quarterly GDP dynamics in France

	PMI			ESI			ZEW			Insee		
	1M	2M	3M	1M	2M	3M	1M	2M	3M	1M	2M	3M
2007-2012	**0.38**	**0.36**	**0.37**	**0.59**	**0.56**	**0.53**	**0.67**	**0.66**	**0.66**	**0.60**	**0.57**	**0.55**
2007	0.13	0.14	0.13	0.25	0.27	0.27	0.26	0.27	0.27	0.28	0.29	0.29
2008	0.61	0.51	0.45	0.97	0.93	0.86	1.20	1.19	1.18	0.98	0.92	0.88
2009	0.33	0.34	0.40	0.92	0.88	0.81	0.99	0.97	0.96	0.95	0.90	0.85
2010	0.19	0.19	0.19	0.24	0.26	0.27	0.25	0.24	0.23	0.30	0.29	0.29
2011	0.44	0.35	0.34	0.33	0.30	0.29	0.34	0.34	0.34	0.33	0.31	0.30
2012	0.39	0.47	0.52	0.21	0.21	0.24	0.24	0.22	0.21	0.19	0.20	0.22

Source: own calculations.

Table 11. Results of the Diebold-Mariano significance test of nowcast error differences in France (loss function based on MSE)

	PMI-ESI	PMI-ZEW	PMI-Ins	ESI-ZEW	ESI-Ins	ZEW-Ins
1M difference	-0.20	-0.30	-0.21	-0.11	-0.02	0.09
p-value	0.16	0.13	0.16	0.08	0.14	0.05
2M difference	-0.19	-0.31	-0.20	-0.12	-0.01	0.11
p-value	0.19	0.12	0.18	0.04	0.10	0.03
3M difference	-0.15	-0.30	-0.17	-0.15	-0.02	0.13
p-value	0.26	0.15	0.24	0.04	0.08	0.03

Source: own calculations.

Table 12. Nowcast root mean squared errors (RMSE) of quarterly GDP dynamics in Italy

	PMI			ESI			ZEW		
	1M	2M	3M	1M	2M	3M	1M	2M	3M
2007-2012	**0.72**	**0.70**	**0.67**	**0.92**	**0.89**	**0.85**	**1.02**	**1.01**	**1.01**
2007	0.49	0.46	0.44	0.53	0.53	0.53	0.74	0.75	0.76
2008	0.80	0.73	0.64	1.01	0.98	0.93	1.25	1.24	1.24
2009	1.33	1.31	1.28	1.77	1.66	1.56	1.83	1.82	1.81
2010	0.51	0.44	0.42	0.58	0.62	0.61	0.66	0.66	0.65
2011	0.32	0.37	0.44	0.13	0.15	0.18	0.36	0.33	0.31
2012	0.35	0.35	0.33	0.50	0.60	0.62	0.47	0.43	0.42

Source: own calculations.

Table 13. Results of the Diebold-Mariano significance test of nowcast error differences in Italy (loss function based on MSE)

	PMI-ESI	PMI-ZEW	ESI-ZEW
1M difference	-0.32	-0.52	-0.20
p-value	0.00	0.00	0.08
2M difference	-0.31	-0.54	-0.23
p-value	0.01	0.00	0.14
3M difference	-0.27	-0.56	-0.29
p-value	0.00	0.00	0.14

Source: own calculations.

Table 14. Nowcast root mean squared errors (RMSE) of quarterly GDP dynamics in Spain

	PMI	PMI	PMI	ESI	ESI	ESI
	1M	2M	3M	1M	2M	3M
2007-2012	**0.40**	**0.42**	**0.46**	**0.34**	**0.32**	**0.31**
2007	0.15	0.15	0.13	0.08	0.06	0.06
2008	0.55	0.53	0.54	0.64	0.60	0.56
2009	0.60	0.69	0.81	0.28	0.21	0.27
2010	0.38	0.38	0.38	0.11	0.15	0.13
2011	0.18	0.12	0.15	0.33	0.28	0.26
2012	0.30	0.34	0.35	0.26	0.29	0.30

Source: own calculations.

Table 15. Results of the Diebold-Mariano significance test of nowcast error differences in Spain (loss function based on MSE)

	PMI-ESI
1M difference	0.05
p-value	0.00
2M difference	0.08
p-value	0.01
3M difference	0.11
p-value	0.01

Source: own calculations.

Streszczenie

PROGNOZOWANIE BIEŻĄCE KWARTALNEJ DYNAMIKI PKB W STREFIE EURO – ROLA WSKAŹNIKÓW KONIUNKTURY

W artykule porównane zostały zdolności najpilniej obserwowanych wskaźników obrazujących nastroje gospodarcze do bieżącego prognozowania kwartalnej dynamiki PKB w strefie euro i jej największych państwach członkowskich. Analizowane są korelacje krzyżowe oraz błędy prognoz poza próbę, wygenerowane z równań szacowanych w oparciu o regresję kroczącą w oknie stałej długości. Wyniki wskazują, że modele wykorzystujące wskaźnik PMI Composite dają na ogół najlepsze wyniki w strefie euro, Niemczech, Francji i Włoszech, podczas gdy bieżąca dynamika hiszpańskiego PKB jest najprecyzyjniej prognozowana przez modele oparte na wskaźniku ESI. Modele oparte na PMI generują relatywnie najlepsze prognozy na początku kwartału, a także w okresach wysokiej zmienności stóp wzrostu PKB.

Słowa kluczowe: *prognozowanie bieżące, wskaźniki koniunktury*

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AGNIESZKA SŁOMKA-GOŁĘBIOWSKA*, PIOTR URBANEK**

Executive Remuneration Policy At Banks In Poland After The Financial Crisis - Evolution Or Revolution?

Abstract

The executive remuneration policy of financial institutions has been indicated as one of the key factors that led to the recent financial crisis. As a consequence a number of legislative initiatives and best practices have been imposed,aimed at strengthening existing and creating new standards of good corporate governance at banks. The purpose of this article is to assess the effectiveness of Poland's new regulations concerning banks' executive pay, which were introduced in the aftermath of the recent financial crisis. The research results indicate that the new legal rules have not been fully enforced. Public banks in Poland are not fulfilling the reporting obligations imposed by law and international principles. Given the crucial importance of executive remuneration policy in the financial sector to the stability of the banking sector, the inability to evaluate the progress made in the adjustment of executive remuneration practices to the new regulations may be perceived as one of the important risk factors that has not been effectively eliminated or even reduced in Poland yet.

Keywords: *corporate governance, compensation policy, banking sector, financial crisis*

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1. Introduction

The recent financial crisis, for which the collapse of Lehman Brothers in 2008 is considered to be the symbolic beginning, showed the importance of executive remuneration policy in financial institutions. The inefficient system of executive pay was pointed out as one of the possible causes of the crisis. It was predominantly short-term oriented, which encouraged excessive risk-taking. As a result, many financial institutions were threatened by bankruptcy, and consequently, the stability of global financial systems was jeopardized. Hence, a number of legislative initiatives and best practices were introduced by international and national institutions responsible for the supervision of financial sectors. They aimed at improving existing and creating new corporate governance standards in the area of executive remuneration.

The purpose of this paper is firstly to examine the evolution of regulation on executive remuneration in public banks operating in Poland. The actual binding law with regard to banker's pay will be compared with international principles. Secondly, the paper focuses on disclosure of the level and the structure of bank's executive pay as well as the remuneration policy, in particular with regard to the use of long-term incentive programsbased on shares. We run the analysis using the sample of all the banks listed on the Warsaw Stock Exchange during 2008-2012. This was a period characterized by a high volatility of macroeconomic conditions and thestock market,as well as a numerous legal changes. It is therefore important to investigate the extent to which banks operating in such a turbulent economic and regulatory environment adapted their practices to the new recommended standards.

2. International regulation for sound executive remuneration practices in the banking sector

Executive remuneration policy is one of the most important instruments of corporate governance. It has attracted a lot of attention at the beginning of this century, when a number of corporate fraudsand accounting scandals related to the excessive pay in underperforming companies were revealed. As a response to the situation,legislative initiatives were introduced to compensate executives in a more effective manner. They focused on improving procedures of setting executive pay and disclosure of executive remuneration systems (Urbanek 2010, pp. 85-86). The most important goal was to link executive income with the corporate results. As a consequence, a significant part of the executive remuneration became variable components - bonuses and deferred share-based

compensation. An important role in the improved process of executive pay setting was played by board remuneration committees.

Issues of executive remuneration policy were raised were for the first time in the *OECD Principles of Corporate Governance*, published in 1999 and updated in 2004. The international standards indicate the necessity of establishing board committees that should focus on key selected areas of board responsibilities, among others executive selection and designing their remuneration scheme. The committees should also have independent board members. OECD principles require public companies to disclose the level and the structure of executive and non-executive remuneration. The scope of thedisclosed information should be sufficient to assess how the executive remuneration may impact corporate performance, as well as to analyze costs and benefits from remuneration schemes and long-term incentive programs. Despite the fact that the OECD principles are quite general, they have become a benchmark for creating national versions of corporate governance codes, including with respect to executive remuneration.

In 2004 the European Commission also issued recommendations for Member States on executive remuneration in public companies. They aimed at improving disclosure of remuneration. Public companies should disclose the executive remuneration scheme, including individual compensation amounts, in the form of a separate report attached to the annual financial statements, which should be available on the company's website. The report should present thecriteria for payout of compensation elements that are based on shares. Additionally, long-term incentive programs based on shares should be approved by the general meeting of shareholders. The next set of the European Commission recommendations,released in 2005, focused on a remuneration committee, which should consist of a majority of independent directors. The most important tasks of the committee encompass design of the executive remuneration scheme, monitoring the level and structure of executive remuneration, presenting opinions to the board on the choice between granting options to subscribe or to purchase shares.

In April 2009 the European Commission issued recommendations on the remuneration of directors of listed companies that completed the EC Recommendations issued in 2004 and 2005.[1] These recommendations seek to address the design of pay packages and remuneration policies in order to promote the growth of the company in the long run by maintaining a proper

[1] European Commission Recommendation of 30 April 2009 on remuneration policies in the financial services sector (2009/384/EC) complementing Recommendations 2004/913/EC and 2005/162/EC as regards the regime for the remuneration of directors of listed companies.

balance between all remuneration components. Great attention is paid to the process of setting variable components of remuneration, severance payment and stock-based pay. In addition, a number of new mechanisms, such as cash incentive deferral, reduction of bonus in the case of subdued or negative corporate performance in the long-term (malus), or reclaiming bonuses paid based on results that later were proven to have been misstated, are introduced. Adoption of the clawback arrangements can be incorporated also in situationswhere there was a breach of the internal procedures of the company. Also, severance pay has been changed by the EC recommendations. Its level should be narrowed down and itshouldn't be paid out if the relevant results are not delivered. The performance criteria which are a basis for remuneration payments should be aligned with long-term value creation and prudent risk-taking.

Until 2009, there was no separate regulation on executive remuneration for financial institutions which took into account the specific nature of the corporate governance of banks. This specificity is made up of a number of factors: systemic risk, the scale and nature of banking operations, interdependencies between the entities of the financial sector, innovative financial instruments, the complex structure of ownership and control of large financial groups as well as thedynamic changes which take place in banks' business models. An area that is closely linked with corporate governance is bank's risk management. Failures and weaknesses of bank's corporate governance can, to the large extent, be viewed as contributing to the recent financial crisis. The pre-crisis practice of executive remuneration in banks was not aligned with prudent risk-taking behaviour, as pay structures were too much focused on short-term gains, which led to excessive risk taking.

Drawing lessons from the crisis, the European Commission in 2009 formulatedRecommendation 384 - that executive remuneration policy should be tied to the level of bank's risk appetite. Thispostulates that the current and future risk, cost of capital and liquidity ratios should be taken into account during the process of determining the criteria for measuring abank's performance and the goals achieved by the individual members of the management board. The rules for setting the executive remuneration components policy also stress that executive pay should be linked to the bank's performance, thatthe criteria used for measuring both abank's performanceand the individual results should be the risk-adjusted, and thatthe eligibility criteria for share-based compensation should be clearly formulated. Most of the European countries did not follow the European Commission recommendations at a satisfactory level.[2] As a result, the Commission decided to issue principles on remuneration in financial institutions

[2] European Commission, Green Paper. Corporate governance in financial institutions and remuneration policies, Brussels, 2010.

through a directive, including them in the revised Capital Requirements Directive (CRD III).[3] The national banking supervisory authorities are obliged to oversee the remuneration policy and, if necessary, to enforce the Directive's requirements through a system of sanctions.

The provisions of CRD III coins a new term - Material-Risk-Takers (MTR) - which indicates a group of people whose professional actions can have a material effect on a bank's risk exposure. The group encompasses " ... at least executive directors, individuals who make decisions regarding risk, staff engaged in control functions and any employee whose total remuneration, including discretionary pension benefit provisions, is at the level of executive directors and of individuals who make decisions regarding risk."[4] For them, the ratio between cash payments and share-based remuneration must be adjusted to the level of risk taken. CRD III strictly defines,and sets minimumrequirements, onwhat part of variable remuneration should be deferred and for how long, as well as how much should be paid in shares or in their equivalent. Theproportion of deferred component is to be set at minimum of 40% over at minimum of three years, and for senior executive directors such as CEOs, at minimum of 60%. A minimum of 50% of the variable compensation shall be awarded in shares or in other non-cash instruments. Furthermore, financial institutions are required to establish a board remuneration committee. Last but not least, there is a great emphasis on the important role played by the disclosure of compensation practices. All the procedures related to setting the level and the structure, as well as the criteria, for executive remuneration payout should be disclosed .

Table 1. Evolution of international principles concerning executive remuneration policy in public banks

	2005[a]	**2005[b]**	**2005[c]**	**2009[d]**	**2009[e]**	**2010[f]**
Transparency of executive remuneration policy - the scope of disclosure:						
- description of the main design characteristics		+			+	+
- description of long-term incentive programs paid in shares or share-linked instruments.		+		+		
- individual disclosure		+				

[3] Directive 2010/76/EU of the European Parliament and of the Councilof 24 November 2010amending Directives 2006/48/EC and 2006/49/EC as regards capital requirements for the trading book and for re-securitisations, and the supervisory review of remuneration policies.

[4] Ibidem, point (3).

- Disclosure of all executive pay elements and the parameters for their payout		+		+	+	
- severance payments		+		+		
- other non-cash remuneration components		+		+		
- annual reports on executive remuneration		+				
Mechanisms for Pay and Governance Structure: - Existence of a Remuneration Committee	+		+	+		+
- Composition of the Remuneration Committee and its tasks.	+		+	+		
- procedures for executive remuneration schemes				+	+	+
- components of executive remuneration					+	+
- recommendation for using long-term incentive programs paid in shares or share-linked instruments.						+
- shareholders' approval for long-term incentives programs paid in shares or share-linked instruments		+				

a - OECD Principles of Corporate Governance, 2004.

b - European Commission Recommendation 2004/913/ECfostering an appropriate regime for the remuneration of directors of listed companies (Official Journal 385/55).

c - European Commission Recommendation 2005/162/EC onthe role of non-executive or supervisory directors of listed companies and on thecommittees of the (supervisory) board,(Official Journal 52/51).

d - European Commission Recommendationof 30 April 2009 complementing Recommendations 2004/913/EC and 2005/162/EC as regards the regimefor the remuneration of directors of listed companies 2009/385/EC [Official Journal120/28].

e - European Commission Recommendation of 30 April 2009 on remuneration policies in the financial services sector (2009/384/EC) complementing Recommendations 2004/913/EC and 2005/162/EC as regards the regime for the remuneration of directors of listed companies. (Official Journal 120/22).

f - Directive 2010/76/EU of the European Parliament and of the Council of 24 November 2010 amending Directives 2006/48/EC and 2006/49/EC as regards capital requirements for the trading book and for resecuritizations, and the supervisory review of remuneration policies (Official Journal 329/3).

Source: Own analysis based on the following documents.

Table 1 summarizes the most important international standards regarding executive remuneration policy in financial institutions, and it demonstrates some trends.In the pre-crisis period legal initiatives on executive remuneration were directed to all companies, irrespective of their sector. The main emphasis was put primarily on disclosure of executive remuneration in accordance with the assumption that market allocation mechanisms, acting on the basis of price signals coming from the labour market for executives,play a major role in the

process of setting executive pay. In practice, this would mean that well-informed shareholders and capital markets are capable of puttingpressure on the boards and makingthem create effective systems of remuneration. During this period the establishmentof boards remuneration committees, composed mainly of independent board members,was highly recommended. Shareholders were advised to get involved to a greater extent in the process of creating the rules of executive remuneration policy through approval of their long-term incentive programs based on shares.

However, the experience of the recent financial crisis experience has shown that it is necessary to mobilize - complementary to market mechanisms - methods of influence on the executive remuneration. The European Commission recommendation of 2009 put special emphasis on the procedure for setting executive remuneration, in particular on performance criteria, the structure of executive pay and rules of payout, as well as limitations on granting severance pay. Special regulations dedicated solely to financial sector institutions have emerged.

3. Regulation of executive remuneration in public banks in Poland

In Poland, the first regulation on executive remuneration was introduced to Accounting Act[5] and Council of Ministers Directives,[6] whichconcentrated solely on disclosure and were applicable to all public companies. Both required disclosure of the total remuneration of all executive directors and board members.

The corporate governance code - so-called the Best Practices of Public Companies –was published in 2002 andbrought abouta significant breakthrough. Section 39 stated that "[t]he total remuneration of all executive directors should be disclosed in the annual report, broken down into all components of remuneration. If the remuneration of individual executive directors differs significantly, it is recommended to publish appropriate justification."[7] In 2005 significant changes were introduced to the disclosure procedures with respect to executive remuneration. In the revised version Section 39 was replaced by the following:"[t]he total remuneration of all executive directors, as well as the

[5] The Accounting Act of 29 September 1994 (Official Journal No 121, item 591).

[6] The Council of Ministers Ordinance dated October 16, 2001 regarding the type, form and scope of current and periodic information and dates of its passing by issuers of securities admitted to public trading (Official Journal No 139 item 1569); The Council of Ministers Ordinance dated August 11, 2004 on detailed requirements applicable to the issuance of prospectuses and abbreviated versions of such prospectuses (Journal of Laws No. 186, item 1921).

[7] Code of Best Practice for WSE Listed Companies as of 2002, Warsaw Stock Exchange, p. 10.

individual pay, together with a breakdown of its various components, should be disclosed in the annual report with information on the procedures and principles of its establishment." The greatest novelty laidin the appointment of two supervisory board committees: the audit and remunerationcommittees –in Section 28. Their tasks should be set forth in detail in the Supervisory Board Rules.The committees should submit annual reports on its activities to the supervisory board, which shouldalso be available to shareholders.

In the next edition of the corporate governance code, as of 2005, the section on disclosure of executive remuneration was missing. It was removed and established as hard law, namely the Minister of Finance Directives on current and periodic information to be published by the issuers of securities.[8] According to this document the scope of mandatory disclosures include "... the value of salaries, bonuses and additional benefits, including those arising from long-term incentive programs usually equity-basedas well as programs based on senior bonds, convertible bonds, subscription warrants (in cash or non-cash), paid, accrued or potentially payable to each of the board members regardless of whether they were included in the company's costs or resulted from profit sharing. If the issuer is a parent company, jointly controlled entity or a significant investor - separate information on remuneration and rewards received with regards to all duties in the subsidiaries should be included; if the information is presented in the financial statements - the obligation shall be deemed satisfied by an indication of their inclusion in the financial statements".

The next editions of the Polish corporate governance codes, as of 2010 and 2012. refer directly to the European Commission Recommendationsof 2004 and 2009. The stock exchange requires all public companies to follow the European Commission recommendation on executive remuneration, while it completely ignores the recommendation on executive remuneration in the financial institutions. The Financial Markets Supervisory Authority in Poland has been in charge of implementing the European standards on executive pay in the financial sector only since2011. Poland was one of the last Member States of the European Union to take legislative steps to adapt to the CRD III Directive. It did so by amending the Banking Act,[9] the Act on Capital Market Supervision, and the Act on Trading in Financial Instruments .

According to the new law, the Financial Supervisory Authority is in a position to determine the variable remuneration policy for executive board

[8] Decree of the Ministry of Finance dated 19 October 2005 on current and periodic information provided by issuers of securities (Official Journal from 2005, No 209, item 1744 § 95.

[9] The Banking Law Act of 1997, as amended 28 April 2011 and the Act on trading in financial instruments and certain other laws (Official Journal from 2011 No 131, Item 763).

members at banks by issuing a resolution.[10] As a result, an FSA resolution has become the most comprehensive Polish piece of law on variable remuneration policies in the banking sector. One of its chapters is devoted entirely to the issue of executive remuneration in banks. This new regulation will certainly bolster the authority of the remuneration committee. It should be established at a bank that fulfils at least *one* of the following conditions: is listed on the stock exchange; holds at least 1% of the assets of the banking sector; holds at least 1% of deposits of the banking sector; or holds at least 1% of the own funds of the banking sector. The regulator's resolution does not delineate the tasks of the remuneration committee. It just mentions one - issuing an opinion on the policy applicable to the variable component of executive remuneration that should support the long-term growth of the bank's and shareholders' value.

The FSA resolution focuses on determining the variable remuneration components. The Supervisory Board is responsible for designing remuneration policy for the variable components, including unspecified pension benefit provisions, which must be preapproved by the remuneration committee. The policy should encompass all executive directors as well as individuals reporting directly to the management board members, regardless of the basis of their employment, branch directors and their deputies, chief accountants, those employees responsible for control/supervisory functions in the bank, and any individuals whose activities significantly impactthe bank's assets andliabilities. It is further provided, however, that the list should cover all people who have a material impact on the bank's risk profile.

The total executive remuneration should be set in such a way as to maintain a balance between fixed and variable remuneration, in order to enable decreasing or disallowing the variable components if the goals are not met. Whensetting the variable remuneration, not only shouldthe individual results be measured and assessed, but also the results of the entire bank should be taken into account. Each component should be linked to the bank's performance, however the performance measures shall be risk-adjusted, imposed by the bank's activities as well as the bank growth cycle. It provides that the individual evaluation should take place at least after 3 years, or when the risk materializes.

In order to encourage bank executives to take into account the long-term growth of the company, at least 50% of variable remuneration must be based on shares or corresponding non-cash instruments that reflect the quality of credit

[10] Resolution no. 258/2011of the Polish Financial Supervision Authorityof 04 October 2011on Detailed Principles of Functioning of the Risk Management System and Internal ControlSystem and Detailed Conditions of Internal Capital Assessment by Banks and of Reviewingthe Process of Internal Capital Assessment and Maintenance and the Principles ofDetermining the Policy on Variable Components of Remuneration of Persons HoldingManagerial Positions at a Bank.

institutions. In addition, banks should have a share retention policy in place, and 40% of variable pay -and in the case of particularly large amounts up to 60% -is subject to a mandatory deferral for a period of three to five years. The payout, in equal annual instalments payable in arrear, is subject to the individual performance and its evaluation, whichtakes into account the goals set for the individual and the bank as a whole, as well as the bank's risk level, business cycle, the nature of the business, its risks and scope of responsibilities of the evaluated executive director.

When the contract with an executive director is terminated, his(or her) severance payment should depend on his productivity and the quality of his work, so as not to reward poor performance. His retirement benefits should be based on bank shares. The FSAresolution stipulates, however, that the benefits are payable only after five years from the date of termination. In the case of an executive director who has reached retirement age, the bank pays their pension benefits in the form of shares or their equivalent, provided that the employee sells them after a period of five years from the termination of the contract.

Table 2. Evolution of the regulation of executive remuneration policy in public banks in Poland

Code of Best Practice for Warsaw Stock Exchange (WSE) Listed Companies	**2002**	**2005**	**2007**		**2010**		**2012**
Legal rules		**2005**[a]		**2009**[b]		**2011**[c]	**33**
Transparency of executive remuneration policy - the scope of disclosure: - description of the main design characteristics		+		+	+		+
- description of long-term incentive programs paid in shares or share-linked instruments.					+		+
- individual disclosure	+	+		+			
- Disclosure of all executive pay elements and the parameters for their payout		+		+	+		+
- severance payments		+		+	+		+
- other non-cash remuneration components		+		+	+		+
- annual reports on executive remuneration							
Mechanisms for Pay and Governance Structure: - Existence of a RemunerationCommittee		+	+		+	+	+

- Composition of Remuneration Committee and its tasks.		+	+		+	+	+
- procedures for executive remuneration schemes					+	+	+
- components of executive remuneration					+	+	+
- recommendation to use long-term incentive programs paid in shares or share-linked instruments.						+	
- shareholders' approval for long-term incentive programs paid in shares or share-linked instruments					+		+

a - Decree of the Ministry of Finance dated 19 October 2005 on current and periodic information provided by issuers of securities,[11]

b - Regulation of the Minister of Finance dated February 19, 2009 on current and interim information delivered by issuers of securities and conditions for recognizing as equivalent the information required by the laws of a non-member state,[12]

c - The Banking Law Act of 1997,as amended 28 April 2011; Resolution no. 258/2011of the Polish Financial Supervision Authority of 04 October 2011 on Detailed Principles of Functioning of the Risk Management System and Internal Control System and Detailed Conditions of Internal Capital Assessment by Banks and of Reviewing the Process of Internal Capital Assessment and Maintenance and the Principles of Determining the Policy on Variable Components of Remuneration of Persons Holding Managerial Positions at a Bank.

Source: Own analysis based on the following documents.

Analysis of the evolution of the regulations related to bank executive remuneration indicates the presence of several regularities (Urbanek, Wieczorek 2012). First, most of the rules on executive remuneration were contained in the corporate governance code, although in a generic manner, prior to theirintroduction into the law (Table 2). This sequence derives from the fact that the corporate governance code is much more flexible and its implementation does not require passing throughan arduous parliamentary legislative procedure. It also makes it possibleto reach high corporate governance standards by trial and error. Hence those rules that well fit the country's institutional context are moved into the hard law. Secondly, there is a gap between the time when international standards are introduced and the period of implementation to either Polish regulations or the corporate governance code. The delay in implementation of the European Commission recommendations of 2004 amounted to almost three years. Thirdly,

[11] Decree of the Ministry of Finance dated 19 October 2005 on current and periodic information provided by issuers of securities (Official Journal from 2005, No 209, item 1744 § 95).

[12] Regulation of the Minister of Finance dated 19 February 2009 on current and interim information delivered by issuers of securities and conditions for recognising as equivalent the information required by the laws of a non-member state (Journal of Laws No. 33 item 259 § 91).

the analysis of different versions of Polish corporate governance codes reflects anevolutionary approach to the issues surrounding executive remuneration. Until the recent financial crisis , the Warsaw Stock Exchange Councilrecommended to public companies a relatively narrow range of disclosures, and no procedures with respect to setting executive remuneration. The real breakthrough appeared in 2010, when the newest version of the Polish corporate governance code made reference to the European Commission recommendations of 2004 and 2005. Also, it took two years to implement the international standards on executive remuneration in financial institutions, which was enforced by the adoption of the CRD III Directive.

Executive remuneration inpublic banks in Poland - results of empirical research

The analysis of executive remuneration policy was conducted on a sample of all 16 banks listed on the Warsaw Stock Exchange. It is based on unique hand-collected data from annual reports of public banks for the period 2008-2012. The timeframe for which data was collected enables the examination of executive remuneration policy during the economic downturn and upturn. The first two years of the study mark a period of decline in the capital market, while the next three years were characterized by a gradual catching up on losses previously incurred. In latter period there were also significant changes in the regulatory environment of public banks, including extended regulation of executive remuneration. Thus, it seems worthwhile to assess the extent to which banks operating in such a turbulent economic and regulatory environment adopt their practices on executive remuneration.

We commence the analysis of bank's executive remuneration in Poland by scrutinising one of its important features - transparency. This is considered to be one of the most important attributes of good corporate governance. High transparency in any aspect of corporate governance bolsters confidence in the capital market and creates an atmosphere of openness. Shareholders and other stakeholder groups have a right to full information about the bank, including information on executive remuneration policy. This disclosure is one of the most important prerequisites for the curbing opportunistic behaviour on the part of managers. An objective evaluation of the quality of the service provided by executive directors requires access to information on the level and structure of other executives pay as well. Disclosure is enforced by sanctions such as reputation and social control based on the rule ‘name it and shame it’ (Słomka – Gołębiowska 2012).

Taking into account the evolution of the regulatory framework for executive remuneration, in particular its transparency, as well as the significant changes introduced to the corporate governance code since 2010, one could expect a real quantitative and qualitative leap in terms of the scope of the disclosures. In accordance with rule I.1. of the Polish corporate governance code, a company should follow the European Commission recommendation no. 913 of 2004, which imposes an obligation to disclose, *inter alia*, remuneration paid in the form of profit sharing or bonus, severance payments, an estimated value of non-cash benefits, as well as an accurate description of the share-based incentive programs. However, Table 3 shows onlyvery minor improvements in the disclosure of executive remuneration in public banks in Poland during the period 2008-2012. Most of them did not change their disclosure practices on executive remuneration. Only three banks increased the number of disclosed components of the remuneration package, while a few banks actually limited the scope of the disclosure. Last but not least, four banks consistently did not break the total CEO remuneration into any components at all for the entire period of the study.[13]

None of the banks described the remuneration policy in any section of the annual financial statement, despite the fact that such an obligation arises not only from the international principles but also from the Polishbanking law.[14] Both the European Commission as well as international organizations such as the FSB stress the importance of transparency of executive remuneration policy. Financial institutions should show the remuneration policy objectives, criteria and time horizon of the assessment, the method of applying risk adjustment to bank's performance measures, linkages between variable executive pay and a bank's overall financial performance, thestructure of remuneration packages, incentive programs based on shares or similar instruments, as well as rules of severance payment. The lack of such information results in the anomaly that we know how much banks' executive directors earn, but we do not know why. The answer to the lastquestion is crucial for assessing the merits of executive remuneration policy in banks.

[13] An example of bypassing disclosure obligations arising from the regulations is offered by the practice of PKO BP SA, which in its annual reports presents only the total remuneration of the CEO. Att the same time one can read in the report that the bank complies with Code of Best Practice for WSE Listed Companies: "... PKO Polish Bank SA adopted in 2011 the necessary measures to ensure full compliance with Code of Best Practice for WSE Listed Companies. In the opinion of the Board, in 2011 PKO Polish Bank SA does not depart from the rules contained in the Code ... "

[14] The Banking Law Act of 1997 as amended 28 April 2011 (Journal of Law from 2011 No 131, item 763); Point 111a Section 1: "1.The Bank shall, subject to paragraph. 2, announce to the public and generally make available: ... 2) The rules for determining the executive remuneration in the bank."

In assessing the standards of transparency of executive remuneration policy in the public banks operating in Poland, two important issues can be raised. First, banks, as institutions of public trust, should be role models for non-financial listed companies in implementing good standards of corporate governance. So far, they have not fulfilled the reporting obligations on disclosure of executive remuneration imposed by law. Secondly, given that the flawed executive remuneration policy in financial institutions is perceived as a cause of the recent financial crisis, the lack of ability to assess the executive remuneration practices can be seen as one of the important risk factors forfinancial stability, and onethat Poland has not been effectively eliminated or reduced.

Table 3. Disclosure of the structure of executive remuneration in public banks in Poland – number of disclosed components of the total executive pay

	2008	2009	2010	2011	2012
BOŚ	1	1	1	1	1
BPH	5	3	4	4	4
BGŻ	0	0	3	3	3
BRE	3	3	4	4	5
BZ WBK	2	2	2	2	2
Alior Bank	-	-	-	-	2
Paribas Fortis	3	3	3	3	N.A.
Kredyt Bank	4	4	4	4	4
DZ Polska	1	1	1	-	-
Bank Handlowy	3	3	3	3	3
ING	2	3	3	3	3
Millennium	2	2	2	2	2
Noble Bank	1	2	2	2	2
Nordea	1	1	1	1	1
Pekao S. A.	3	3	3	3	3
PKO BP	1	1	1	1	1

Source: Own analysis based on banks' financial statements.

Our analysis also covers the procedures for determining the remuneration policy. The empirical research results demonstrate that excessive and imprudent risk was one of the main reasons that led to financial problems and thebankruptcy of many financial institutions. The evidence is convincing that poorly designed compensation arrangements encouraged excessive risk taking. Hence, the post-crisis recommendations have imposed new rules for the calculation and payment of variable executive remuneration components, including both bonuses as well as the long-term incentiveprograms based on

shares. Annual bonuses should be dependent on the bank's performance. This increases the degree of aggressiveness of executive remuneration policy and introduces an element of risk for executive directors. This should ensure executives' dynamism in running a bank and put pressure on them toimprovethe bank's performance.

Due to the lack of transparency of banks' remuneration policy (Table 4), it is very difficult to assess whether the banks in our sample used aggressive executive remuneration mechanisms. During the period 2008-2012 only five banks revealed information about the amount of bonuses granted to theirCEOs. Furthermore, it is highly exceptional to see additional explanations of the period for which a bonus is granted and is paid out. None of the banks disclose the performance criteria on which any entitlement to the variable components of executive remuneration is based. Such practices stand in sharp contrast to the European Commission recommendation no. 913 of 2004, as well as the FSA Resolution according to which "... variable remuneration should be accounted for and paid in a transparent manner to ensure effective implementation of the policy variable components of executive remuneration".[15]

Table 4 demonstrates that public banks in Poland pursued conservative as opposed to aggressive executive remuneration policy (Słomka-Gołębiowska 2013, pp. 135-154). The banks' supervisory boards are reluctant to motivate executive directors via granting significant variable remuneration. Only two banks - BPH and Paribas Fortis - rewarded their CEOs with a significant portion of total remuneration in the form of bonusesin each of the studied years. Definitely there are more cases where bonuses were not paid at all or their sharein the total pay was negligible. This may reflect the bank's interpretation of the FSAResolution suggesting that the fixed component should account for a large enough proportion of the total remuneration. This allows for the flexibility of policy variable remuneration, including the lowering bonusesor not paying any out at all.

The analysis does not indicate any significant changes in executive remuneration policy at the public banks in Poland following the recent crisis. There is no increase of the variable remuneration component since 2010, when the bank's corporate results have notably improved. It is also not possible to assess how banks comply with the FSA recommendations requiring the deferment of bonus payments and payments in shares or share-linked instruments.

[15] Resolution no. 258/2011of the Polish Financial Supervision Authority of 04 October 2011, § 29.12.

Table 4. The ratio of bonuses in total CEO remuneration in public banks in Poland

	2008	2009	2010	2011	2012
BOŚ	N.A.	N.A.	N.A.	N.A.	N.A.
BPH	44,2%	28,9%	39,3%	35,8%	40,5%
BGŻ	N.A.	N.A.	14,5%	26,4%	14,5%
BRE	0,0%	54,1%	3,5%	13,5%	43,4%
BZ WBK	N.A.	N.A.	N.A.	N.A.	N.A.
Alior Bank	-	-	-	-	0,0%
Paribas Fortis	44,1%	28,6%	32,1%	31,0%	N.A.
Kredyt Bank	7,0%	14,8%	0,0%	8,7%	39,1%
DZ Polska	N.A.	N.A.	N.A.	N.A.	N.A.
Bank Handlowy	N.A.	N.A.	N.A.	N.A.	N.A.
ING	N.A.	N.A.	N.A.	N.A.	N.A.
Millennium	N.A.	N.A.	N.A.	N.A.	N.A.
Noble Bank	N.A.	N.A.	N.A.	N.A.	N.A.
Nordea	N.A.	N.A.	N.A.	N.A.	N.A.
Pekao S. A.	34,6%	13,4%	17,2%	20,5%	15,3%
PKO BP	N.A.	N.A.	N.A.	N.A.	N.A.

Source: Own analysis based on banks' financial statements.

Both the international principles and national regulations on executive remuneration strongly emphasize the use of long-term incentive programs that are based on sharesfor financial institutions. Assessment of the use of long-term incentives by public banks in Poland encounters similar difficulties as the evaluation of payment of bonuses. The supervisory authority has imposed no uniform standards of disclosed information on long-term share-based remuneration. Hence, it is almost impossible to compare different long-term incentive programs in public banks in Poland.

Table 5 shows that ten banks out of 16 had some kind of long-term incentive program involving payment in share-linked instruments. However, only three banks designed them based on its own equity of the issuer. Two other banks offered their executives additional participation in the motivation program that is run within the capital group. Five banks exclusively used long-term incentiveprograms based on shares of the parent bank. This latter case is inconsistent with the main objective of such schemes, which aim at enhancing bank's long-term value creation for shareholders and other stakeholders. Such programs serve to motivate executives' efforts. In addition, the interpretation of the FSAResolution[16] is clear. It stresses that the payment of share-based remuneration should not be made in shares of the parent company. Moreover,

[16] Resolution no. 258/2011of the Polish Financial Supervision Authority of 04 October 2011.

a substantial proportion (e.g. more than fifty percent) of variable remuneration should be awarded in shares or share-linked instruments in order to create incentives aligned with the creation of long-term value for a bank.

The importance of the long-term incentive programs can be measured by the ratio of share-based compensation to the executive remuneration. Table 5 shows that only Noble Bank and Alior Bank resembled banks from the European Union, as their proportion of shares in total pay is higher than 30%. In other public banks in Poland the income from shares and share options did not exceed 10% of the total executive remuneration. Also, there were no significant differences in theuse of share-based programs by banks during the recent crisis 2008-2009 and in the post-crisis period. The low transparency in the reporting makes it difficult to assess whether banks are complyingwith the FSA resolution.

Table 5. The ratio of the value of long-term incentive programs based on shares or similar instruments to total executive remuneration

	2008	**2009**	**2010**	**2011**	**2012**
BOŚ	0,0%	0,0%	0,0%	0,0%	0,0%
BPH*	15,4%	7,1%	8,6%	6,9%	6,2%
BGŻ	0,0%	0,0%	0,0%	0,0%	0,0%
BRE***	0,0%	0,0%	7,2%	7,7%	4,5%
BZ WBK**	N.A.	N.A.	N.A.	N.A.	N.A.
Alior Bank**	N.A.	N.A.	N.A.	19,8%	87,47%
Paribas Fortis*	1,2%	1,3%	1,1%	1,3%	6,6%
Kredyt Bank	0,0%	0,0%	0,0%	0,0%	0,0%
DZ Polska	0,0%	0,0%	0,0%	0,0%	0,0%
Bank Handlowy*	5,5%	2,4%	4,1%	11,9%	7,7%
ING*	0,0%	0,1%	0,5%	0,7%	1,9%
Millennium	0,0%	0,0%	0,0%	0,0%	0,0%
Noble Bank**	0,0%	0,0%	35,8%	46,2%	13,4%
Nordea*	6,3%	6,0%	10,1%	3,9%	N.A.
Pekao S. A.***	2,9%	3,5%	17,0%	16,0%	6,8%
PKO BP	0,0%	0,0%	0,0%	0,0%	0,0%

* programs based on shares of the parent bank

** programs based on the equity of the issuer

*** programs based on shares of the parent bank and ** programs based on the equity of the issuer

Source: P. Urbanek, Programy partycypacji we własności jako narzędzie polityki wynagradzania kadry kierowniczej na przykładzie banków publicznych w Polsce (Participation programs in equity as a remuneration policy instrument for supervisory directors: the case of Poland), "Law and Economics" conference proceedings, Toruń 2013.

4. Conclusions

The recent financial crisis revealed the consequences of inefficient executive remuneration practices in financial institutions. Executive remuneration policy which encourages excessive risk-taking in the banking sector may threaten the viability of a bank and the stability of the financial system. In reaction to the financial crisis certain actions were undertaken, among them amendments to the supervisory framework for the financial sector. A number of legislative initiatives were adopted by international organizations and national regulators which aimed at strengthening existing and creating new standards of executive remuneration policy.

The above analysis shows that the specific regulatory gap that existed between the regulations binding in Poland and those legal rules applicable to foreign financial institutions was removed in 2011 due to implementation of the CRD III Directive. However, the research results indicate that the new legal rules have not been completely enforced. Public banks in Poland arenot fulfilling the reporting obligations imposed by law and international principles. Hence, it is hardly possible to assess whether they comply with the FSArecommendations on the structure of the variable component of bank's executive pay. Given the crucial importance of executive remuneration policy in the financial sector to the stability of banking sector,the inability to evaluate the progress in adjusting executive remuneration practices to the new regulations may be perceived as one of the important risk factors that has not been effectively eliminated or even reduced in Poland yet.

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Streszczenie

POLITYKA WYNAGRADZANIA KADRY ZARZĄDZAJĄCEJ W SEKTORZE BANKOWYM W POLSCE PO KRYZYSIE FINANSOWYM – EWOLUCJA CZY REWOLUCJA?

Polityka wynagradzania osób zarządzających instytucjami finansowymi została zidentyfikowana, jako jeden z kluczowych czynników, który doprowadził do ostatniego kryzysu finansowego. Reakcją na dysfunkcjonalności tej polityki są liczne inicjatywy legislacyjne i środowiskowe mające na celu wzmacnianie istniejących i tworzenie nowych standardów regulujących ten obszar nadzoru korporacyjnego. Celem artykułu jest ocena skuteczności nowych regulacji obowiązujących banki publiczne w Polsce wprowadzonych po ostatniego wybuchu kryzysu finansowego. Stosowane przez banki praktyki zostaną skonfrontowane ze standardami prawnymi i środowiskowymi.

***Słowa kluczowe**: ład korporacyjny, polityka wynagradzania, banki, kryzys finansowy*

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AGNIESZKA PACH-GURGUL*

Significance Of The Climate And Energy Package For The Development Of Renewable Energy Sources In The European Union

Abstract

The utilisation of renewable energy in the European Union seems, at the present stage of energy policy development, inevitable. It offers many benefits, including, above all:

- *the possibility of increasing the energy security of a given state or region thanks to the diversification of the sources of energy supply,*
- *the limitation of imports from energy suppliers, such as of natural gas or oil, thus reducing dependence on imported fossil fuels,*
- *ecological effects connected with the elimination of greenhouse gas emissions and other substances harmful to the natural environment,*
- *economic and social benefits, such as the creation of new jobs.*

The Climate and Energy Package obliges member states to pursue a common aim – to increase the share of renewable energy to 20% in the general energy balance of the European Union by 2020. This is a challenging task, since the renewable energy sector requires significant financial support to increase its competitiveness, compared to traditional energy sources. When adopting the Energy Package, leaders of member states did not anticipate the economic crisis and its impact on the European Union's economy, and on the energy sector in particular.

***Keywords**: climate and energy package, renewable energy sources, European Union policy, energy security, energy mix, instruments for supporting development of RES*

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1. Introduction

Development of the renewable energy supplies worldwide seems inevitable due to limited natural fossil fuel resources and the need to increase the security of the energy supply of individual countries. Moreover, a fundamental advantage of renewable energy sources is the fact that, apart from the energy production effect itself, they offer a positive environmental effect, including the reduction of conventional fuel consumption and curbing harmful emissions of CO_2.

By promoting the development of renewable energy supplies, the European Union hopes to reduce reliance on imports of fossil fuels from outside the EU and create new jobs associated with this sector, hence in recent years it has directed its energy policy towards supporting the development of renewable energy supplies. The path it has chosen to achieve this goal is the realisation of the energy and climate package, also named the "3x20% Package". It provides for increasing the share of renewable energy up to 20% of the overall energy consumption in the European Union by 2020. This goal will be very difficult to achieve, since investments in renewable energy sources - being very specific expenditures in tangible goods - require huge outlays, often at the cost of other sectors and branches. Moreover, these investments are of a long-term nature, requiring adequate legislation to ensure they provide an appropriate return rate for investors.

The purpose of this paper is to:

- define the factors determining the share of the renewable energy supply sources in the energy consumption balance of the European Union,
- explain the idea underlying the Climate and Energy Package and determine the status of fulfilment of the provisions relating to the sources of renewable energy,
- review the prospects for the development of sources of renewable energy in the EU by 2020.

2. The Idea of Renewable Energy Sources, and Their Share in the Energy Consumption Balance of the European Union

A simple classification divides sources of energy into renewable and non-renewable. Non-renewable sources include fossil mineral fuels such as hard coal, lignite, crude oil or natural gas. These sources are finite and their quantity

is limited. The rate of their extraction has been rapidly increasing in the last century and is still very high; the world's supply of these resources has become severely depleted.

On the other hand, renewable sources are characterised by a specific feature – their exploitation in a given place does not deplete the general resource: solar radiation, wind, rivers, sea currents and tides, and biomass (Ligus 2010).

In the report of 1972 published by the Club of Rome (*The Limits to Growth* Meadows, Meadows, Randers, Behrens, 1972) a pessimistic scenario for the world was presented, predicting that natural resources would be exhausted (by 1990 the entire supply of oil and gas resources was predicted to be depleted) and, due to their insufficient quantity, interruptions in their supply were to inevitably occur. While these predictions have not materialised, nevertheless today some people still think that the world's production of crude oil has reached its maximum, so-called "peak oil", which means that further deposits will be more difficult to find and extract. Others point out that new discoveries of oil in Brazil and shale gas in the USA, as well as deposits of alternative minerals, recede the spectre of collapse of the fuel supply, and contradict the theory of exhaustion of resources. The discourse has stimulated the search for fuel substitutes and the development of new technologies – including renewable sources of energy.

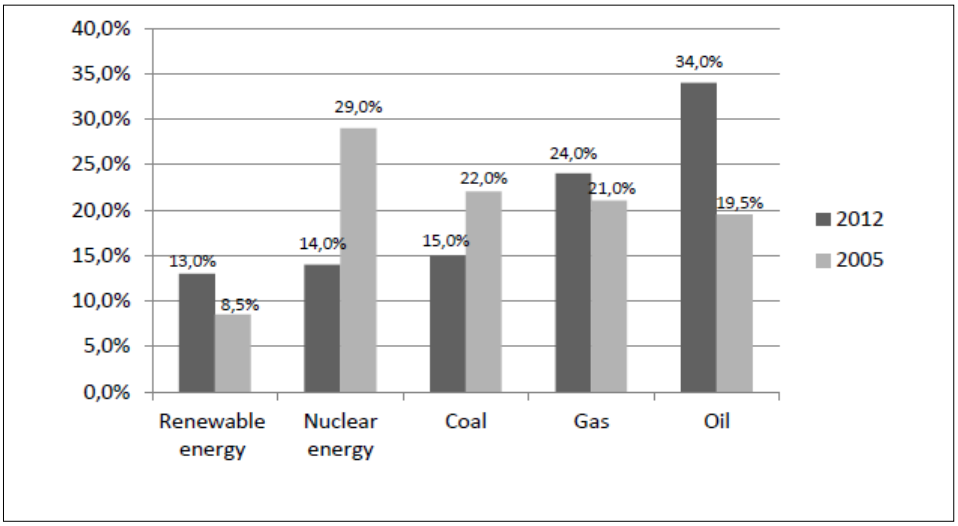
In connection with the limited character of resources as well as events such as oil shocks, gas crises, and spikes in fuel prices, the European Union has strongly engaged in the development of renewable sources of energy. It became one of the priorities of European energy policy, interlinked with its three principal goals:

1. Energy security of EU countries
2. Competitiveness of the EU economy
3. Protection of the natural environment against the harmful effects of energy production, supply and consumption.

Moreover, the utilisation of local, renewable sources of energy facilitates the diversification of energy supply, which is deemed to be very important in the context of the EU's strong dependence on fossil fuel imports. Apart from increasing the level of self-dependence in terms of energy, the use of renewable energy sources also offers environmental advantages. The main attractive feature of renewable sources of energy is their substitution of high-emission fossil fuels. They thus play a key role in the realisation of the EU's idea of decarbonisation of the economy and its climate policy. The European Union also counts on social effects stemming from the utilisation of renewable energy sources, such as the creation of additional employment opportunities and the economic stimulation of regions.

In 2012, the total energy needs of the EU, in terms of its gross consumption of energy, consisted of 34% oil, 24% natural gas, 15% fossil fuels (coal), 14% nuclear energy, and 13% by energy from renewable sources (hydropower and wind energy) *(Energy challenges and policy, Commission contribution to the European Council*, Fig. 1*).*

Figure 1. Energy balance of European Union in 2005 and in 2012



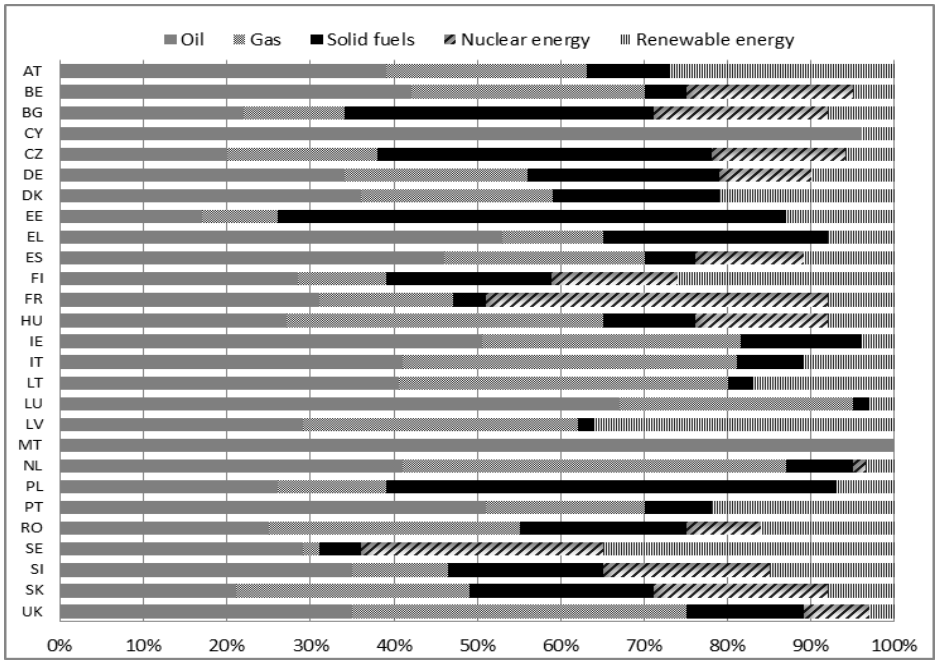
Source: own materials based on: *Energy challenges and policy, Commission contribution to the European Council* and *Energy, transport and environment indicators,* 2007 edition, Eurostat& European Commission, Luxembourg: Office for Official Publications of the European Communities, 2007.

The share of energy obtained from renewable sources is highly diversified across European countries (Fig. 2). It differs significantly and evolves due to geographical conditions such as the presence of mineral deposits and their accessibility, policies adopted by individual countries (including financial incentives), technological progress, decarbonisation requirements, and development of the home market.

The following countries have the largest share of energy obtained from renewable sources in their energy mix: Sweden, Latvia, Finland, Austria and Denmark.

The share of energy obtained from renewable sources in the EU's overall energy balance has been systematically growing. This is primarily due to ecological debates, energy safety considerations, and the Climate and Energy Package adopted in 2008.

Figure 2. Energy mix in European countries in 2012



Source: Energy challenges and policy. Commission contribution to the European Council of 22 May 2013.

3. The Climate and Energy and Energy Package Gives the Green Light to the Development of Renewable Energy Sources

The Climate and Energy Package adopted in March 2008 presents the assumptions of the European Union's energy policy, the so-called "3x20%" goal, which has to be fulfilled by member countries by 2020 and includes:

1. An increase of the share of energy obtained from renewable sources to 20% of the general energy balance of the EU;
2. The reduction of CO_2 by 20%, when compared with emissions from 1990;
3. The reduction of the overall consumption of energy coming from primary sources in the European Union by 20% against the basic prediction for 2020, presented in 2007.

Additionally, it was agreed that the share of biomass in the total fuel consumption of transportation across the EU will increase to 10% (*Green Paper. A 2030 framework for climate and energy policies).*

The above-mentioned paper is a regional initiative aimed at finding fast and effective ways to stop climate change. It should also help break the connection between economic development and the degradation of the natural environment. The package is intended to be the basis for the introduction of radical changes in the functioning of the energy sector across the EU, since it is the energy sector, far more than transport and industry, that is responsible for high emissions. (See: *Energy, transport and environment indicators - 2013 edition*, Luxembourg: Publications Office of the European Union, 2013).

The package includes four directives concerning: promotion of the use of energy from renewable sources, reduction of greenhouse gas emissions, broadening and strengthening of the Union's system of emissions trading, and geological storage of carbon dioxide. Moreover, two general communications were issued on supporting early stage demonstrative actions in the area of balanced energy production from fossil fuels, and general guidelines up until 2020 (Table 1).

Table 1. Documents constituting the Climate and Energy Package

Title and type of document	**No acc. to EUR – Lex**
Communication of the Commission to the European Parliament, the Council and the European Economic and Social Committee, and the Committee of the Regions *Supporting undertaking, at an early stage, demonstrative actions related to balanced production of fossil fuel energy*	COM (2008) 13
Motion of the Commission *Directive of the European Parliament and the Council revising the directives 2003/87/EC in order to broaden and strengthen the Union's system of emissions trading*	COM (2008)16
Motion of the Commission *Decision of the European Parliament and the Council setting differentiated limits on greenhouse gas emissions (GHG) for each Member State aimed at reduction of emissions of greenhouse gases in order to fulfil the obligations of reduction of emissions of greenhouse gases by 2020*	COM (2008)17
Motion of the Commission *Directive of the European Parliament, the Council on the Geological Storage of Carbon Dioxide revising the directives of the Council 85/337/EEC, 96/61/EC, directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC and regulation EC no1013/2006*	COM (2008) 18
Motion of the Commission *Directive of the European Parliament and the Council on the promotion of the use of energy from the renewable sources*	COM (2008) 19
Communication of the Commission to the European Parliament, the Council and the European Economic and Social Committee, and the Committee of the Regions *20 and 20 by 2020 Europe's opportunity to combat climate change*	COM (2008) 30

Source: L. Szczygieł, *Meandry europejskiej polityki...*, op. cit.

The Renewable Energy Sources Directive (RES) ("Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources", Brussels, COM (2008)) obliges member states to achieve the goal of a 20% share of energy from renewable sources in the EU's overall energy balance by 2020. (*National Overall Share and Targets for the Share of Energy from Renewable Sources in Gross Final Consumption of Energy in 2020*).

The Directive established the general limit for specific states of their target share of energy from renewable sources (see Table 2), and the precise method of calculating it, assuming as a benchmark the share of energy from renewable sources in 2005.

Table 2. National share of energy from renewable sources in total energy consumption in 2005 and 2020

EU-27 countries	**Share of energy from renewable sources in total energy consumption in 2005 (%)**	**Target share of energy from renewable sources in total energy consumption in 2020 (%)**
Austria	23.3	34
Belgium	2.2	13
Bulgaria	9.4	16
Cyprus	2.9	13
Czech Republic	6.1	13
Denmark	17.0	30
Estonia	18.0	25
Finland	28.5	38
France	10.3	23
Germany	5.8	18
Great Britain	1.3	15
Greece	6.9	18
Holland	2.4	14
Hungary	4.3	13
Ireland	3.1	16
Italy	5.2	17
Latvia	32.6	40
Lithuania	32.6	40
Luxemburg	0.9	11
Malta	0.0	10
Poland	7.2	15
Portugal	20.5	31
Romania	17.8	24
Slovakia	6.7	14
Slovenia	16.0	25
Spain	8.7	20
Sweden	39.8	49

Source: own materials based on: National Overall Share…, op. cit.

With respect to the decisions concerning the use of energy from renewable sources in individual countries of the EU, a compromise has been reached and it was agreed that the target will not be identical for all member countries. For instance Denmark, whose total share of energy from renewable sources in 2005 amounted to 17% was targeted to achieve 30% in 2020, while Poland which used 7.2% of renewable energy in its total consumption of 2005 needs to reach 15% in 2020 (Pach-Gurgul 2012).

Increasing of the share of energy from renewable sources in the structure of production and consumption of power in the EU is a difficult and very expensive task. It requires implementation of solutions supporting the growth of this share and at the same time leading to lowering the costs of production of renewable energy, consequently improving its competitiveness.

The necessity to support renewable energy sources stems first of all from the much higher cost of production of renewable energy compared to energy based on conventional sources. The reason for this is the high capital expenditures that accompany launching renewable installations and connecting them to the network. Another important consideration is the discontinuous character of renewable sources – implying the need to supplement them by conventional sources of energy, together with the accompanying costs of balancing power supply systems, as well as incomplete legislative measures, which can raise concerns in investors.

There are several ways to support the development by EU countries of production of energy from renewable sources (Table 3).

A popular form of support for the development of renewable energy is the mechanism of feed-in tariffs (FiTs). In the case when these tariffs have a long-term character, they allow the investors to evaluate the efficiency of the investment (including its payback period) in a more effective way, thereby encouraging them to invest in such energy sources. In connection with the Quota Obligations (QOs) of the distribution companies, these tariffs constitute a significant factor for co-financing projects in renewable energy (Motowidlak 2012).

Another instrument for supporting renewable sources of energy are tax incentives. Such a form of support for EU member states is guaranteed by the provisions of the 2003/96/EU Directive. These perks may take the form of incentives for investments in the renewable energy sector (the supply of pro-investment instruments) to initiate their utilisation (post-productive supply instruments).

Subsidies and all types of grants constitute a non-refundable form of financial support of projects in renewable energy. They are not of a market type and are usually applied at the early stages of renewable energy development.

Table 3. Instruments for supporting development of renewable energy sources

<table>
<tr><th>FINANCING</th><th>ADMINISTRATIVE</th><th>NETWORK</th></tr>
<tr><td>Systems supporting the purchase of renewable energy sources:
- fixed purchase price (guaranteed price),
- green certificates,
- tenders.</td><td>Quantitative obligation to buy energy from renewable sources</td><td>Determining justified costs of using distribution networks</td></tr>
<tr><td>Donations and subsidies</td><td>Obligation to give priority to the transfer of power from renewable sources in the national energy system</td><td>Transparent prices of access to the network</td></tr>
<tr><td>Preferential and low-interest credit</td><td rowspan="2">Issuing certificates of origin of renewable energy, together with the accompanying proprietary rights</td><td>Subsidies for necessary modernisation of networks</td></tr>
<tr><td>Fiscal support:
- tax allowances,
- exemptions from excise duty,
- lower VAT rates.</td><td>Co-financing the connection to the network</td></tr>
</table>

Source: own materials based on J. Pyka (ed), *Szanse i zagrożenia rozwoju rynku energetycznego w Europie i Polsce*, Wydawnictwo Akademii Ekonomicznej w Katowicach, Katowice 2007.

In order to meet requirements concerning renewable energy, EU member states have worked out and implemented their own national programmes for supporting and promoting the creation of renewable energy. These programmes reflect the diversity of available systems of support and the varied financial possibilities of EU member states. It must be stressed that financing the above programmes is a burden for the budgets of member states, and this fact, especially during the economic crisis, has put a question mark over the future development of renewable sources of energy.

4. The Degree of Implementation of the Provisions of the Climate and Energy Package Concerning the Development of Renewable Sources of Energy in EU Member States

The economic crisis, which especially hit the countries of the Euro zone, has also affected the realisation of the provisions of the Climate and Energy Package, including those pertaining to renewable sources of energy.

In 2010, the majority of EU member states managed to cope quite well with increasing the usage of renewable sources of energy in their energy

balance, including for example: Austria, Bulgaria, Germany, Denmark, Estonia, Lithuania, Romania, Sweden and Slovenia. It is also worth emphasising that Spain and Italy – countries undergoing significant economic problems during the economic crisis – had earlier belonged to the group that were dynamically developing renewable sources of energy (cf. Table 4.).

Table 4. The progress in the implementation of the Directive on Renewable Sources of Energy[1]

Member state	The share of renewable sources of energy in 2005	The share of renewable sources of energy in 2005	Intermediate objective	The objective concerning renewable sources of energy
Austria	23.3%	30.1%	25.4%	34.0%
Belgium	2.2%	5.4%	4.4%	13.0%
Bulgaria	9.4%	13.8%	10.7%	16.0%
Cyprus	2.9%	5.7%	4.9%	13.0%
Czech Republic	6.1%	9.4%	7.5%	13.0%
Denmark	17.0%	22.2%	19.6%	30.0%
Estonia	18.0%	24.3%	19.4%	25.%
Finland	28.5%	33.0%	30.4%	38.0%
France	10.3%	13.5%	12.8%	23.0%
Germany	5.8%	11.0%	8.2%	18.0%
Great Britain	1.3%	5.0%	4.0%	15.0%
Greece	6.9%	9.7%	9.1%	18.0%
Hungary	4.3%	8.8%	6.0%	13.0%
Ireland	3.1%	5.8%	5.7%	16.0%
Italy	5.2%	10.4%	7.6%	17.0%
Latvia	32.6%	32.6%	34.0%	40.0%
Lithuania	15.0%	19.7%	16.6%	23.0%
Luxemburg	0.9%	3.0%	2.9%	11.0%
Malta	0.0%	0.4%	2.0%	10.0%
The Netherlands	2.4%	3.8%	4.7%	14.0%
Poland	7.2%	9.5%	8.8%	15.0%
Portugal	20.5%	24.6%	22.6%	31.0%
Romania	17.8%	23.6%	19.0%	24.0%
Slovakia	6.7%	9.8%	8.2%	14.0%
Slovenia	16.0%	19.9%	17.8%	25.0%

[1] Directive 2009/28/EC of 23rd April 2009.

Spain	8.7%	13.8%	10.9%	20.0%
Sweden	39.8%	49.1%	41.6%	49.0%
EU	**8.5%**	**12.7%**	**10.7%**	**20.0%**

*The most objective measure of progress is the evaluation of member states in comparison with their first intermediate objective, calculated as the mean of the shares in 2011-2012.

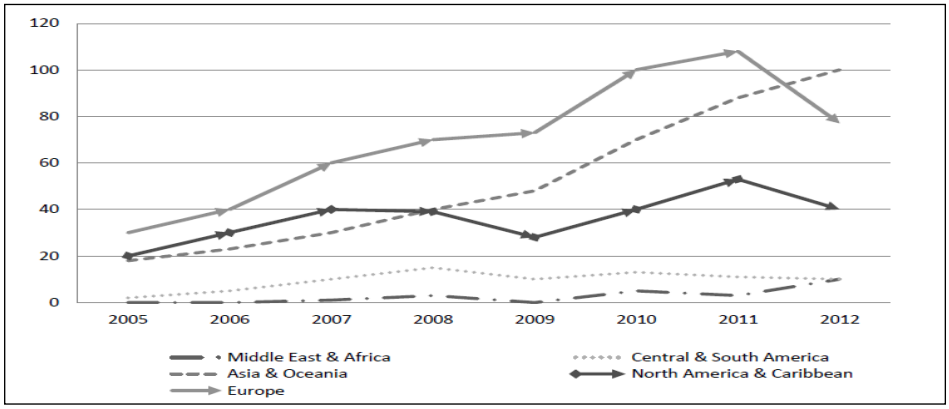
Source: own work on the basis of *Energy Challenges and Policy*, EC contribution to the European Council of 22nd May 2013.

In spite of the crisis, the share of energy from renewable sources in the entire EU in 2012 amounted to 13.0%, in comparison to 8.5% in 2005 (*Energy Challenges and Policy*, 2013). According to the most recent data from 2012, the first country which exceeded the objective for 2020 was Estonia, which achieved an almost 26% share of renewable energy in its energy balance, with its objective for 2020 being 25%.

The lowest share of "green" energy in the EU was in Malta (0.4 %, with the objective being 10%) and in Luxembourg (2.9%, with the objective being 11%) (*EU Energy, transport and environment indicators*, 2013).

It should be stressed here that by mid-2011, the EU was the world leader in the development of renewable sources of energy and had devoted great financial resources to this objective – much larger than those designated for the same objective in China or the USA (cf. Fig. 3). The intensification of the effects of the crisis within the Euro zone led however to a decrease of investments into renewable sources of energy in specific EU member states. Also, there was a reduction in the supply of resources to framework funds and programmes created at the EU level for the purpose of supporting its renewable energy sector.

Figure 3. Investments in renewable sources of energy in 2005-2012 (in USD billions) in specific world regions



Source: own materials based on: *Energy Challenges and Policy*, EC contribution to the European Council of 22nd May 2013.

Increasing unemployment and the indebtedness of countries during the crisis re-ignited the discussion whether given EU member states could afford the development of renewable energy sources, and inasmuch as this is an expensive source of energy the point of subsidising it was questioned. Subsidies which in recent years supported prosperity in this field are, in times of crisis and looming cutbacks, unfortunately treated as a burden to the budget and to the final recipients of the energy. The real costs of renewable energy are turning out to be too high for many European economies. Experts are certain that a mechanism of subsidising should exist in some form or other, as the production of solar and wind energy is very expensive. However, the current permissive legislation concerning the determination of forms and conditions of subsidies within the EU does not work.

In order to combat the effects of the economic crisis, the EU member states decided to introduce cutbacks, thereby limiting their support for the renewable energy sector. In the face of growing unemployment rates and increasing debt, the financing and subsidising of the renewable energy sector was reduced. At the same time, sudden changes in the systems of support were introduced, in some cases having a retroactive effect, thus leading to investor uncertainty and limiting investments in such sources of energy. Entrepreneurs were hampered in their investments.

The limitations on subsidising the renewable energy sector, having the consequence of leading to a slow-down in the development of renewable energy sources, were heaviest in Spain, Germany and the Czech Republic, but also in Italy, Bulgaria and Great Britain.

Spain was the first EU country to admit that it could not afford further support of new investments into renewable sources of energy at the required level of subsidising. This country – a world and European leader in the use of renewable energy in 2001 – had a share of energy coming from renewable sources exceeding 30%. Subsidising wind farms and photovoltaic cells was supposed to make renewable energy a new source of economic growth that would hasten the creation of new jobs (*Hiszpania nie będzie liderem w wiatrowniach*, [*Spain will not be the leader in wind farms*], 2012). However, the economic crisis changed economic priorities, the result of which was that investments into renewable sources of energy were almost completely stopped in 2013.

Italy has been coping with problems similar to Spain's. In Italy, the system of governmental support for renewable energy is currently being reformed, as existing regulations are becoming too expensive. **The system for subsidising existing renewable energy has led to the situation whereby the supply of energy coming from renewable sources exceeds the demand.** Italy is now another country which has decided to reform its system of subsidising

renewable energy (*System wsparcia dla energetyki odnawialnej we Włoszech potrzebuje zmian, [The system of subsidising renewable energy in Italy needs change*. 2011).

Also in the Czech Republic the economic crisis has resulted in a problem with subsidising renewable sources of energy. The FiT system for solar energy in the Czech Republic was commenced in 2006, as a result of the fact that the Act on promoting renewable sources of energy obligated the sellers to purchase energy from solar plants at a price several times higher than the market price. Additionally, energy producers received exemptions from income tax for a period of five years from the moment they became connected to the network. In the system of subventions, the corrective mechanism was envisaged to consist of a decrease of subventions by 5.0 % annually (*Status of Photovoltaics in the European Union New Member States,* 2011). It was assumed then that with the development of photovoltaic cells, the cost of energy production would gradually decrease. However, the prices of photovoltaic cells were dropping much faster than had been predicted. In such circumstances, subsidies which were meant to guarantee a return on investments within eleven years allowed investors to gain this return within only four. Starting the FiT system resulted in the sudden growth in the number and power of photovoltaic cells in the Czech Republic. There was a sharp increase in the number of solar energy plants, from fewer than 1500 in 2006 to almost 13,000 in 2010. During the economic crisis, this sudden increase of power generated by the installations containing photovoltaic cells became a burden for the Czech economy. The guaranteed sale price for solar energy, as well as EU and state subsidies, resulted in public pressure to increase electrical energy prices. The increase in electrical energy led to an increase in prices of consumer goods, which was highly inconvenient in the time of crisis. Therefore, in November 2010 the law on supporting renewable energy was changed in the Czech Republic. The provisions limited subsidies only to solar cells in the roofs or walls of buildings, and withdrew these subsidies from installations not connected to the network (*Solar subsidies cut by more than half* 2011). The five-year period of "tax freedom" for producers of renewable energy was abolished.

In the case of Germany, the basic motive for the limitation of subsidies for photovoltaic cells was the effect of these subsidies (similar to the Czech Republic) on the price increases in electrical energy and, therefore, on the prices of consumer goods across many branches of industry (Motowidlak 2012). The increases in these prices also affected many households.

5. Conclusions

The Climate and Energy Package raises many controversies and disputes. The reservations are voiced, first of all, by the countries in which the production of energy and heat is based, to a large degree, on high-emission hard coal and lignite (e.g. in Poland, where more than 90% of electrical energy is produced from hard coal and lignite). Such fears are also raised by the EU countries in which GDP, measured per capita, is low (mainly the new EU-12 member states), and whose further economic development is strictly connected with an increase in the demand for energy. Also the countries in which the energy-consuming industry is highly developed point out the risk of becoming uncompetitive, which might lead to a shift of the production of, e.g., cement and many other energy-consuming and heavy-industry products to the countries with less strict policies concerning the emission of greenhouse gases (*carbon leakage*). These doubts were intensified by the economic crisis of 2008, and in particular the crisis of the Euro zone. Large state debts, immense unemployment and the difficulties in the banking sector raised the question whether reaching the targeted 20% share of renewable sources of energy in the overall energy balance of the EU should still be a priority, given such grave economic problems.

In spite of difficult economic situation in the European Union, creating many financial, administrative or infrastructural and location obstacles for the development of renewable energy, this sector is however still developing.

The ambitious plan of the European Union to meet the majority of its energy needs with energy coming from renewable sources brought about the necessity to create new legal regulations concerning the support of diversified directions in the use of renewable sources of energy. By means of implementation of many directives, the EU made every effort to create legal instruments promoting the use of renewable sources of energy. In order to attain this ambitious goal, the member states introduced various systems supporting the development of such sources. Some of these systems are based on guaranteed prices, green certificates and tenders, whilst others are based on subsidies, grants or tax exemptions.

It can be observed that in the states which primarily subsidised and co-financed, a rapid development of the renewable energy production sector was observed; e.g. a government programme in Germany supporting wind energy and the application of a system of guaranteed prices made this country become a world leader in this area in less than twenty years.

It must be stressed that reaching the 20% share of energy coming from renewable sources in the EU energy balance by 2020 will depend on the economic situation of the EU, the methods of finding their way out of the economic crisis employed by given member states, but above all on further financial support.

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Energy challenges and policy, Commission contribution to the European Council

Streszczenie

ZNACZENIE PAKIETU ENERGETYCZNO-KLIMATYCZNEGO DLA ROZWOJU ENERGETYKI ODNAWIALNEJ W UNII EUROPEJSKIEJ

Wykorzystanie energii odnawialnej w Unii Europejskiej na obecnym etapie rozwoju wydaje się nieuniknione. Niesie ono za sobą liczne korzyści, w tym przede wszystkim:

- *możliwość zwiększenia bezpieczeństwa energetycznego danego państwa, czy regionu na skutek dywersyfikacji dostaw energii,*
- *ograniczenie importu nośników energetycznych, np. gazu ziemnego, ropy naftowej, a tym samym zmniejszenie zależności surowcowej,*
- *efekty ekologiczne związane z eliminacją emisji gazów cieplarnianych i innych substancji szkodliwych dla środowiska naturalnego a także wiele korzyści ekonomiczno-społecznych, takich jak chociażby nowe miejsca pracy.*

Pakiet energetyczno- klimatyczny zobligował kraje członkowskie do spełnienia wspólnego celu jakim jest zwiększenie udziału energii z odnawialnych źródeł energii do 20% w ogólnym bilansie energetycznym UE do 2020.r Jest to zadanie niezwykle trudne gdyż sektor odnawialnych źródeł wymaga rozwoju i ogromnego wsparcia finansowego, w celu zwiększenia jego konkurencyjności w stosunku do źródeł konwencjonalnych energii. Przyjmując pakiet energetyczny przywódcy państw członkowskich nie przewidzieli kryzysu gospodarczego i jego wpływu na gospodarkę Unii Europejskiej, w tym na sektor energetyczny.

Słowa kluczowe: *pakiet energetyczno- klimatyczny, energetyka odnawialna, polityka energetyczna UE, bezpieczeństwo energetyczne, mix energetyczny, instrument wspierające rozwój OZE*

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Changing Patterns In The Export Of Goods *Versus* International Competitiveness. A Comparative Analysis For Central-East European Countries In The Period 2000-2011

Abstract

This paper discusses the existing links between changing patterns in the export of goods, broken down by technology-intensity, versus intrenational competitiveness. The study covers nine Central-East European (CEE) economies: Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and the Slovak Republic, in the time span 2000-2011. We examine the hypothesis of a strong, positive and statistically significant relationship between flows of export of high-tech and ICT manufactures industries goods, and an economy's level of international competitiveness (approximated by the Global Competitiveness Index – GCI, see: World Economic Forum). Our methodological approach relies on elaboration of each country`s individual export patterns with regard to industries of different technology-intensities, and statistical analysis between the international GCI variable and variables identifying shares in total export of certain industries. Contrary to what was initially expected, our empirical results do not seem to support the hypothesis on statistically positive links between growing shares of high-tech and ICT manufactures industries in the total value of export versus the Global Competitiveness Index in the analyzed countries.

***Keywords**: competitiveness, export, technology-intensity, comparative analysis*

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1. Introduction

Over last two decades, transition economies have undergone tremendous structural changes in various areas. The process of liberalization, deregulation of markets and privatization, and increased pressure on introducing the CEE countries into the global economy forced these countries not only to invest and acquire foreign investment inflows, but also to boost the volume and value of export. After 1989, most of the former 'Soviet bloc countries' had lost their leading trading partners. This led to a diametrical reorientation in their export markets, which required substantial improvements in the quality of goods and services offered abroad. The quality adjustments resulted in shifts in the technologies used in different industries. By entering an investment-driven phase of economic development, these countries were forced to base their international competitiveness on increasing productivity, efficiency, and the assimilation of newly emerging technologies and innovations to make their production of goods and services more sophisticated and demand-oriented. In transition economies, investing in new technologies is perceived as an enabler for shifting from low-, to high-added value industries (Roztocki & Weistroffer 2008), which generates economic growth and creates conditions for gaining competitive advantages, in both relative and absolute terms. Additionally, new technologies may be used to support international competitiveness by increasing a country's share on the global export market.

According to the World Economic Forum (2012), international competitiveness can be described as *"the set of institutions, policies, and factors that determine the level of productivity of a country."*[1] Growth of international competitiveness remains one of the most important aspects in the field of development economics, as it drives increases in a country`s productivity and enhances socio-economic progress and stability. J. Schumpeter (Schumpeter 1934) underlined that technological progress is treated as an important determinant of a country`s ability to develop in the long-term perspective. In that sense, technology and international competitiveness are interrelated, each strongly impacting the other.

This paper consists of five parts. Following this introduction, in section two we present the conceptual framework, combining issues of international competitiveness and export of goods broken down by technology-intensity. Section three explains the empirical targets and data applied in the analysis, and section four contains analysis of the empirical outcomes. The final part draws conclusions and indicates further research directions.

[1] The Global Competitiveness Report 2012-2013 (Klaus Schwab, Global Economic Forum), 2013.

2. Theoretical framework

The notion of international competitiveness is ambiguous. For many it is directly associated with overall economic performance, but on the other hand it is often perceived a factor driving economic growth (Nicoletti *et al.*, 2003; Porter, 2006; Fagerberg *et al.* 2007). Taking into account different perspectives, international competitiveness is linked with the low cost of labour or offering attractive geographic locations for new investments (Spencer, 2008). It captures a multitude of dimensions, covering issues associated with employment, productivity, economic growth, and income inequalities, level of education, political freedom, ability to assimilate innovation, and finally trade openness. A country`s openness to international competition fosters increases in capital and labour productivity, technology transfers, and accessing new knowledge (Bernard *et al.*, 2007). All these above-mentioned factors can be acquired by using international trade channels, which influence positively a country`s innovativeness, but – at the same time – subject a country`s industries to international exposure, forcing enterprises to compete on the globalized market. The positive effects of broad internationalization, leading to growth in international competitiveness *via* trading, have been reported in a broad array of studies (Alcala *et al.*, 2004; Dollar *et al*., 2003; Rodriguez *et al.* 2000). The OECD`s definition of international competitiveness combines it with country`s ability to trade goods on the global market (OECD 2005). Trabold (1995) states that *"ability to sell in terms of international competitiveness means the ability to export. Market shares on the main export markets and changes over time can be taken as the basic indicators of international competitiveness"* (see Transnational Corporations, UNCTAD/ITE/IIT/27 (Vol.10, No.2), 2001). Differentiation in trade patterns deeply depends on a country`s ability to assimilate and use new technologies, national economic elasticity and dynamism, and/or the availability of a highly-skilled labour force. As Lall claims (Lall, 2000), crucial differences in export patterns broken down by the technology-intensity of industries can only be explained by differences in "national learning capabilities". Technology and technological capabilities might be strong determinants of growth in international competitiveness. Technological advancement radically reshapes ways of competition, constituting a great "promise" for the lagging-behind economies. The diffusion of new technologies diffusion enables reduction in the costs of physical (geographical) and economic distance. Enterprises are enhanced or permanently improved, and technological upgrading in the field of production of goods and services intensifies intra- and international trade flow. Furthermore, the massive diffusion and adoption of new technologies by industrial sectors determines changes in patterns of international trade. The breakdown of industries by technology and R&D intensity level accounts for the

common trend of the growing relative importance of high-technology industries and ICT manufactures, whereby medium-low technology and low-technology industries` shares in country`s global export should potentially decrease.

Additionally, many postulated concepts (i.e. Leontief, 1953; Posner, 1961; Cantwell, 1989; Dosi *et al.*, 1990) link international competitiveness with international trade flows, which are affected by technological progress. The idea that technology and trade play a massive role in growth of a country`s competitiveness lies behind the neo-Schumpeterian concepts, where changing patterns of international trade – treated as a proxy of international competitiveness – are a direct consequence of interactions between innovation and the diffusion of technologies on the global market. Following the Schumpeterian approach, we assume that the existence of absolute differences in technology level of countries significantly influences its export performance, in turn influencing international competitiveness. Dosi *et al.*(1990 state that differences in technological advancement particularly influence a country's market share on world export markets (Narula & Wakelin, 1993), while country`s trade position is a "product" of the country`s absolute advantage with respect to its competitors (other countries). Empirical evidence in this regard is reported in the works of Fagerberg (1989) and Amable and Verspagen (1995). They claim that existing technology gaps among countries differentiate their export of goods and service, influencing international competitiveness. Similar conclusions can be derived from works of Chesnais (1992), Dunning (1993) or Wood (1994). Empirical evidence provided by Hatzichronoglou (1997), Buiter (1995), Carlyn, Glyn *et al.* (2001) and Lopez (2005), shows that growth of exports correlates positively with competitiveness, while a major role in export dynamics is played by the dynamics of high-technology industries (high-tech export).

In a broad conceptual framework, international competitiveness can be seen through the lens of productivity, costs and market shares (Porter *et al.* 2012). To complete our analytical targets we deploy the concept which explains international competitiveness through increasing/decreasing market shares. It is then assumed that countries tend to benefit by growth in international competitiveness and their companies gain new markets (Hausmann *et al.*, 2006; MacGarvie, 2006). Following this logic, one country can only improve its international competitiveness at the cost of another country (Fagerberg *et al.*, 2007). Such a concept implies that macro-competitiveness refers to a country`s ability to gain better position in the "play" on global markets, which should potentially lead to wealth creation (Aiginger 2006).

3. Empirical targets and data

The main goal of this study is twofold. Firstly, we aim to uncover substitution effects with regard to export patterns in high-tech/medium-high-tech export *versus* medium-low-tech/low-tech export of goods. Secondly, statistical links are tested between the following pairs of variables: high-tech export and the Global Competitiveness Index; ICT manufactures and the Global Competitiveness Index; low-tech export and the Global Competitiveness Index.

To achieve our goals, we adopt a sample covering nine East-Central European countries, namely: Bulgaria (BG), Czech Republic (CZ), Estonia (EST), Hungary (HU), Latvia (LV), Lithuania (LT), Poland (PL), Romania (RO) and the Slovak Republic (SK) over an 11-year period (2000-2011). All nine selected countries are post-communist economies and relatively homogenous in kind, which makes inter-country comparisons rational. The data on country`s export are derived from OECD STAN[2] Bilateral Trade Database by Industry and End-use Category (BTDIxE). All statistics report exclusively on the value of export of goods[3] (in current US dollars), broken down by industry technology-intensity level. Therefore, export of goods is classified in four industrial categories: high technology industries[4] $(HTInd_{i,j})$, medium-high technology industries $(MHTInd_{i,j})$, medium-low technology industries $(MLTInd_{i,j})$, and low technology industries $(LTInd_{i,j})$, where *i* denotes the country, and *j* the year. Additionally, we deploy data on the export of Information and Communication Technology (ICT) Manufactures $(ICTMan_{i,j})$.

To assess the international competitiveness of countries, we apply an index developed by the World Economic Forum (WEF) – the Global Competitiveness Index which was introduced in the year 2006. In 2006, WEF changed an algorithm to calculate the international competitiveness index. To assure in-time comparability we exclusively analyze the period 2006-2011 with regard to the relationship between the value of goods exported and international competitiveness in the analyzed countries.

[2] STAN – Structural ANalysis Databes provided by OECD (www.oecd.org).

[3] Refers to value of export of goods to all international trading partners.

[4] For details, see Appendix 1.

4. Export of goods and international *competitiveness* –evidence regarding the Central-East European countries

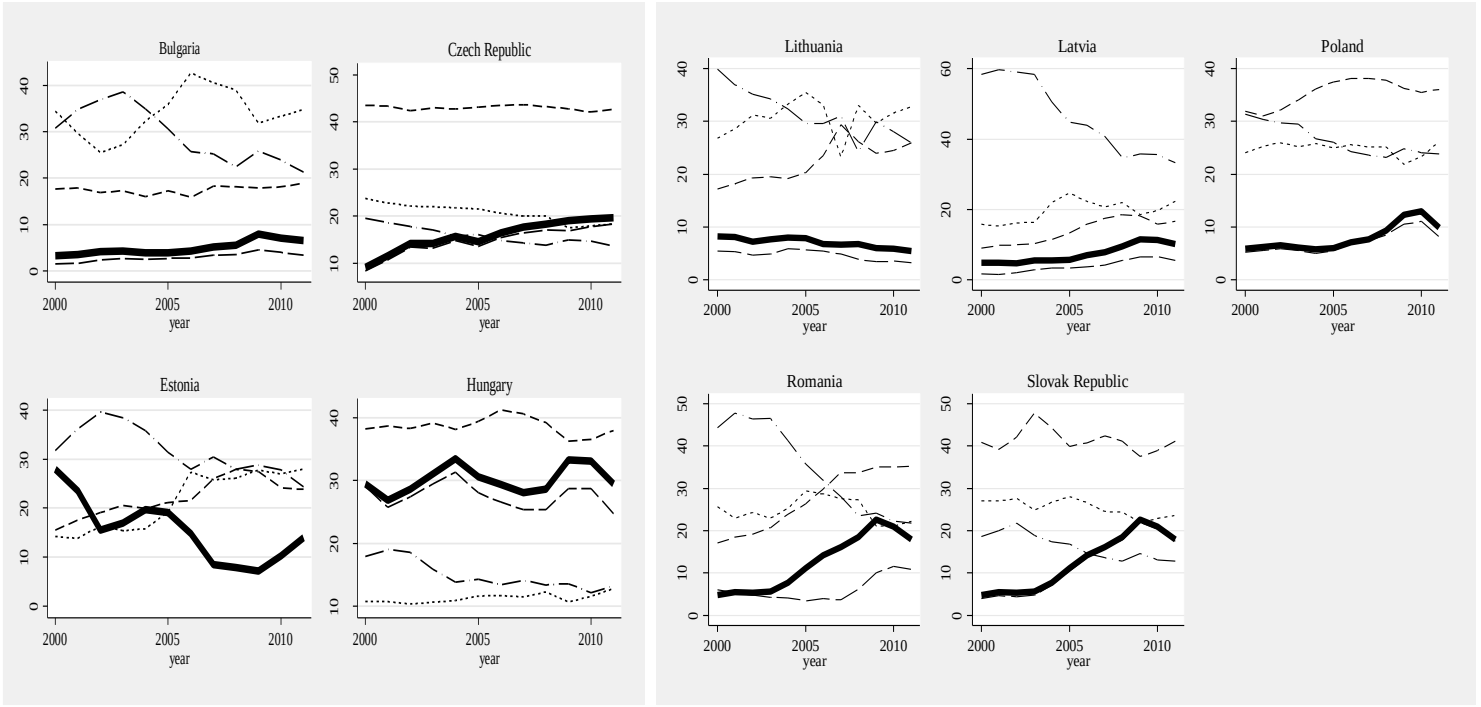
In the following section, we analyze changing patterns in the export of goods, broken down by technology intensity, in nine CEE countries. We report separately on trends in the changing shares of industries (*($HTInd_{i,j}$), ($MHTInd_{i,j}$), ($MLTInd_{i,j}$), ($LTInd_{i,j}$), ($ICTMan_{i,j}$)*) in the total value of export ($TotEXP_{ij}$) in each country. Plotting separate export patterns for each country individually allows us to assessing each variable's behaviour in time. In the case of high-technology industries *($HTInd_{i,j}$)* and ICT Manufactures (*$ICTMan_{i,j}$)*, it is expected to uncover significant growth in their share of the total export of goods. We also expect to detect decreasing shares of low-technology industries in *($TotEXP_{ij}$)*, and the total value of export should be substituted by the export of high-technology and medium-high-technology goods.

Chart 1 (see below) describes patterns in the export of goods in the nine selected countries. Patterns showing changes in the export of high-tech goods are marked as solid line. Clearly, in 2000, the best performing countries in terms of $HTInd/TotEXP_{ij}$ were Hungary and Estonia, where the shares were respectively: $HTInd/TotEXP_{Hungary,2000}$=29.5%, and $HTInd/TotEXP_{Estonia,2000}$ =27.9%. However, in Hungary the share of HTI_{ij}/TotEXP was relatively stable in the analyzed 11-year period (in 2011, the value for Hungary remained at $HTInd/TotEXP_{Hungary,2011}$=29.5%). In Estonia we can observe a significant drop in the share of HTI_{ij} in total value export of goods, with the final value in 2011 being: $HTInd/TotEXP_{Estonia,2011}$=13.9%. In Estonia, a negative trend is also observed in the case of ICT Manufactures, as its export pattern strictly follows that of the high-technology industry sector. Starting from the 2006, shares of medium-high technology industry and medium-low technology industry in $TotEXP_{Estonia,j}$, are significantly higher. Such changes are not considered as positive, as they do not create preferable relations in Estonian export markets. It is possible that such a disadvantageous situation in Estonia is a consequence of economic crisis that the country had to face in the last decade. Again it proves the volatility of Estonian export and its high exposure to external shocks. In the period 2000-2011, Hungary managed to maintain a high share of high-tech industry in its total export of goods, keeping analogically good scores in 2011. In the analyzed years, Hungary was the best performing country, both in terms of $HTInd/TotEXP_{Hungary,2000-2011}$ and $ICTMan/TotEXP_{Hunagry,2000-2011}$, which can be confronted with its relatively lowest share of low-technology industries in total export of goods, both in 2000 and 2011.[5] This shows that Hungary`s relative

[5] In 2011, an analogous low share of $LTInd/TotEXP_{i,j}$ is noted for the Slovak Republic (12.8%) and the Czech Republic (13.7%).

position with regard to export of goods is stable (for detailed numbers see Table 1). Additionally, in Hungary, the evolvement of all five patterns of industry-related exports of goods is highly simultaneous, which constitutes proof of the unvaried development path of its national economy, and its relatively good resistance to external disturbances. Different findings are reported for Bulgaria, the Czech Republic, Latvia, Lithuania, Poland, Romania and Slovak Republic. Overall, a comparative analysis of export patterns reveals their high heterogeneity and instability over time. Export structures, broken down by industries with differing technology-intensity levels, are differentiated and extrapolated in trends reporting on their substantial in-time variability. In the Slovak Republic, Czech Republic and Romania, significant increases in shares in the total value of export are reported for high-technology industries. In 2000, their respective shares of $HTInd_{i,j}$ in total export of goods were: $HTInd/TotEXP_{SlovakRep,2000}$=4.75%, $HTInd/TotEXP_{CzechRep,2000}$=9.1%, and $HTInd/TotEXP_{Romania,2000}$=6.0%; while in 2011 the analogous values are reported as: $HTInd/TotEXP_{SlovakRep,2011}$=17.9%, $HTInd/TotEXP_{CzechRep,2011}$=19.6% (in 2011 the Czech Republic was the second leading economy in the group in terms of $HTInd/TotEXP_{i,j}$), and finally $HTInd/TotEXP_{Romania,2011}$=10.9%.

Chart 1. Trade patterns in the export of goods, broken down by industry technology-intensity. Central-East European countries. Period 2000-2011



Source: own elaboration based on data derived from OECD STAN Bilateral Trade Database by Industry and End-use Category (BTDIxE). Note: solid line presents high-tech industries export pattern; on vertical axis – shares of industries in the total value of export of goods.

Table 1. Shares of export of goods (%) – by industries – in a country`s total export value, and Global Competitiveness Index scores. Years 2000, 2006 and 2011

	2000						2006					
	High-tech industries	*Medium-high-tech industries*	*Medium-low-tech industries*	*Low-tech industries*	*ICT manufactures*		*High-tech industries*	*Medium-high-tech industries*	*Medium-low-tech industries*	*Low-tech industries*	*ICT manufactures*	*Global Competitiveness Index*
Bulgaria	3.3	17.7	34.5	30.8	1.5		4.3	15.9	42.7	25.7	2.8	3.96
Czech Rep	9.1	43.6	23.7	19.5	8.4		16.4	43.5	20.6	14.9	15.5	4.74
Estonia	**27.9**	15.5	14.2	31.8	**27.8**		**14.8**	21.5	27.4	**27.9**	15.0	5.12
Hungary	**29.5**	38.2	10.7	17.9	**29.0**		**29.3**	41.2	11.7	13.4	**26.6**	4.52
Latvia	4.9	9.1	15.8	**58.3**	1.8		7.1	15.8	22.3	**43.8**	3.8	4.57
Lithuania	8.2	17.2	26.8	39.9	5.4		6.9	23.5	33.1	29.7	5.5	4.53
Poland	6.0	32.0	24.0	31.3	5.2		7.1	38.2	25.6	24.3	6.9	4.3
Romania	6.0	17.1	25.7	**44.3**	5.5		4.0	29.8	28.7	24.3	4.3	4.02
Slovak Rep	4.7	40.9	27.0	18.7	3.9		14.2	40.8	26.6	14.6	13.7	4.55

	2011					
	High-tech industries	*Medium-high-tech industries*	*Medium-low-tech industries*	*Low-tech industries*	*ICT manufactures*	*Global Competitiveness Index*
Bulgaria	6.5	18.9	34.8	21.3	3.4	4.27
Czech Rep	**19.6**	42.8	18.4	13.7	**18.3**	4.51
Estonia	13.9	23.8	28.0	24.3	13.6	4.64
Hungary	**29.5**	38.0	12.8	13.2	**24.8**	4.3
Latvia	10.3	16.6	22.3	**33.3**	5.6	4.35
Lithuania	5.5	25.9	32.8	**26.0**	3.2	4.41
Poland	9.9	36.1	26.2	23.9	8.2	4.46
Romania	10.9	35.2	22.2	23.9	10.2	4.07
Slovak Rep	17.9	41.1	23.7	12.8	17.5	4.14

Note: Industries classified according to technology-intensity. Scores for Global Competitiveness Index – exclusively for 2006 and 2011 (not available previously).

Source: Estimates are based on raw data derived from OECD STAN Bilateral Trade Database by Industry and End-use Category (BTDIxE).

In Bulgaria, Lithuania, Latvia and Poland, the share of high-tech industries in the total export of goods remained at a relatively low level. Analogously poor results are repeated when the ICTMan/TotEXP$_{i,j}$ variable is taken into account.

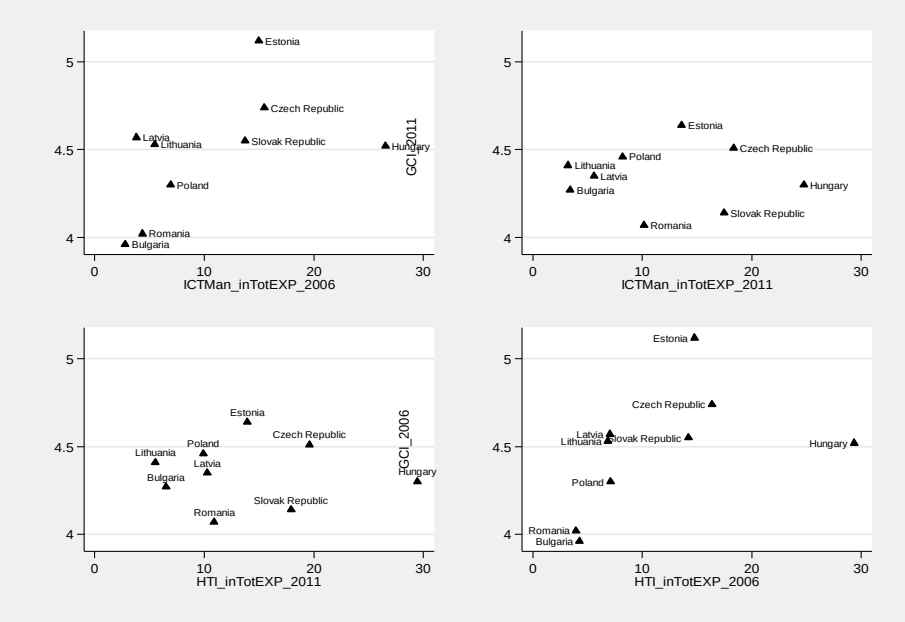
Tracing countries` individual trade patterns in all economies, specific substitution effects are displayed. Different dynamics in exports shape trade patterns differently with regard to certain industries. This implies substitution effects in changing shares of diverse industries in a country`s total export value, which can be identified (see Chart 1) in Bulgaria, Estonia, Lithuania, Poland, Romania and the Slovak Republic. In Bulgaria it is demonstrated that in 2004 and 2005 medium-low tech and low-tech industries substituted one another, as shares of MLTInd/TotEXP$_{Bulgaria,j}$ were rising, and falling for LTInd/EXP$_{Bulgaria,j}$. In Lithuania a definite substitution of low-tech industries by medium-low-tech industries is observed for the year 2004. In Poland, a three–times substitution between low-tech industries and medium-low-tech industries can be observed (finally however the effect is not stable, and possibly not permanent), In Romania, a definite substitution between low-tech industries and medium-high-tech industries took place in the year 2007. Finally, in the Slovak Republic a definite substitution took place between low-tech industries and high-tech industries/ICT Manufactures in the year 2007.

In the second part of our empirical analysis, we check the identified relationships between HTInd/TotEXP$_{ij}$ and ICTMan/TotEXP$_{ij}$ and the level of international competitiveness of countries. As recognized in the previous section, the data coverage – both including time and number of countries - is highly limited, which suggests that the results obtained from econometric modeling might be misleading. For this reason we exclude the econometric approach from our empirical evidence. Alternatively, interactions between selected variables are captured using graphical approximation, as such an approach allows for assessing existing relationships straightforwardly. Our hypothesis is that we will uncover positive and statistically significant relationships between the values of HTInd-/TotEXP$_{ij}$, ICTMan/TotEXP$_{ij}$ and GCI$_{ij}$ variables.

Charts 2 and 3 plot sequential pairs of variables: Chart 2 – GCI$_{i,2006}$ *versus* HTInd/TotEXP$_{i,2006}$; GCI$_{i,2011}$ *versus* HTInd/TotEXP$_{i,2011}$; GCI$_{i,2006}$ *versus* ICTMan/TotEXP$_{i,2006}$ and GCI$_{i,2011}$ *versus* ICTMan/TotEXP$_{i,2011}$; and Chart 3 – GCI$_{i,2006}$ *versus* LTInd/TotEXP$_{i,2006}$ and GCI$_{i,2011}$ *versus* LTInd/TotEXP$_{i,2011}$**.** According to the empirical evidence, the hypothesis on the existence of a statistically significant and positive relationship between the share level of high-technology industries in total export of goods and international competitiveness has to be rejected**.** In Chart 2, the dots referring to countries are highly scattered both for 2006 and 2011 (the correlation coefficients for 2006 and 2011 are respectively: r^2=0.25 and r^2=0.0004).

Paradoxically, in the period 2006-2011, international competitiveness measured by $GCI_{i,j}$ dropped in six analyzed countries (out of 9). The declining achievements in terms of the value of international competitiveness were accompanied by constant increases in the export shares of high-technology industries in seven out of nine analyzed cases. Four countries - the Czech Republic, Hungary, Latvia and the Slovak Republic - experienced slight decreases in $GCI_{i,2006\text{-}2011}$, while the $HTInd/TotEXP_{i,2006\text{-}2011}$ increased. Only Bulgaria, Poland and Romania accounted for increases in $GCI_{i,2006\text{-}2011}$ in the period 2006-2011 while the value of $HTInd/TotEXP_{i,2006\text{-}2011}$ was changing in the same direction. Bulgaria made the relatively greatest progress in terms of international competitiveness - in 2006 the $GCI_{Bulgaria,2006}$=3.96, and five years later: $GCI_{Bulgaria,2011}$ =4.27. The dynamics of $HTInd/TotEXP_{Bulgaria,2006\text{-}2011}$ was at about 8,34% annually,[6] achieving the second best score in the group.

Chart 2. High-technology industries' and ICT Manufactures industries' shares of total national export and the Global Competitiveness Index. Years 2006 and 2011



Source: authors own elaboration based on data derived from OECD STAN Bilateral Trade Database by Industry and End-use Category (BTDIxE) and World Economic Forum statistics. Note: on X axis – shares of HTI(i,j) and ICTMan(i,j) in total value of export of goods.

[6] Author`s own estimates based on time trends

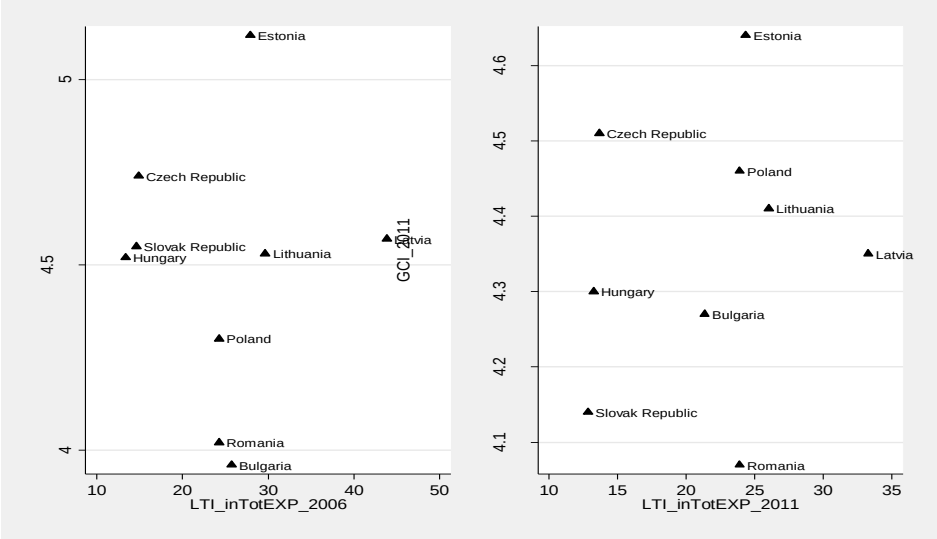
The best performing country, in terms of $HTInd/TotEXP_{i,2006\text{-}2011}$ dynamics, was Romania, with an average annual growth of approximately 20.23%. Relatively, the best scores were achieved by the two weakest countries in the sample, which probably reflects the catching-up effect that these countries are experiencing. Very low initial levels of $HTInd/TotEXP_{i,j}$ enhanced more rapid growth than in the initially "richer" economies.

As might be expected, quite analogous conclusions can be derived when analyzing the plots in Chart 3. They explain relationships between variables $ICTMan/TotEXP_{i,j}$ and $GCI_{i,j,}$ again in 2006 and 2011. Correlation coefficients are statistically insignificant and low: in 2006 – r^2=0.27, and in 2011 – r^2=0.000; which prevents us from uncovering any statistical regularities between the variables. In the cases of Estonia, Hungary and Lithuania, the variables' changes in value follow similar paths. In addition drops, both in global competitiveness and export shares of goods delivered by ICT Manufacturing industries, are reported. However the greatest decline occurred in Lithuania, where in 2006 $ICTMan/TotEXP_{Lithuania,2006}$=5.5%, while in 2011 $ICTMan/TotEXP_{Lithuania,2011}$= 3.2%.These changes were accompanied by slight decrease in GCI value ($GCI_{Lithuania,2006\text{-}2011}$=(-0.12)% pp), compared to Estonia: ($GCI_{Estonia,2006\text{-}2011}$= (-0.48)%pp) and Hungary ($GCI_{Hungary,2006\text{-}2011}$=(-0.22)%pp). The results for the Czech Republic, Latvia and the Slovak Republic may be confusing. In these countries we observe a growth of export in ICT Manufacturing sector in total export value, which contrasts with declines in international competitiveness. The most significant and dynamic changes in the ICT Manufacturing sector are reported for Romania, which accounts for 5.8%pp growth of ICTMan/ $TotEXP_{Romania,2006\text{-}2011}$. However this seems to have no significant impact on the growth in international competitiveness of Romania.

Chart 3. explains relationships between export shares of low-technology industries ($LTInd/TotEXP_{i,j}$) and international competitiveness ($GCI_{i,j}$). On the basis of general intuition, we again expected to find statistically significant and negative correlation coefficients. On the contrary, in both years (2006 and 2011), the coefficients were: r^2=0.000 (in 2006) and r^2=0.028 (in 2011).[7] In the analyzed period 2006-2011, in each country downward trends in $LTInd/TotEXP_{i,j}$ are revealed. Except for Latvia (see Chart 1), low-technology industries are substituted by industries of higher technology-intensity. This process, however positive in nature, seems to have had no significant impact on growth in international competitiveness as measured by the Global Competitiveness Index.

[7] Regressing GCI on LTInd/TotEXP, both for 2006 and 2011, the coefficients are positive, but statistically insignificant.

Chart 3. Low-technology industries (shares of total export value) and the Global Competitiveness Index. Years 2006 and 2011



Note: on X axis – shares of $LTI_{(i,j)}$ in total value of export of goods.

Source: authors own elaboration based on data derived from OECD STAN Bilateral Trade Database by Industry and End-use Category (BTDIxE) and World Economic Forum statistics.

The obtained empirical results differ dramatically from what was initially expected. We hypothesized that we would identify significant and positive relationships between the development of high-technology industries and ICT Manufacturing sector and a country`s global competitiveness. But relying on our analysis of the outcomes, one should conclude just the opposite. Such results are at odds with general economic intuition, and may seem to be paradoxical. It is hard to admit that growth in the export of high-tech industries has no impact on international competitiveness.

However, our *"strange"* results may be a consequence of four aspects. Firstly, the geographic and time coverage was very limited, which resulted in a small number of observations. Secondly, the measure of international competitiveness – $GCI_{i,j}$, is highly complex, covering a multitude of different variables, which negatively affects it in time variability. Thirdly, the selected countries are highly specific. In the former "transition countries", some trends observed in national economies are the direct result of dynamic structural adjustments that these countries have had to undergo to catch-up with the highly developed economies. Additionally, trade patterns depend not only on a country`s current individual endowments, but are conditioned by wide bundle of different, often exogenous, factors. High vulnerability and lack of ability to resist external

shocks constitutes an obstacle to entering a stable development path. Fourthly, and in relation to the previous observation, the period taken into consideration (2006-2011) was highly unstable due to the spread of the economic crisis across the world. The turmoil disrupted development processes, which was especially serious in the case of Estonia. All the imperfections listed above account for the significant lack of robustness of the final results presented in the empirical part of this paper.

5. Concluding remarks

The main aim of the paper was to check for intensity of changes in the trade patterns of nine Central-East European countries over the period 2000-2011, concentrating exclusively on the export of goods classified by the level of technology-intensity of industries. Having reference to the traditional concepts that technological progress explains international trade flows and national competitiveness, we also aimed to identify the relationship to changing trade patterns in international competitiveness, measured by the Global Competitiveness Index. Our empirical results rejected the hypothesis of the existence of positive links between growth of exports in technology-intensive industries and international competitiveness in the analyzed countries. However, the obtained outcomes should be interpreted with caution. The trade patterns uncovered in each country show that technological changes positively impact international trade flows and that the examined economies are gradually opening their internal markets to the global economy. The study also revealed substitution effects in industries' shares in a country's total export of goods, contributing positively to changing the structure of the national economy. As countries become more export-oriented, growth of high-tech and medium-high-technology industries in total export of goods legitimizes the assumption of an increase in their competitive potential. The link between the two is not direct however, and possibly reveals itself with significant time lags, and – above all – international competitiveness cannot be explained solely by technological factors. However, as technology potentially constitutes an important catalyst of growing international competitiveness, enhancing countries to transform from technology-importing countries into efficient and innovation-led developments, driven by growing export of high-technology industries, indicate that future studies of these aspects are desirable.

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Streszczenie

ŚCIEŻKI EKSPORTU DÓBR VERSUS MIĘDZYNARODOWA KONKURENCYJNOŚĆ. ANALIZA PORÓWNAWCZA DLA KRAJÓW WSCHODNIEJ I ŚRODKOWEJ EUROPY W LATACH 2000-2011

W artykule analizie poddano zmieniające się ścieżki eksportu dóbr w podziale na gałęzie o różnej intensywności technologicznej. Analizę przeprowadzono dla lat 2000-2011 dla 9 wybranych krajów Europy Centralnej i Wschodniej, tj: Bułgarii, Republiki Czeskiej, Estonii, Litwy, Łotwy, Polski, Rumunii oraz Słowacji. Dodatkowo postawiono hipotezę o zachodzącej pozytywnej relacji między rosnącym – w stosunku do całej wartości eksportu kraju–udziale sektorów technologicznie-chłonnych oraz międzynarodową konkurencyjnością, która jest aproksymowana za pomocą Global Competitiveness Index (GCI).

Dane dotyczące eksportu pochodzą z bazy OECD STAN Bilateral Trade Database by Industry and End-use Category (BTDIxE), zaś te dotyczące międzynarodowej konkurencyjności – World Economic Forum. Wyniki przeprowadzonej analizy empirycznej nie potwierdzają statystycznej zależności między poziomem międzynarodowej konkurencyjności (GCI) a udziałem sektora high-tech oraz ICT w całości eksportu danego kraju.

Słowa kluczowe: *międzynarodowa konkurencyjność, ścieżki eksportu, intensywność technologiczna, analiza porównawcza*

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Competitiveness In International Trade In Knowledge-Intensive Services – The Case Of Poland

Abstract

The aim of this paper is to study Poland's competitiveness in international trade in knowledge-intensive services (KIS). The author analyzes the trends in Polish KIS trade and tries to answer the question whether Poland is moving towards obtaining a comparative advantage in this field.

The first part of the paper presents a definition and classification of KIS, indicators to measure competitiveness in international services trade, and a short review of the research in this field. The second part of the study is empirical. The author uses traditional indicators of international competitiveness such as: export performance, trade balance, and the RCA index. The analysis also touches upon the impact of Poland's accession to the EU on its competitiveness in KIS trade. Finally, some possible determinants of Poland's competitiveness in particular KIS sectors are indicated.

The paper uses the Eurostat and WTO databases. The analyzed period for international transactions is usually 2000-2010, but for Poland the 1994-2010 period was used, i.e. since the European Agreement entered into force.

***Keywords**: international competitiveness, international trade in services, knowledge intensive services*

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1. Introduction

A modern competitive economy is defined as a service and knowledge-based economy, and it should come as no surprise the KIS play a key role in such an economy. Statistical data demonstrates that this is the case in the EU economies, including Poland. In addition, when the issue of competitiveness in international trade is discussed, it is generally considered that high-tech goods are its driving force. There are some studies indicating that KIS are an important source of productivity improvements, both in the service and manufacturing branches, and thus contribute to improving international competitiveness. There are also analyses showing the increasing importance of KIS in international trade. Nonetheless, in general the issue of competitiveness in international trade in KIS remains poorly investigated.

The problem discussed in this paper is especially important in the case of Poland, because professional services were indicated as a possible source of comparative advantage in Polish trade following its accession to the EU (Wyszkowska-Kuna 2004, p. 142), and were identified as priorities in Polish pro-export policy, owing to Poland's good performance in value added/export activities, and high-tech advancement and innovativeness (Chojna 2008, p. 52).

The question whether Poland has moved towards such a pattern of specialization is of great importance because Poland, in comparison with other developed countries, is characterized by a relatively low level of technological advancement and competitiveness in international trade in high-tech goods. On the other hand, Poland has a relatively large pool of relatively cheap and well-qualified labour, which has been perceived as a possible resource of comparative advantage in Polish export of KIS.

2. Definition and classification of knowledge-intensive services

The term "knowledge-intensive (or knowledge-based) industries" usually refers to those industries which are relatively intensive in their inputs of technology and/or human capital. While there are established methods for classifying manufacturing industries according to technological intensity, capturing the right service sectors to help measure the impact of knowledge has proved more challenging. The reasons for thus include the following: for a long time most countries provided data on services only at fairly aggregate levels; limited information in areas such as R&D expenditure and skill levels makes it

difficult to group them according to "knowledge-intensity"; countries/organizations record services using different classifications of technology/knowledge-intensive sectors (some may use no definition), and thus data coming from different sources may not be comparable (OECD 1999, p. 18).

In this paper Eurostat and WTO data are used.[1] Eurostat uses the sectoral approach for all indicators except for data on high-tech trade and patents (where it uses the product approach). The sectoral approach is an aggregation of the manufacturing industries according to technological intensity (R&D expenditure/value added), and it is based on the Statistical Classification of Economic Activities in the European Community (NACE). Manufacturing industries are classified into high-technology, medium-high technology, medium-low technology and low-technology industries. Services are aggregated based on the share of persons with a tertiary education persons, and they are classified into knowledge-intensive services (KIS) and less knowledge-intensive services (LKIS). Due to the revision of NACE Rev. 1.1 into NACE Rev. 2, the definition of high-technology industries and knowledge-intensive services, as well as knowledge-intensive activities, has changed (Eurostat 2011a).

Eurostat (2011b) defines four categories of knowledge-intensive services:

1. **Knowledge-intensive high-tech services (HTKIS):**
   Post and Telecommunications (NACE Rev. 1.1)/ Telecommunications (NACE Rev. 2); Computer and related activities; Research and development.
2. **Knowledge-intensive market services (excluding KIFS and HTKIS):** Water transport; Air transport; Real estate activities; Renting of machinery and equipment without an operator, and of personal and household goods; Other business activities;
3. **Knowledge-intensive financial services (KIFS):**
   Financial intermediation, except insurance and pension funding; Insurance and pension funding, except compulsory social security; Activities auxiliary to financial intermediation;
4. **Other knowledge-intensive services:**
   Education; Health and social work; Recreational, cultural and sporting activities.

In accordance with the definition of KIS presented above, statistics on output, employment and business activities are collected. We should keep in mind that statistics on international trade use a different set of categories. What's more, there is no official definition and no statistics on knowledge-intensive services trade (KIS trade) - there are only statistics on high-tech trade that refer to trade in high-tech manufacturing products.

[1] The WTO has no official definition of knowledge-intensive industries, and its data refers only to international trade.

In this paper KIS trade includes: Communications services;[2] Insurance services; Financial services; Computer and information services; Royalties and license fees; other business services;[3] and Personal, cultural and recreational services. Other business services consist of: Merchanting and other trade-related services; Operational leasing services and Miscellaneous business, professional and technical services (including: Legal services; Business and management consultancy, public relations services; Accounting, auditing, book-keeping and tax consulting services; Advertising, market research and public opinion polling; Research and development services; Architectural, engineering and other technical consultancy; Agricultural, mining, and on-site processing; Other miscellaneous business, professional and technical services; and Services between affiliated enterprises, n.i.e.). Eurostat's definition of KIS also includes Inland waterway transport, Air transport, and Personal spending on education and health services by foreign students and visitors, but these data are available only from Eurostat (and for Poland mainly since 2004)[4], thus we exclude them.

The Balance of Payments records transactions between resident and non-resident entities, which covers to a varying extent three of four modes of service trade defined under the General Agreement on Trade in Services (GATS 1994, pp. 285-286). Thus, the analysis refers only to international KIS trade through cross-border transactions and temporary movement of service recipients (modes 1 and 2) and that part of temporary movement of natural persons (mode 4) which takes place through service transactions. We exclude trade through commercial presence (mode 3 –separate data on Foreign affiliates statistics), and that part of mode 4 that takes place through temporary employment (Borchsenius 2010, p.7).

[2] Communications services consist of Telecommunications, postal and courier services – KIS should include only Telecommunications, but this data is incomplete (e.g. for Poland there is no such data before 2004).

[3] Other business services – the sub-category Merchanting and other trade-related services should be excluded here, but statistics on this category are available only in Eurostat databases (mainly for the EU countries), thus for comparability with international data (WTO), the entire category was included in KIS trade.

[4] The OECD statistics exclude these transport subcategories from the definition of KIS.

3. Measuring competitiveness in international trade

Competitiveness, unlike comparative advantage, was not rigorously defined in the early economic literature, and even after many attempts to define it,[5] it remains a somewhat ambiguous concept (Siggel 2007, p. 5).

Because this paper analyses competitiveness in international trade in KIS, we need definitions and indicators to measure this field of competitiveness.

Competitiveness in international trade is a measure of a country's advantage or disadvantage in selling its products in international markets (OECD, 2005). Indicators of competitiveness in international trade can measure the size or increase of market shares (e.g. De la Guardia, Molero, Valadez 2004, pp. 5-7), export performance (e.g. Balassa 1965), price ratios (e.g. Durand, Giorno 1987, p.153), cost competitiveness (e.g. Turner, Gollup1997, pp. 5-7; Cockburn, Siggel 1999, pp. 5-10), or more complex dimensions (multi-dimensional indicators, e.g. Porter 1990, pp. 73-91; Oral 1993, pp. 9-22). Bieńkowski (2008, pp. 23-29). They may be categorized into: (a) indicators measuring benefits from international trade (factorial or price terms of trade, labour and capital productivity, a sector's share in a country's total export); (b) indicators measuring market domination (export performance, market share, relative market share, hypothetical export index, constant market share, revealed comparative advantage); and (c) indicators combining the previous ones (composite competitiveness indicators). The theoretical studies on the international service trade are not very extensive, but they generally demonstrate that export-based indices of competitiveness can also be used to study competitiveness in international service trade (Misala 2001, pp. 153-168; Wyszkowska-Kuna 2005, pp. 15-30).

One of the most commonly used indicators of competitiveness in international trade is the Balassa (1965) index of revealed comparative advantage (RCA) (Wysokińska 1995, p. 106; Misala 2001, p. 245; Bieńkowski 2008, p. 28). This index was designed to analyze competitiveness in international merchandise trade, but as Nusbaumer (1987, pp. 60-61) noted, it can be also used with respect to service trade. At the same time Barras and Peterson (1987, pp. 139-140) proved that the RCA index, together with adjusted export shares, are conceptually superior measures of competitiveness in international service trade compared with observed export shares. Therefore, in this paper Poland's competitiveness in KIS trade is measured by the RCA index, as well as by its export performance and trade balance.

[5] In the broader literature we can find some classifications of different concepts and indicators of competitiveness e.g. (Siggel 1997, pp. 6-16; Misala 2001, 242-255; Bieńkowski 2008, pp. 18-23).

Finally, we should stress that the measurement of competitiveness is - even within a well-defined conceptual framework - very much a matter of compromises with the available data, and entails a number of trade-offs among different criteria and objectives (Durand, Giorno 1987, p. 153; Durand, Simon, Webb 1992, p. 6; Chen 2011, p. 342). This is especially visible in the case of services trade, where data is scarce, often incomplete, recorded at a high level of aggregation, and difficult to compare since it comes from different sources – generally of much poorer quality than in the case of merchandise trade. Additionally, as Peterson and Barras (1987, pp. 137-142) noted, measuring competitiveness in services is severely limited by the problem of accurately measuring the output of service industries (Peterson and Barras 1987, p. 133).

4. A review of related studies

Few research projects are focused on the impact of some producer services (FC&BS - financial, communication and business services, KIS or KIBS - Knowledge Intensive Business Services) on productivity and growth. These services are recognized as providers of strategic inputs to the rest of the system (manufacturing and service industries), and therefore as important contributors to increasing productivity in these sectors, and as a consequence increasing competitiveness in international trade. They are also recognized as sectors with a high potential growth (Antonelli 1998, p. 181, 192; Katsoulacos, Tsounis 2000, p. 192; Windrum, Tomlinson 1999, p. 393-394, 401-402; Balaz 2004, pp. 478-487; Di Cagno, Meliciani 2005, p. 161). Windrum and Tomlinson also state that the impact of KIS on a country's output and productivity is higher if there is strong degree of integration between services and other economic activities (most notably manufacturing). The importance of intersectoral linkages for export specialization is also stressed by Laursen and Drejer (1997, pp. 16-17). They conclude that the two types of technological activities, namely technological activities within a single 'own' sector, and inter-sectoral linkages, are both important in the determination of national export specialisation patterns.

There are also few studies analyzing the issue of competitiveness in international KIS trade. Guerrieri and Meliciani (2005, pp. 489-502) test the determinants of trade specialisation and competitiveness in FC&BS. They find that a country's ability to develop a competitive service economy depends on the structure of its manufacturing sector, as some manufacturing industries are more intensive users of these services. They also state that knowledge-intensive industries (office&computing machinery, professional goods, electrical apparatuses&radio, TV&communication equipment, chemicals and drugs) are

the main users of producer services, and thus countries which specialise in these industries are in a favourable position to develop a comparative and absolute advantage in producer services. They also prove that domestic specialisation in the service industries that are important users of FC&BS positively contributes to international specialisation in FC&BS. Finally, they find that ICT has a positive and significant impact on trade performance in FC&BS.

Di Cagno and Meliciani (2005, p. 151, 161) look at spillovers through trade in services in the context of the literature on the role of trade in economic growth. They show that both domestic and imported producer services (especially communication, business, financial and transport services), contribute to fostering technological change and increasing productivity. They also prove that the importance of these services varies across industries.

Yap Co (2007, p. 893-900) studies the determinants of US KIS exports and finds that affiliated services exports (e.g. research, development, and testing services) generally arise to support other firm activities (e.g. manufacturing) in the importing countries, whereas non-affiliated services exports do not require the presence of other activities. Thus affiliated services exports may be more sensitive to the characteristics of importing countries.

Brinkley (2007, pp 7-26) shows that the UK economy has experienced a major structural change in its trade with the rest of the world, from trade in other manufactured goods towards exports in KIS and high tech manufacturing. This has been driven by the rising global demand for KIS, and it has been achieved by: (a) consolidation of traditional strengths such as the City, business services, and higher education; (b) moving into rapidly growing areas such as computer and information services and the creative industries; (c) the transformation of parts of manufacturing from pure production to offering a manufacturing and services package; and (d) the development of global brands and expertise across a range of knowledge-based service industries. Brinkley claims that the UK has developed as an unrivalled world-leader in KIS trade, but there is a possible threat from increased competition from high wage economies in the EU and North America, as well as from lower wage economies such as India.

Javalgi, Gross, Joseph and Granot (2011) assess and compare the comparative performance of major emerging markets in KIBS exports. They indicate that while the major emerging markets are building competitive advantage by focusing on KIBS, their progress differs sharply – e.g. China has the lead, followed by India, Brazil, Russia, Mexico, Turkey, and Indonesia, whereas smaller nations lag behind. They also show that the leading emerging economies have not reached parity with the highly industrialized countries.

In the studies referring to China, we learn that KIS trade contributed more to the economic growth in China than the labour-intensive and capital-intensive

services trade (the University of International Business & Economics 2010). On the other hand Chen (2011, pp. 343-346), using the TC and MI indices, shows that China lacks international competitiveness in the KIS trade, which is related to some extent with the immaturity of its KIS industries. Chen states that the KIS sector in China is relatively backward and lacks independent innovation capacity, and in addition is unfamiliar with foreign laws, international conventions and the market environment closely associated with KIS industries, such as insurance, consulting, financial and other professional services. Thus, it is difficult for China to adapt to international market demand.

5. Poland in international trade in knowledge intensive services

The data in the Table 1 shows that, between 2000 and 2010 (earlier data is unavailable),the dynamics of growth in KIS exports was higher than of world services exports, world merchandise exports and the world GDP. KIS exports increased threefold, whereas world services exports increased 2.5 times, world merchandise exports nearly 2.5 times, and world GDP doubled. As a result KIS increased their share in total services exports from 41.9% to 50.3%; in exports of goods & services from 8% to 10.1%; and in world GDP from 2% to 3.1%.

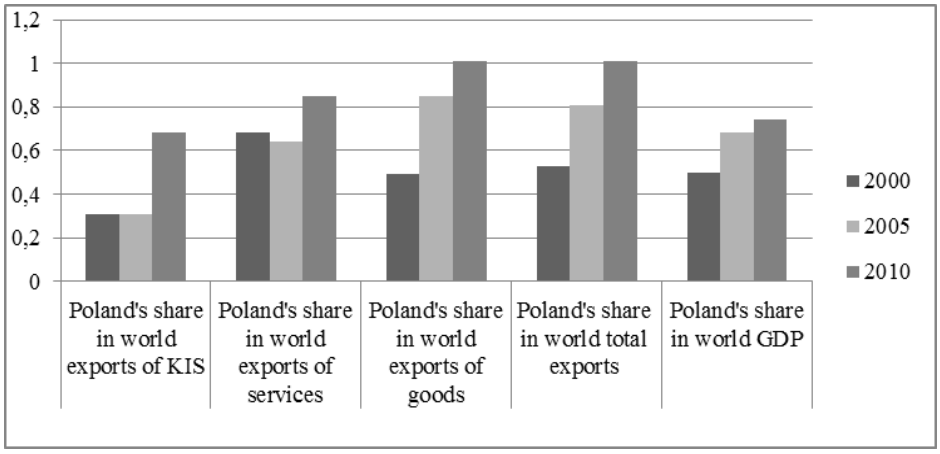
Table 1. World exports of KIS compared with world exports of services, goods and GDP

	World value (in mln $)		Relation to world GDP (in %)		2010/2000x100	
					World	Poland
Exports:	2000	2010	2000	2010	2010/00	2010/00
of KIS	637,900	1,927,300	2.0	3.1	**302.1**	**659.6**
of services	1521700	3835000	4.8	6.1	252.0	314.9
of foods	6456000	15274000	20.5	24.2	236.6	503.1
GDP	31492776	63048823			200.2	297.1

Source: World GDP: World Bank, 2002/2007/2011. Total GDP 2000/2005/2010, World Development Indicators database, World Bank, http://www.pdwb.de/archiv/ weltbank/ gdp00.pdf; http://www.fts.uner.edu.ar/catedras03/economia/archivos_ts/PBIBanco Mundial.pdf; http://siteresources.worldbank.org/DATASTATISTICS/Resources/GDP.pdf., World KIS /services /goods exports: WTO, Time series on international trade, http://stat. wto.org/ Home/WSDBHome. aspx?Language=E.

The growth dynamic of KIS exports in Poland was more than twice that of the world KIS exports, total services exports and GDP in Poland, as well as higher than merchandise exports in Poland (Table 1). In a result, with more than 6.5-times growth, KIS increased their share in Polish services exports from 19% in 2000 to 40% in 2010.

Graph 1. Poland's share in world KIS/services/goods exports and in world GDP – 2000-2010



Source: Own calculations based on the source as in Table 1.

In Graph 1 we can see that between 2000-2005, Poland's share in world KIS exports remained at the same level (in case of total services it decreased slightly), whereas between 2005-2010 it increased more than twofold (in total services by 33%). With respect to merchandise trade, the situation was reversed. In a further part of the paper we explore the relation of this growth to Poland's accession to the EU.

According to the data in Table 2, we can see that Poland has increased its position in world KIS exports from 29th place in 2000 to 26th place in 2010, and its share in world KIS exports from 0.31% to 0.68% respectively. However, it should be mentioned that Poland's place actually was lower, both in 2000 and in 2010.[6] In 2010 Poland managed to achieve a better position than Australia, Czech Republic, Portugal and Turkey, but we don't know if Poland was ranked higher than Egypt, Israel, Malaysia and Mexico (no data on 'Other business services' for these countries). Thus, we can suppose that in 2010 Poland was ranked at more or less the same position as in world commercial services exports (30th) and in world merchandise exports (28th). Poland's share in world KIS exports (0.68%) was lower than its share in world services exports (0.9%) and world merchandise exports (1.0%). (WTO, 2012, pp. 24, 26)

[6] In 2000 Belgium and Luxembourg were treated as one country, and four countries were probably ranked higher: Denmark and Finland – no data on KIS exports, India and Russia – data incomplete (lack of data on Other business services, and in the case of India also on Computer and information).

Table 2. Leading World KIS exporters in 2000 and in 2010

	In mln $*	In %		In mln $	In %
	2000			2010	
World	637,900	100	World	1,927,300	100
1. USA	134,343	21.06	1. USA	324,048	16.81
2. United Kingdom	77,317	12.12	2. United Kingdom	180,942	9.39
3. Germany	36,850	5.78	3. Germany	129,299	6.71
4. Japan	33,482	5.25	4. Ireland	88,432	4.59
5.Belgium/Luxembourg	29,520	4.63	5. Japan	75,969	3.94
6. France	27,927	4.38	6. China	75,729	3.93
7. Hong Kong, China	21,348	3.35	7. India	72,007	3.74
8. Canada	20,737	3.25	8. Singapore	64,093	3.33
9. Italy	17,867	2.80	9. Luxembourg	58,252	3.02
10. Switzerland	15,776	2.47	10. France	55,653	2.89
11. Spain	13,292	2.08	11. Hong Kong, China	53,856	2.79
12. Ireland	12,423	1.95	12. Belgium	47,987	2.49
13. Taipei, Chinese	11,912	1.87	13. Spain	45,558	2.36
14. Sweden	11,674	1.83	14. Italy	44,210	2.29
15. Singapore	11,421	1.79	15. Sweden	43,534	2.26
16. China	9,641	1.51	16. Canada	39,803	2.07
17. Korea, Rep. of	9,196	1.44	17. Switzerland	38,548	2.00
18. Austria	8,172	1.28	18. Austria	26,077	1.35
19. Norway	5,804	0.91	19. Korea, Rep. of	24,935	1.29
20. Australia	5,780	0.91	20. Taipei, Chinese	21,263	1.10
21. Malaysia	5,685	0.89	21. Finland	20,453	1.06
22. Brazil	5,514	0.86	22. Brazil	19,416	1.01
23. Israel	4,135	0.65	23. Norway	18,915	0.98
24. Mexico	3,383	0.53	24. Russia	18,099	0.94
25. Turkey	2,991	0.47	25. Denmark	16,502	0.86
26. Egypt	2,604	0.41	26. Poland	13,040	0.68
27. Czech Republic	2,222	0.35			
28. Portugal	2,069	0.32			
29. Poland	1,977	0.31			

*At current prices. India: data on Computer & information and Other business services from 2009.

Source: WTO, Time series on international trade (as in Table 1).

6. Poland's competitiveness in KIS export in the light of its accession to the EU

From the data in Table 3, we can observe that in Poland KIS accounted for more or less the same (slightly higher) share in total exports as did high-technology products, whereas in the EU high-tech products recorded a higher share. It seems important to note that KIS increased their share in EU exports, whereas high-technology products decreased – as a result the difference between them in 2010 was much smaller than in 2000. In Poland, both KIS and high-technology products more than doubled their share in total exports, but in both cases they were lower than in the EU.

Table 3. KIS exports in comparison with high-tech products exports as a share of total exports in Poland and in the EU-27

	KIS exports as a share of total exports			High-tech products exports as a share of total exports		
	2003/04	2005	2010	2000	2005	2010
Poland	3.1	3.4	6.8	2.8	3.2	6.0
EU-27	10.8	11.3	13.1	20.4	18.7	16.1

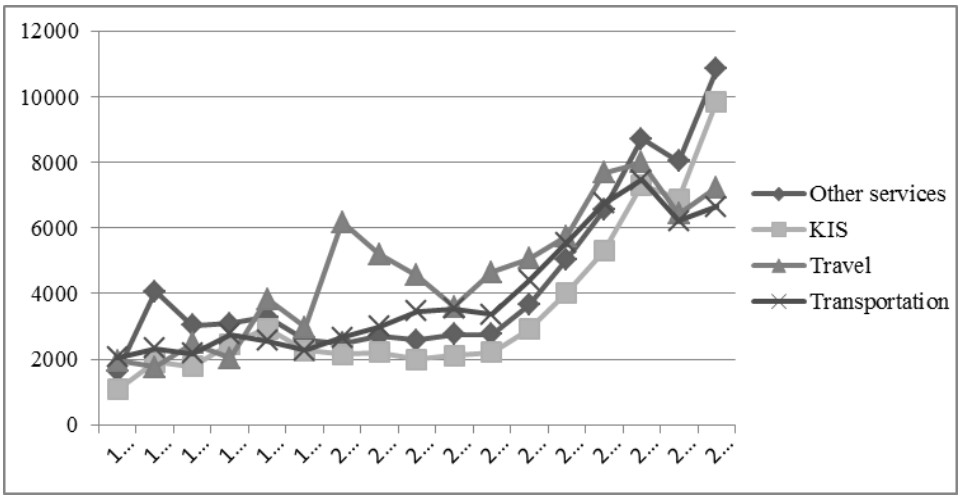
Source: Exports of high technology products as a share of total exports (1995-2006, SITC Rev. 3)/(from 2007, SITC Rev. 4), http://epp.eurostat.ec.europa.eu/portal/page/portal/science_ technology_ innovation/data/database, Exports of KIS as a share of total exports – own calculations based on: International trade in services, geographical breakdown: International trade in services (since 2004)/(from 1985 to 2003), http://epp.eurostat.ec. europa. eu/portal/page/portal/balance_ of_payments/data/database.

Examining Graphs 2 and 3 below, we can see that Polish KIS exports recorded two periods of increase: between 1994 and 1998 (with the exception of 1996), and since 2004 (with the exception of 2009). It's important to note that the first period of increase began when Poland entered into its association agreement with the EU, and the second when Poland entered the EU. It is also not surprising that the second period of increase has been much stronger than the first, because following the accession most barriers in services trade between Poland and the EU were removed. Lack of data on Polish service transactions with the EU countries before 2004 makes it more difficult to assess the impact of EU integration on Poland's competitiveness in services exports. But nevertheless it seems justified to relate this growth in KIS exports to the integration processes.

Graph 2 yields additional important information - that the chart for Other business services (OBS) exports is very similar to the chart for KIS exports. OBS is the major category in KIS trade, and thus their high export growth was the main engine of the growth in KIS exports. While the other two categories - Computer and information services (C&IS) and Royalties and license fees

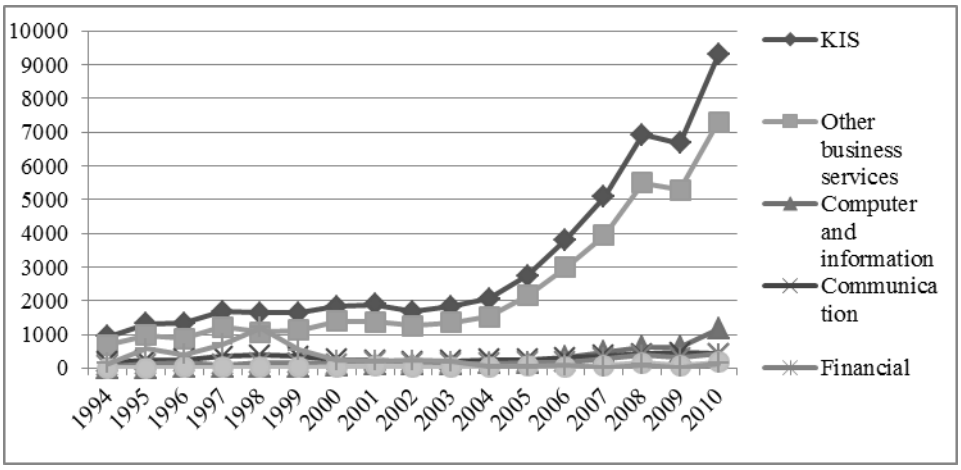
(R&LF) – achieved even higher growth rates, they contributed to a much lesser extent to the increase in KIS exports, because they have a relatively low share in Polish KIS exports (particularly in the case of R&LF).

Graph 2. The growth of KIS exports in comparison with the growth of exports in other main services categories in Poland between 1994-2010



Source: as in Table 3.

Graph 3. The growth of KIS exports in comparison with the growth of exports in KIS categories, in Poland between 1994-2010



Source: as in Table 3.

Table 4. International services transactions in Poland between 1994-2010 (mln EUR)

		1994	2003	2005	2007	2010	2010/94
Communication	Credit	175.7	215.9	249.1	368.7	419.8	238.9
	Debit	134.5	216.8	293.1	510.6	488.9	363.5
	Net	41.2	-0.9	-44.0	-141.7	-68.8	
Insurance	Credit	127.8	192.1	54.4	14.0	134.9	105.6
	Debit	198.4	365.3	311.0	335.4	278.4	140.3
	Net	-70.6	-173.2	-256.5	-321.4	-143.4	
Financial	Credit	58.0	142.1	175.0	285.7	419.8	723.7
	Debit	106.8	252.3	309.5	375.3	642.1	601.4
	Net	-48.8	-110.2	-134.5	-89.6	-222.6	
Computer & information	Credit	1.7	118.2	158.6	483.4	1162.8	69172.6
	Debit	29.4	310.5	337.1	635.6	1255.9	4268.3
	Net	-27.7	-192.3	-178.5	-152.2	-93.1	
Royalties & licence fees	Credit	0.8	25.7	50.5	72.7	177.2	21074.3
	Debit	15.1	658.9	833.7	1144.1	1692.0	11181.5
	Net	-14.3	-633.3	-783.3	-1071.4	-1514.8	
Other business services	Credit	695.2	1351.9	2156.1	3930.5	7296.2	1049.4
	Debit	896.2	2185.4	2553.8	3616.8	5570.9	621.6
	Net	-200.9	-833.5	-397.7	313.7	1725.0	
Personal, cultural and recreational	Credit	11.8	53.4	75.3	140.6	232.6	1976.0
	Debit	10.9	113	127.8	219.6	650.6	5953.1
	Net	0.8	-59.6	-52.5	-79.0	-418.1	
KIS	Credit	**1071.0**	**2099.3**	**2919.0**	**5295.6**	**9843.3**	**919.1**
	Debit	**1391.3**	**4102.2**	**4765.9**	**6837.5**	**10578.8**	**760.3**
	Net	**-320.3**	**-2002.9**	**-1846.9**	**-1541.6**	**-735.7**	
Services	Credit	5631.7	9881.4	13102.7	13102.7	24717.5	438.9
	Debit	3244.2	9418.4	12515.3	12515.3	22381.2	689.9
	Net	2387.5	463.0	587.4	587.4	2336.4	
Transport	Credit	2049.6	3533.3	4393.5	4393.5	6637.8	323.9
	Debit	1147.5	2031.8	2684.1	2684.1	4644.4	404.7
	Net	902.0	1501.5	1709.4	1709.4	1993.4	
Travel	Credit	1954.6	3598.1	5056.4	5056.4	7223.6	369.6
	Debit	269.0	2476.6	4485.0	4485.0	6510.1	2420.0
	Net	1685.6	1121.5	571.5	571.5	713.5	
Other services	Credit	1627.6	2750.0	3652.5	3652.5	10850.4	666.7
	Debit	1827.6	4909.5	5346.5	5346.5	11219.4	613.9
	Net	-200.1	-2159.5	-1694.1	-1694.0	-369.2	

*1994 – mln ECU.

Source: International trade in services (as in Table 3).

It is also worth stressing that OBS and C&IS recorded only slight declines in exports in 2009, while international trade in services suffered from a deep decline due to the world financial crisis. What's more, the following year they not only recovered to the growth rates from the period before the crisis, but they even increased them (e.g. C&IS doubled their value between 2009-10). R&LF were more heavily affected by the decline in 2009, but the following year they recorded their highest growth, particularly in exports to the third countries. As far as the other KIS categories are concerned, all of them - except for Insurance - increased their credit and debit transactions within the analyzed period, and they also quickly recovered after a one-year-decline in 2009.

As we mentioned in section 2, a net trade balance is an important indicator of a country's competitiveness in international trade. The data in Table 4 shows that throughout the entire analyzed period Poland recorded a deficit in KIS trade, which indicates a rather poor level of competitiveness in this field. Generally, during this time Poland enjoyed a surplus in total services trade, but this was thanks to a surplus in transactions in Transportation and Travel, whereas in transactions in Other services Poland suffered a deficit. However, it is important to stress that there has been an improvement in the competitiveness of Poland in KIS trade in recent years. After a six-year period of growing deficits in KIS trade, since 2004 Poland has recorded reductions in this deficit. This was mainly due to the high export growth in OBS. This was the only KIS category that has enjoyed a trade surplus since 2007, and what's more this surplus has grown 5.5 times (following a fourfold growth in its deficit during the association period). C&IS and Communications services have also recorded reductions in their deficits (following a sevenfold growth in the deficit during the association period), whereas R&LF, Personal, cultural and recreational services (PC&RS) and Financial services have recorded increases in their deficits, with the highest deficit taking place in transactions in R&LF.

In order to effectively assess the impact of Poland's accession to the EU on its competitiveness in KIS trade, we should have data on Polish service transactions with the EU before and after 2004. Unfortunately, there is no such data before 2004, thus we can't say if there was a shift from extra-EU to intra-EU trade following the accession. From the data in Table 5 we can observe that since 2004, on average about 75% of Polish transactions have been intra EU-trade, both in exports and imports and in both KIS trade and total services trade. Thus we can say that Poland's services trade has been greatly dominated by transactions with EU countries. However, since 2007 we can observe a shift from intra-EU to extra-EU transactions in Polish KIS exports, owing primarily to OBS. OBS exports have recorded high growth, both to the third countries and to the EU member states, but exports to third countries have increased eight

times, twice more than the corresponding exports to the EU. As a result, in 2010 their share in extra-EU services exports reached the level of 36%, 10 p.p. higher than in services exports to the EU (Table 6). The other two categories with the highest growth rates (C&IS and R&LF) have increased their shares in the EU markets to a greater extent.

Table 5. Percentage shares of trade with the EU-27 countries in Polish international transactions in KIS and in total services for the period 2004-2010

	Credit							Debit						
Year	04	05	06	07	08	09	10	04	05	06	07	08	09	10
KIS	76	76	77	75	70	69	66	75	76	77	76	77	78	77
S	73	74	75	74	73	73	70	76	76	75	76	76	77	77

S – Services.

Source: Own calculations based on the source as in Table 4.

Table 6. Trade in each KIS category as a percentage of total services trade (in 2004 and 2010), and its growth between 2004-2010; in Poland – with the EU and with third countries

	EU (27)			Extra EU (27)			EU (27)			Extra EU (27)		
Year	04	10	G*	04	10	G	04	10	G	04	10	G
	Credit						Debit					
C	2.5	1.9	167	1.5	1.2	202	2.7	2.3	180	1.3	1.8	282
I	0.3	0.6	484	1.0	0.4	99	2.2	1.6	152	1.1	0.1	22
F	1.3	2.0	331	0.9	1.0	308	2.6	2.8	233	3.2	3.0	186
C&I	1.2	4.6	854	2.3	5.0	553	2.9	5.4	390	4.0	6.4	320
R&LF	0.2	0.6	804	0.4	0.9	652	5.6	6.5	244	9.5	11.5	232
OBS	15.1	26.6	386	11.6	36.5	814	19.0	26.8	299	17.2	18.6	215
PC&R	0.7	1.0	336	0.8	0.8	279	0.9	2.3	571	1.4	4.9	276

* Growth: 2010/2004*100.

Source: Own calculations based on the source as in Table 4.

As was mentioned in section 2, the RCA index is recognized as a reliable indicator for measuring competitiveness in services trade. In Table 7, RCA indexes for Polish KIS exports are presented – separately for exports to the EU, to third countries, and for total exports.

A country enjoys a comparative advantage in exports of a given product if the of RCA index value is above 1. In 2000, the RCA indexes in Polish KIS exports could be calculated only for total trade (on the basis of statistics from the WTO database). They showed that Poland enjoyed a comparative advantage in the export of Insurance and Communications services (in the latter case the RCA index had a border value). However, in the following years the RCA indices

reflected a decreasing trend in both categories, with particularly high decreases in Insurance. In OBS and C&IS the trend was reversed, both with respect to exports to the EU and to the third countries. As a result, in 2010 Poland achieved comparative advantages in both categories, but interestingly only to the EU in the case of exports of C&IS, and only to third countries in the case of exports of OBS (the RCA index more than doubled its value with respect to third countries).

Table 7. RCA indexes in Polish KIS exports to the EU countries; to the third countries; and in total exports (in 2005 and 2010)

	In exports to the EU (27)		In exports to the third countries		In total exports		
Type of services	2005	2010	2005	2010	2000	2005	2010
Total KIS	0.48	0.75	0.42	0.83	0.44	0.47	0.78
Communications	0.75	0.60	0.72	0.61	**1.00**	0.81	0.68
Insurance	0.16	0.28	0.25	0.15	**1.17**	0.21	0.25
Financial	0.32	0.46	0.12	0.11	0.15	0.19	0.23
Computer & information	0.37	**1.24**	0.28	0.65	0.18	0.28	0.82
Royalties and license fees	0.05	0.08	0.13	0.15	0.06	0.06	0.11
Other business	0.63	0.97	0.62	**1.40**	0.57	0.68	**1.14**
PC&R	0.33	0.68	0.55	0.70	0.30	0.45	0.79

Source: Own calculations based on the source as in Table 4.

7. Determinants of Poland's competitiveness in the export of Other business services and Computer and information services

Competitiveness in KIS exports, including OBS exports, is mainly determined by a country's endowment in human capital, as well as by the costs and productivity of labour. Comparing the data on employment in HRST-core[7] as percentage of total employment, we can see that Poland generally enjoyed an advantage over the EU-27 countries in the service industries (including KIS), whereas in manufacturing the situation was reversed. It's also worth stressing that between 2004-2010 this advantage increased, particularly in KIS, where it amounted to 10 percentage points (49% in Poland; 39% in the EU-27). Poland's largest advantage was in Financial services, Information and communication

[7] HRST-core employment - persons fulfilling at least one of the following two conditions: (1) have successfully completed a university level education; (2) are employed in a science and technology occupation as 'Professionals' or 'Technicians and associate professionals'.

(I&C) and Professional, scientific and technical activities (PS&TA). To compare the costs and productivity of labour we can use the data on Wage adjusted labour productivity[8] (WALP). On the basis of the relation between WALP in Poland and in the EU-27, we can say that Poland has an advantage over the EU-27 in OBS, since 2008 in PS&TA (that replaced OBS) and in Post & telecommunications, since 2008 in I&C (that replaced P&T). WALP in Poland was higher than in the EU-27 by 10% in OBS and 33% in P&T (2007), 22% in PS&TA and 31% in I&C (2010) (Eurostat, 2013).

While analysing competitiveness in the services trade we shouldn't forget about the process of out-sourcing/off-shoring. This mainly refers to computer and business activities, where Poland has advantages over the EU-27. Thus, Poland should be an interesting location for out-sourced/off-shored activities, which in turn may enhance its export performance in these sectors. From the data on FDI in Poland, we can observe that between 1996-2009 the FDI inflows into Real estate and business activities increased by 16 times, whereas total FDI inflows increased by only 2.7 times. As a result their share in total FDI inflows increased from 3% to 21% (26% in 2008). On the basis of new classifications, we can see that in 2010 Real estate activities accounted for 11%, and PS&TA for 36% of total FDI inflows into the Polish economy. The share of C&I in total FDI inflows was very small, although it recorded the highest growth (from 0.01% to 3%). Thus, we can say that in both sectors FDI inflows can have a positive impact on export performance. However, we should add that on average 87% of FDI inflows came from the EU countries, so they mainly generate increased export opportunities to the EU markets (NBP, 2004/2008/2010).

8. Conclusions

1. In the most recent decade the growth of world KIS exports was higher than that of world services exports, world merchandise exports, and world GDP. In Poland the growth of KIS exports was more than twice higher than that of world KIS exports, Polish total services exports, and Polish GDP, as well as higher than the growth of Polish merchandise exports.
2. Poland has improved its position in world KIS exports, and in 2010 this was higher than Poland's position in world merchandise or world services exports. However, if we take into account Poland's share in world KIS exports (0.68%) it was lower than Poland's share in world merchandise (1%) or world services exports (0.9%).

[8] WALP – apparent labour productivity by average personnel costs.

3. Despite the high growth rate in KIS exports, in 2010 the share of KIS in total trade was in Poland still nearly twice lower than in the EU (in case of high-technology products it was even three times lower). But the disparity between Poland and the EU has diminished significantly.
4. Poland has enjoyed a surplus in services trade, but despite the high growth rate in KIS exports Poland still hasn't managed to achieve a surplus in this field. On the other hand, we can note an improvement in Poland's competitiveness in KIS trade, mainly thanks to OBS exports. This was the only KIS category where Poland has enjoyed a surplus since 2007, with a 5.5-time growth rate since then. OBS was also the only category where Poland managed to achieve a comparative advantage – with respect to third countries, and nearly so in the EU and in total exports. In 2010, despite its trade deficit, Poland also achieved a comparative advantage in exports of C&IS, but only to the EU market. It is worth stressing that, during the times of the global crisis, which adversely affected international trade, in Poland transactions in KIS trade recorded only a single-year decline, after which then they returned to a path of growth, in some cases with even higher growth rates.
5. Poland's competitiveness in the export of OBS and C&IS is positively affected by its advantage over the EU-27 in wage adjusted labour productivity and HRST-core employment, as well as by FDI inflows.

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Structural Business Statistics, Database, SBS – services [serv]: Annual detailed enterprise statistics for services (NACE Rev. 2 H-N and S95) [sbs_na_1a_se_r2] and Annual detailed enterprise statistics on services (NACE Rev. 1.1 H-K) [sbs_na_1a_se]

Streszczenie

KONKURENCYJNOŚĆ W MIĘDZYNARODOWYM HANDLU USŁUGAMI NASYCONYMI WIEDZĄ – PRZYPADEK POLSKI

Celem artykułu jest zbadanie konkurencyjności Polski w międzynarodowym handlu usługami nasyconymi wiedzą. Autorka analizuje tendencje w międzynarodowych transakcjach Polski w usługach nasyconych wiedzą i stara się odpowiedzieć na pytanie, czy Polska przesuwa się w kierunku osiągnięcia przewagi komparatywnej w tym obszarze.

W pierwszej części artykułu przedstawiona jest definicja i klasyfikacja usług nasyconych wiedzą, omówiona jest kwestia pomiaru konkurencyjności w handlu usługami oraz dokonany jest przegląd badań w analizowanym obszarze. Dalsza część pracy ma charakter empiryczny. Autorka wykorzystuje tu tradycyjne mierniki pomiaru konkurencyjności w handlu międzynarodowym, takie jak: wielkość eksportu, saldo transakcji handlowych oraz wskaźniki przewagi komparatywnej RCA. Analiza dotyka również wpływu akcesji Polski do UE na jej konkurencyjność w eksporcie usług nasyconych wiedzą. Na koniec wskazane są możliwe determinanty tej konkurencyjności.

W pracy wykorzystywane są bazy danych Eurostatu i WTO. Analiza obejmuje okres 2000-2010 dla transakcji międzynarodowych, oraz 1994-2010 dla Polski (od 1994 roku wszedł w życie Układ Europejski).

***Słowa kluczowe**: międzynarodowa konkurencyjność, międzynarodowy handel usługami, usługi nasycone wiedzą*

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Attracting FDI To The Region Of Lodz By Its Local Government

Abstract

This paper evaluates the financial and non-financial incentives used by local authorities in the Province of Lodz to promote the inflow of FDI. Conclusions are based on a questionnaire study conducted in the second half of 2010 among 188 companies with foreign capital (CFC) which invested in the region, and 87 local government units hosting the majority of the CFCs included in the study. The obtained results indicate that support offered by local authorities had only a minor impact on the location decision for the investment project, and this conclusion is consistent with results of studies which assessed the role of incentives in Poland at macro, regional and sectoral levels.

Keywords: *FDI, incentives, Lodz Region*

1. Introduction

The role of Foreign Direct Investment (FDI) in the process of economic modernization remains a hotly debated issue, especially in transition countries. The entry into a market of a foreign enterprise with a fixed investment can influence a host economy through various channels, like the inflow of financial and physical capital, availability of know-how, diffusion of technology, and

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access to international production and sales networks. With these new resources FDI brings various advantages and disadvantages for a domestic economy. Its net balance for growth and development is not always positive, because according to numerous theoretical and empirical researches (e.g. Moran, Graham, Blomström eds. 2005; Tytel, Yudaeva 2006; Herzer 2012; Temiz, Gökman 2014), it is dependent on many specific factors, both from the side of an investor (form of market entry, level of technology transferred) and from the side of a country (business climate, openness of the economy, market size and its growth potential).

In spite of the doubts and warnings raised by various academic studies, the vast majority of policy makers seem to be convinced that FDI could play a positive role in economic development. First, in many countries the regulations on FDI entry have become more liberal and more selective in the last dozen or so years (WIR 2013). Second, the governments universally compete for projects through an array of incentives, from open grants and tax relief to various promotional activities (James 2009; Harding, Javorcik 2011). Central, regional and even local authorities are involved in this race for FDI. At the central level FDI promotion may form a part of the policy to eliminate social and economic disparities in spatial terms, while for the remaining levels of government it is an additional opportunity to offer new jobs, higher income and a better standard of living to their people.

Among the various policy instruments designed to attract foreign capital, a key role is played by investment benefits as broadly understood, which may impact the size, location or sector of a FDI project and are usually unavailable to comparable projects by domestic investors (OECD 2003, p. 12 and pp. 17–20; WTO, 2006, pp. 48–49). Surely the most appealing instrument in the toolkit consists of financial incentives (mostly subsidies and tax allowances), which are also the main subject of empirical studies. Investors also appreciate access to public services below their market price (e.g. subsidized training and road infrastructure) and all sorts of preferential legal regulations which reduce the cost of starting-up and pursuing economic operations. Other categories of incentives include public outlays promoting the search for potential investors (which also contributes to positive image of the host country/region), provision of essential business information free of charge, and assistance in complying with the requisite formalities when a project or production is started. Such subsidies indirectly reduce the costs of investment and therefore, especially in developing economies, where the market operates less smoothly and the state works less efficiently, they may become an important, even decisive, parameter for the location decision for a project (Harding, Javorcik 2011).

Clearly, the availability of investment benefits at various levels of state administration is not the same. The central government, especially in unitary

states like Poland, has much greater financial and organizational potential to inspire potential investors compared to local or regional governments. Nevertheless, the operations and attitudes of the latter may be decisive for determining where a foreign investment project is located in cases where business conditions are comparable in various potential locations. The role of local government is even bigger in Poland, as large multinationals represent only a small fraction of foreign investors, who are mainly micro- and small businesses operating on a local scale.

This paper aims at studying the role of the local government in attracting foreign capital to the Province (Voivodeship) of Lodz by the end of the first decade of the 21st century. The importance of incentives for the inflow of FDI to Poland and to its regions has seldom been analyzed, and the activities of the local government, whose competences were expanded following the reform in 1999, were not taken up by researchers. In this paper, conclusions are drawn based on the literature on the subject and on the results of a questionnaire study conducted among local government units (LGUs) of the province and among companies with foreign capital (CFCs) operating in the region.

2. Efficiency of incentives for FDI as assessed by Polish economists

As far as we know, the sensitivity of inbound FDI to investment incentives in Poland has never been studied as a separate subject. It was only considered as an element when analyzing conditions decisive for the attractiveness of Poland (or its regions) as a location for an investment project, or when studying the reasons followed by foreign entrepreneurs when they decided to do business in Poland.

Such a macroeconomic study with the use of an econometric model was presented by W. Orłowski (Orłowski 2010), who compared the importance of factors decisive for the interest of foreign investors in twelve Central and East European countries in the period 1995–2007. In order to eliminate the impact of the size of the domestic market as a determinant of FDI inflow, he considered only export-oriented investment projects, with the dependent variable being their stock per capita. His estimations showed that in the period covered by the study none of the tested economic variables, including tax burdens, was statistically significant in the countries of the region (other dependent variables were: unit cost of labour and labour productivity, corruption, legal protection of the investment, geographical distance from the EU-15, and the inflation rate). As stressed by W. Orłowski, the impression the countries of this part of Europe made on foreign investors, e.g. thanks to their image created by the media, was much more important than purely economic factors (conditions and costs of production).

Another example of a macroeconomic study is the analysis of reasons for spatial concentration of companies with foreign capital in Poland (Cieślik 2005). The study is based on a macroeconomic partial equilibrium model which assumes that investors are guided by profit maximization, which, in turn, depends mostly on the availability of potential domestic or foreign suppliers of specialized goods and intermediary services in the region. Variables encouraging FDI inflow include prices of final products and services, productivity of the region and fiscal incentives, while production costs were included as a factor counteracting FDI concentration. The results of several options assessed for the (previously) 49 provinces (data for the period 1993–1998) showed that the presence of Special Economic Zones (SEZ) was either statistically insignificant or even discouraged foreign investors.

Similar results, contrary to theoretical and intuitive expectations, were also obtained from estimates in the new administrative division of Poland into 16 provinces, using the data for 1999–2003. In the light of these results, it seems justified to presume that the SEZs were of no importance for the interest of foreign investors in Poland.

Questionnaires based microeconomic studies were much more popular among Polish researchers than those based on econometric models. The examples presented in Table 1, relating to Poland, the Lodz Region, and individual sectors of economy, indicate that they do not allow us to make an unequivocal assessment of the importance of investment incentives. Even in the same study the outcomes may seem inconsistent (see e.g. studies No. 3 and 7). Despite this fact, we may conclude with a high degree of probability that incentives did not materially impress foreign investors seeking locations for their projects in this part of Europe and in Poland, as they were guided by other motivations.

Summing up, the outcomes of macro- and microeconomic studies allow for the conclusion that the role of incentives in stimulating FDI inflow into Poland and in shaping its structure (sectoral, technological, territorial) and economic effects remains little known, although it most probably was marginal. On the one hand, this may mean the applied incentives were too weak and they should be strengthened or modified. On the other hand, however, in the light of empirical studies in other countries (Morisset, Pirnia, 2002), the Polish experiences only confirm the general pattern where, for weaker economies, major importance is attached to fundamental factors while financial incentives may lead even to a waste of public resources.[1]

[1] J. Różański (2010, p. 167) stresses that a clear majority of foreign companies included in his study would invest in Poland (in the region) independently of the possibility to be included in the Lodz SEZ.

Table 1. Efficiency of incentives for FDI inflow into Poland in the light of empirical studies

No. and Author	Period	Scope	Sample	Results
1. Wysokińska, Witkowska (a)	1995–1997	Motives for investing in Poland	110 companies with foreign capital	Investment incentives were not among the main motives
2. Różański (a)	1999–2002	Reasons for investing in Poland	24 companies with foreign capital, mainly from the Province of Lodz	Investment incentives did not play any role
3. Wysokińska, Witkowska (b)	2001	Motives for investing in Poland	15 companies with foreign capital (a *case study*)	Investment incentives were important for 42% of the companies, but their absence was an obstacle to only 10% of respondents
4. PAIiIZ	2003	Barriers to investing in Poland and in communes	Synthesis of some studies	Absence of effective promotion and incentives discouraged foreign investors
5. Stawicka	2004	Investment attractive-ness of Poland	234 companies with foreign capital	SEZs were the least important factor for locating a project in Poland
6. Słomińska	2005/ 2006	Factors facilitating and hampering FDI in trade in Poland	a) companies: 309 in 2005, 400 in 2006; b) communes: 100 in 2005; 100 in 2006	a) absence of investment incentives was not considered a barrier b) the less developed a commune. the more importance it attaches to an SEZ in attracting investors
7. Różański (b)	2007–2008	Motives for investing a) in the host country b) in Poland c) in the Province of Lodz	301 companies with foreign capital in the Province of Lodz	a) tax allowances were the most important determinant for the location; subsidies were of little importance b) SEZs were of little importance c) a local SEZ was of little importance
8. Deloitte	2010	Attractive-ness assessment for 14 SEZs	152 Polish and foreign companies	Ca. 68% of respondents, when they plan a new project, would invest in an SEZ again

Source: own study based on: (PAIiIZ, 2003); (Wysokińska, Witkowska, 2004), (Słomińska, 2007); (Stawicka, 2008); (Różański, 2010); (Deloitte, June 2010).

3. Scope of study and method

The assessment of local government activities with respect to attracting FDI was a part of a broader study on the role played by FDI in the economy of the region. The study was conducted in the second half of 2010 and included 275 respondents.[2] It was a direct questionnaire-based study, with two types of questionnaires. Each questionnaire included demographics and was composed of several dozen closed and open questions. Some of them included rating scales. We also used answer cards.

For interviews we deployed a team of several dozen interviewers, mostly students of the Faculty of Economics and Sociology of the University of Lodz who were familiar with the problems of FDI and the operations of local government. They were additionally trained in conducting direct interviews. In the course of the survey they could ask the Project team for substantive and organizational assistance. During interviews, interviewers could ask additional questions, change the sequence, or ask for more detailed explanations.

Random and quota sampling were applied. For companies we used the REGON.[3] database and the results of our own statistical analyses. When selecting operators we were guided by, e.g., their location in the region, sectoral specialization and employment. In selecting local government units, quotas were based on the types of units (type of a commune, type of a county).

The results of the survey were digitalized. Various useful statistical tools for processing questionnaire data were applied, such as: cross analysis, mean assessment, coefficients of variation, variance analysis, Kolmogorov-Smirnov test and Cronbach's alpha reliability coefficient for the scale.

4. Sample

In the first part of the study we assessed how active local government was in supporting foreign investors. Questions were related to two aspects of LGU operations, i.e. attracting and retaining FDI.

The administrative structure of the Province of Lodz is composed of 24 counties, including three townships (towns with the rights of a county) and 21

[2] *Role of FDI in the shaping of present and future economic profile of the Province of Lodz*, project delivered between 2009-2011 by the team of academics of the University of Lodz co-financed with European Union resources under the European Social Fund.

[3] REGON – National register of businesses kept by the Main Office of Statistics.

rural counties, and 177 communes. Interviews were conducted with representatives of all types of local governments.

The eighty-seven local government units included in the study represented ca. 43% of all local governments in the region. Statistical data shows that investors tended to choose large and medium-sized cities to locate their businesses, which is we studied all the counties. In order to achieve a complete picture of the situation in the region, we also included more than one third of all communes, mostly urban ones.

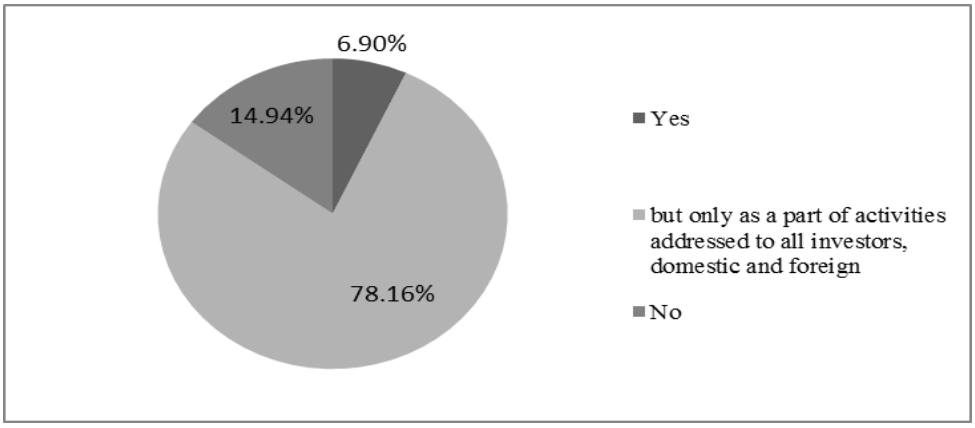
The second part of the study covered 188 CFCs from the Province of Lodz. They accounted for 9% of the total number of companies with foreign capital, and were based in 28 towns and cities. We surveyed businesses from all major towns and cities of the province. The sample included 63% of companies based in Lodz. The proportion reflects the share of businesses based in the capital of the province and the total population.

5. Study results

5.1. Incentives offered by LGUs to attract FDI

The majority of LGUs declared, firstly, that they sought investors; and secondly, that they did so regardless of whether they were domestic or came from abroad. There were a few activities addressed only to foreign investors. These activities were conducted only by 7% of communes and counties, including only one rural commune (which consisted of just printing information materials in English) (Diagram 1).

Diagram 1. Does a commune/county act to attract foreign investors?



Source: own compilation.

Analysts and politicians commonly believe (James, 2009) that financial support is one of the most effective policy instruments used for attracting external capital. However, as many as three-quarters of communes did not have a ready-made offer of such support, neither for foreign nor for domestic investors. Some of them stressed they did not offer such support due to the lack of interest on the part of investors in it. Respondents who had ready-made financial offers for foreign investors represented 70% of urban communes and just 13% of counties. Their share in the metropolitan area of Lodz was close to the average 25%.

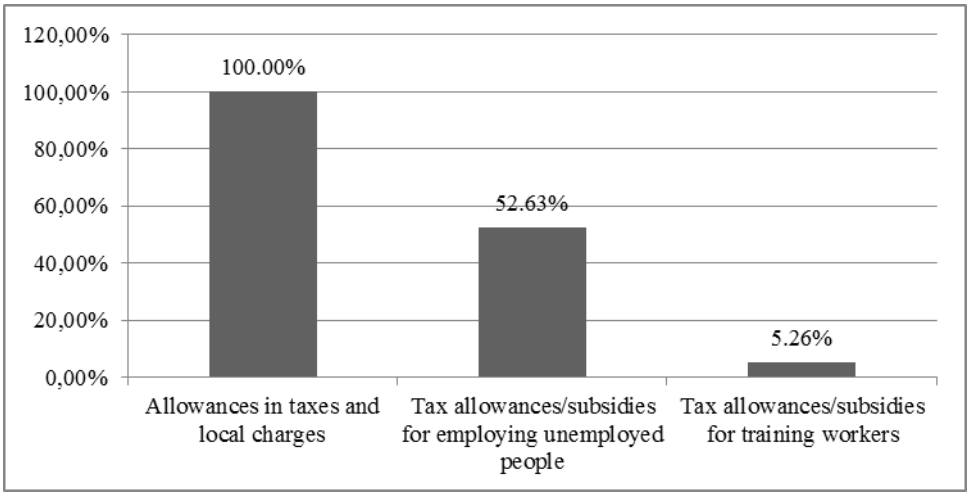
But the responses suggested that the absence of a ready-made offer did not mean that potential investors should not expect, under certain circumstances, financial incentives or that such support was not made available in the past. It was often stressed that the scope of assistance was considered only when an investor appeared. Attention was drawn to individual nature of negotiations in this matter. Unfortunately, this discretionary method is not very transparent and may induce corruption. Only a very few LGUs attempted to approach the issue in a systemic way by passing appropriate resolutions concerning the possibilities of granting financial aid to investors (domestic or foreign) depending on the value of the undertaking and the size of planned employment.

Representatives of those LGUs which financially supported foreign investors agreed that when making their decisions they did not distinguish between capital based on its origin (foreign or domestic), and that they followed the same rules for both. They declared that discrimination against one of the groups would be unacceptable as incompatible with State aid rules and it would involve the risk of ineffective allocation of resources. This demonstrates a good command of the legal and economic regulations among the group of local government officials in question.

Tax relief and allowances in property and local charges were the most popular form of financial support granted to investors by all the LGUs. This most probably resulted from the fact that they are decided by communes themselves and can become effective relatively quickly.

Potential investors could also receive non-financial support of a promotional type. Firstly, LGUs were generally ready to provide information concerning the terms on which one may operate in their respective territory. Such assistance is, relatively speaking, the simplest, cheapest and least absorbing for local authorities. Informing potential investors about how to start and pursue economic operations (e.g. availability of land, infrastructure, workers, suppliers) does not require the officials to be familiar with FDI mechanisms. Learning about the realities of a concrete location free of charge is important to investors as it accelerates decision making and reduces costs of transaction (Diagram 2).

Diagram 2. Forms of financial support offered by LGUs* to foreign investors



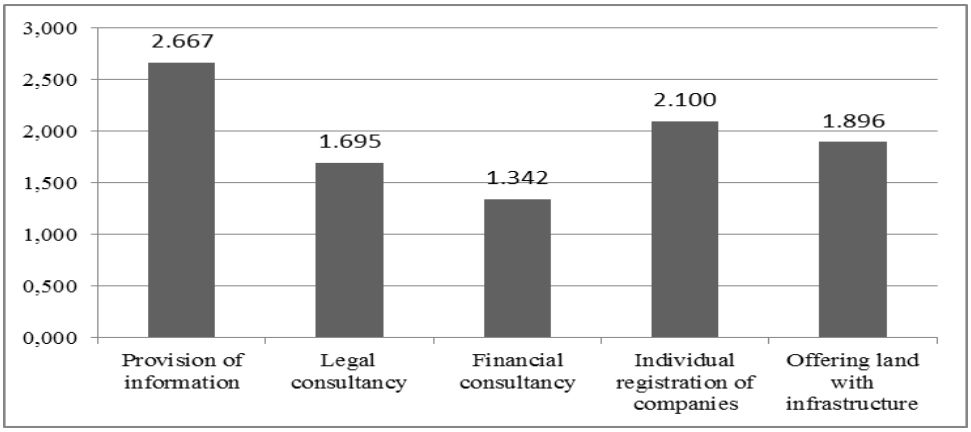
* The question was asked only to respondents who claimed their LGUs offered financial support to foreign investors.

Source: own compilation.

Secondly, most LGUs (60%) offered assistance in dealing with various formalities connected with starting up a business in a given area (e.g. in acquiring land). Sometimes LGUs were even willing to offer legal and financial consultancy. Such cases, however, were very rare probably due to the low competences of people employed there and restrictions in the number of full-time jobs in these units, or perhaps because they find this type of engagement awkward and at the edge of corruption. Usually respondents highlighted that their units only provided legal and financial information connected with business and investment activities but did not offer legal and financial consultancy as such.

Thirdly, most of the LGUs (64%) could offer developed land ready to start an investment. Of course the land was also available to foreign investors. In practice, especially in rural communes, all the above forms were usually declarative or they were used only by domestic investors, as there was no foreign operator interested in investing his capital (Diagram 3).

Diagram 3. Non-financial assistance offered by LGUs to foreign investors, mean answers*



*Mean answer was calculated using the following scale: non-financial assistance offered to a large extent – (3), to a small extent – (2), not offered – (1)

Source: own study.

5.2. Companies' opinions about LGUs' activities aimed at attracting FDI

To assess LGUs activities aimed at attracting FDI, companies with foreign capital were asked to specify the importance of proposed investment incentives against other factors that could make them select the Province of Lodz as a location for their investment. In fact, CFCs were asked to specify the degree to which factors outlined in the questionnaire encouraged or discouraged them from selecting our region. In their answers respondents evaluated 27 suggested reasons on a seven–degree scale. In analyzing their responses we used both distributions and statistical indicators: mean answers, variance, standard deviation, average relative error, median and mode. The calculated Cronbach's alpha index of reliability was 0.884, which indicates very high reliability of received answers (Ferguson, Takane 2004, p.496).

As expected, the Province of Lodz was selected by foreign investors mostly because of its attractive investment climate (which automatically improved after Poland's accession to the EU), in particular low labour costs, good availability of persons with relatively high qualifications, convenient location of the region at the cross-roads of main transportation routes of Poland, and relatively rich offer of land with infrastructure. The promotional and investment support activities of LGUs were much less important. Their impact upon location decision was assessed by respondents in their reactions to seven listed factors (Table 2).

Table 2. Administrative activities as factors encouraging or discouraging to locate FDI in the Province of Lodz*

Ranking position by means**	Factor	Mean answer	Variance	Standard deviation	Average relative error	Median	Mode
12	Attitude of commune authorities to foreign investors	4.627	1.844	1.358	0.293	5	4
15	Attitude of county authorities to foreign investors	4.489	1.563	1.250	0.278	4	4
17	Attitude of provincial authorities to foreign investors	4.435	1.416	1.190	0.268	4	4
18	Access to data and information about the province	4.435	1.132	1.064	0.240	4	4
19	Support to foreign investors offered by a commune, a county, province	4.321	1.760	1.327	0.307	4	4
23	Quick action and flexibility of administration at different levels in the Province of Lodz	3.871	2.621	1.619	0.418	4	4
24	Stability of regulations issued by authorities at different levels in the Province of Lodz	3.863	1.558	1.248	0.323	4	4

* Statistical indicators were calculated using the following scale; factor discouraging from location: to a large extent (1), to medium extent (2), to a small extent (3); neither encouraging nor discouraging (4); encouraging to a small extent (5), encouraging to medium extent (6), encouraging to a large extent (7).

** Ranking covered 27 factors

Source: own study and compilation.

According to half of the CFCs, the attitude of local authorities (at various levels) was not very important when they selected the Province of Lodz. This suggests that the promotion and support tools applied by the LGUs were mostly a matter of indifference to foreign investors in considering potential locations. Half of CFCs responded that the possibility to get support from the authorities was of no importance for their investment in the Province of Lodz instead of another region in Poland. This means the support offered was relatively unattractive compared to the comparative advantage of the region resulting from the availability of

production factors. The distribution of opinions and mean answers in this area were very similar at the commune, county and province levels. There were no major differences in the distribution of answers of companies representing various sectors and intensity of export operations.

The LGUs' performance in the following areas were clearly criticized in their dealings with investors: the rate at which decisions are issued by local authorities at different levels in the Province, their flexibility vis-à-vis declared needs, and stability of legal regulations. The means (below 4) indicate the prevalence of negative answers. They prevailed among CFCs representing all industries and sectors of economy. This definitely reflects bad promotion of the region among foreign investors.

It may be interesting that a certain regularity in answers was noticed – the larger the CFCs were, the higher they evaluated available incentives, both financial and promotional ones. We could thus suppose that the LGUs were more favourably disposed towards those foreign investors which had more to offer to the local economy, first of all in the form of additional jobs. However there were no significant differences in opinions between CFCs oriented toward export and on the domestic market. Some authors indicate that the former, as more mobile and selling in a more competitive environment, think highly about incentives, especially about financial ones (James 2009).

In order to define the distribution of answers to the scaled question we can use typical ranges of variation. For a seven-degree scale an appropriate range is 2.5-4.0. Its upper edge corresponds to the distribution of answers equally distributed across all the points of scale. The bottom edge of the range is interpreted as a situation in which the values of answers are rather concentrated around a given point on the scale, like in the normal distribution (Churchill 2002, p. 550). In our study of the activities by LGU administration, all the variances were below the lower extreme, meaning the answers were very uniform.

5.3. Efficiency of FDI support in the assessment of LGUs

Opinions of the companies with foreign capital about the quality of support to FDI in the region of Lodz can be supplemented by the perspective of the **LGUs which offer such support.** To this end representatives of communes and counties assessed, on a seven-degree scale, six factors connected with selected aspects of the work of local administration for investors (Table 3).

Table 3. Incentives to locate foreign investments – self-assessment of LGUs *

No.	Factor	Mean	Variance	Standard deviation	Average relative error	Median	Mode
1	Availability of investment land in	5.988	2.812	1.677	0.278	7	7
	LGUs:	6.105	2.881	1.697	0.278	7	7
	-with CFCs in their area	5.590	3.206	1.791	0.320	6	7
	-without CFCs in their area						
2	Availability of information about a	6.082	0.993	0.997	0.164	6	6
	commune/county in	6.193	0.480	0.693	0.112	6	6
	LGUs:	5.571	1.188	1.090	0.196	6	6
	-with CFCs in their area						
	-without CFCs in their area						
3	Possibility to receive support from commune/county authorities in obtaining information	6.448	0.512	0.715	0.110	7	7
4	Possibility to receive support from commune/county authorities in dealing with legal and financial formalities	5.942	1.467	1.211	0.204	6	6
5	Tax relief and allowances in local charges	5.518	2.350	1.533	0.278	6	6
6	Possibility to receive support from commune/county authorities in applying for EU funds	5.459	1.442	1.201	0.220	6	6

*Statistical indicators were calculated based on the following scale: factor discouraging location to a large extent (1), to medium extent (2), to a small extent (3); neither encouraging nor discouraging (4); encouraging to a small extent (5), encouraging to a medium extent (6), encouraging to a large extent (7).

Source: own study and compilation.

The self-assessment by LGUs was very positive (Table 3). A large majority of them highly assessed the engagement of their units in attracting foreign investors. High medians, modes and mean answers, all above 5.5 (on a scale from 1 to 7) indicate a significant prevalence of answers at the two highest levels of the scale, meaning that a factor in question encourages the location of a foreign

investment to a medium or large extent. Contrary opinions stating that the factor discourages the location of FDI in the respondent's commune or county were few and accounted for less than 6% of answers. Variances were below the lower extreme, which shows the answers were strongly concentrated around the means, i.e. they were very uniform. Under such circumstances, the relatively low saturation of a region with FDI would result from structural reasons (relatively low level of development), independent of the current policy of the LGU.

Informing potential investors about conditions for economic operations in the unit of local government was identified as the strength in encouraging investments to be located in their area. This is confirmed by the highest mean and low variance, which means respondents' opinions were the most uniform.

Local government units with no companies with foreign capital offered clearly worse access to information and did not have land available for potential investors. This could be caused by their pessimistic evaluation of possibilities to attract foreign capital. In all other cases they assessed support to investors similarly to LGUs which have CFCs in their area.

5.4. Opinions of CFCs and self-assessment of the LGUs

The answers of the CFCs concerning the incentives were confronted with the answers of LGUs. This comparative analysis took account of questions relating to four aspects: access to information, possibilities to receive support in access to information and in dealing with formalities, and also opportunities to get financial support from LGUs.

The analysis revealed large differences in the perceptions of the two parties of the importance of factors which support FDI inflow. All LGUs were very positive about their own activities aimed at helping foreign investors. The latter, in turn, were much more reserved, albeit more dispersed. The differences in assessment suggest that local authorities often do not know or do not understand the objectives and needs of this category of investors, or perhaps they underestimate their importance for the local economy. It also means that the efficiency of modest support and promotion tools largely depends on the so-called human factor in the LGUs, i.e. on the will to cooperate, kindness, professional service, efficiency of officials, etc.

The discrepancies in opinions were confirmed by the results of the Kolmogorov – Smirnov test, which verified the hypothesis that the distributions of answers by companies and local government units are identical for respective factors. The hypothesis on the conformity of distributions was rejected in all cases (Table 4).

Table 4. Comparison of the assessment of incentives for foreign investment used by LGUs*

No.	Factor	Respondent	Mean	Variance	Standard deviation	Averagerelative error	Median	Mode
1	Availability of information about commune/ county	LGU	6.082	0.993	0.997	0.164	6	6
	Availability of information about the province	CFC	4.435	1.132	1.064	0.255	4	4
2	Possibility to receive support in access to information from commune/ county authorities	LGU	6.448	0.512	0.715	0.110	7	7
	Attitude of commune authorities to foreign investors	CFC	4.627	1.844	1.358	0.399	4	4
	Attitude of county authorities to foreign investors	CFC	4.489	1.563	1.250	0.348	4	4
3	Possibility to receive support from commune/ county authorities in dealing with legal and financial formalities	LGU	5.942	1.467	1.211	0.204	6	6
	Attitude of commune authorities to foreign investors	CFC	4.627	1.844	1.358	0.399	4	4
	Attitude of county authorities to foreign investors	CFC	4.489	1.563	1.250	0.348	4	4

4	Tax relief and allowances in local charges	LGU	5.518	2.350	1.533	0.278	6	6
	Support to foreign investors from the commune, county or province	CFC	4.321	1.760	1.327	0.407	4	4

* Statistical indicators were calculated based on the following scale: factor discouraging location to a large extent (1), to a medium extent (2), to a small extent (3); neither encouraging nor discouraging (4); encouraging to a small extent (5), encouraging to a medium extent (6), encouraging to a large extent (7).

Source: own study and compilation.

6. Conclusions

Empirical studies conducted in Poland show that investment incentives were of little importance for the inflow of FDI to the country and to its regions. This is also true of the Province of Lodz. Representatives of local governments in the Lodz region were aware that competing for foreign investors was necessary to accelerate the development of the local economy, but very few of them engaged in activities aimed at winning foreign capital more actively than in winning domestic capital. Only 7% of local governments prepared special offers for foreign investors. Financial incentives at their disposal were relatively modest and usually "tailor made", depending on the candidate at hand. Most of the LGUs did not have any specific strategy with respect to, e.g., preferred type of investment project or making the investment dependent upon the compliance of the proposed project with specified conditions. Incentives were complemented with promotion activities, mostly the provision of information, consultancy and assisting investors in dealing with formalities. Incentives and promotion were not accompanied by any more general reflection on the cost-benefit analysis of the outcomes of FDI compared to the cost of attracting it.

However, to half of foreign investors included in the study, mostly SMEs, modest financial incentives offered by LGUs and available information were completely irrelevant to their selection of the region to locate their investments. Investors assessed the quality of cooperation with the local government as average and similarly evaluated the authorities of communes, counties and the province, the latter of which has the largest contacts with other countries and the greatest possibility to offer various types of assistance.

The impressions of foreign investors diverged from the generally high opinions of LGUs about their own engagement in attracting foreign capital. Probably, by making local administration aware of the fact and by improving its

operations, we could mobilize significant reserves in attracting and keeping foreign investors at a relatively low cost. For the time being officials have too much discretion and too much depends on their personal commitment and their interpretation, especially on how they see the role of foreign capital in the development of their local economy.

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Streszczenie

PRZYCIĄGANIE BEZPOŚREDNICH INWESTYCJI ZAGRANICZNYCH DO REGIONU ŁÓDZKIEGO PRZEZ SAMORZĄD TERYTORIALNY

Głównym celem artykułu jest ocena wykorzystania finansowych i pozafinansowych zachęt dla inwestorów zagranicznych stosowanych przez władze lokalne w województwie łódzkim. Podstawę do wyciągania wniosków stanowią wyniki badania kwestionariuszowego przeprowadzonego w II połowie 2010 r. wśród 188 przedsiębiorstw z kapitałem zagranicznym (PKZ), które zainwestowały w regionie oraz wśród 87 jednostek samorządu terytorialnego, które gościły większość w nim obecnych PKZ. Uzyskane wyniki wskazują, że wsparcie oferowane przez władze lokalne w niewielkim stopniu wpłynęło na wybór miejsca do inwestowania, i są zgodne z wynikami badań, które oceniały rolę zachęt w Polsce na poziomie makro, regionalnym i sektorowym.

Słowa kluczowe: *bezpośrednie inwestycje zagraniczne, zachęty, region łódzki*

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Determinants Of The Issuance Of Put/Call Convertibles In The Non-Financial Sector Of The US Market

Abstract

The aim of this article is to characterize and show the differences between issuers of ordinary convertibles and convertibles with attached put/call provisions (put/call convertibles). The research was carried out on a sample of 379 firms in the US market, outside the financial sector, between 2002 and 2011. It turns out that the issuers of put/call convertibles are the companies with a higher risk exposure, associated with, inter alia, a higher level of indebtedness and worse ratio between the issue value to the fixed assets value. Adding the put/call provisions is aimed at decreasing issuers' risk exposure, which may increase the market demand for this type of convertible securities.

Keywords: *financing, convertible bonds, put/call provisions, U.S. market*

1. Introduction

A convertible bond is a financial instrument which at maturity gives the bondholders the right to convert it into the issuer's stock. Convertible bonds were first issued in the USA in 1967, and since then the volume amount of hybrid debt trade in the global capital market has been rising steadily. In 2012, the total amount of convertibles issued was $9200 bln USD, mainly in Germany (65%), Switzerland (15%) and tax havens such as Guersey (7%).

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Researchers have been for more than 50 years trying to identify the theoretical motives for using convertible debt. The theoretical premises of their issuance are based on an asymmetric information framework (see, inter alia, Brennan and Kraus 1987; Brennan and Schwartz 1988; Stein 1992), an agency theory framework (e.g. Green 1984; Mayers 1998; Isagawa 2002), rationing in the equity market (Lewis *et al.* 2001) or tax advantage motives (Jalan and Barone-Adesi 1995). In order to make convertible debentures more profitable for the issuers and the bondholders, and attract additional purchasers, very often the companies decide to add *call* and *put* provisions. This phenomenon has been the object of researchers' interest since the late 1970s (e.g. Ingersoll 1977; Harris and Raviv 1985; Asquith and Mullins 1991; Chemmanur and Simonyan 2010). In 2012 so-called *put/call convertibles* constituted up to 12% of the total number of convertible issues. However, taking into account exclusively companies outside the financial sector, the total share of *put/call convertibles* increases to 30%, which means that it is necessary to conduct an accurate research study into this convertible bond type among production and service companies.

The main aim of this article is to analyze the *put/call convertibles* market and to show the potential differences between the issuers of the convertible bonds with and without the *call* and the *put* options. Previous research on *callable* and *putable convertibles* has concentrated mainly on hybrid securities issued all over the world, without a division into countries or particular economic sectors. Our paper differs from them in terms of the research sample, which includes the convertibles issued only in the American market, the biggest worldwide market of *put/call convertibles*. The analysis conducted within only one country allowed us to eliminate the taxation motive for their issuance. Therefore, the conclusions to be drawn from our research may be of a more general character. It may be also possible to compare our findings with the outcomes of studies carried out by means of the same research method, but considering hybrid securities issued in other parts of the globe.

The research sample encompassed 379 companies in the American market, which the best represents the group of subjects outside the financial sector, between 2002 and 2011. It turns out that the issuance of put/call convertibles is more prevalent in firms with a higher financial risk exposure, connected with a higher level of indebtedness and smaller possibilities to issue secured debentures.

This paper is structured as follows. Sections II and III describe the theoretical premises of the issuance of convertible bonds and the application of the call and put provisions. Section IV provides the sample description and methodology. Section V discusses the research results. Section VI summarizes and concludes the article.

2. Theoretical premises of hybrid debt issues

In their seminal paper, Modigliani and Miller (1958) started a discussion concerning the issue of the capital structure; a discussion which is still in progress. However, oversimplified assumptions in their model (e.g. the existence of a perfect market, no corporate tax, no transaction costs, and symmetric access to information) make its practical verification impossible. For this reason, further research focused on capital structure problems under imperfect market conditions. Two theories gained the most interest: (1) *information asymmetry theory*, which assumes an asymmetric access to information among managers and market participants related to companies' market activities and their future prospects[1]; (2) an *agency theory*, describing conflicts between managers (*agents*) and investors (*principals*). On the basis of these theories, several theories concerning hybrid debt have been developed, trying to explain why firms decide to gain capital through the issuance of convertible bonds.

The theoretical premises of the application of convertibles have been the subject of researchers' interest since the mid-1960s. (Brigham, 1966). This was caused by the desire to understand the growing popularity of these instruments, especially in the US market. Brennan and Kraus (1987) suggested that junior bonds, bonds with warrants and convertible bonds are a very profitable source of capital in cases of uncertainty arising from information asymmetry, when the financial risk of the issuer is difficult to estimate. According to Brennan and Schwartz (1988), the convertible bond's value is insensitive to changes in the issuer's risk, due to its hybrid nature. Convertible debt can be treated as a package of straight bonds and warrants. An increase in uncertainty regarding an issuer's future financial prospects causes a reduction in the straight debt value, whereas the value of the warrant rises. These changes in value offset each other, which mitigates the negative effects of an information asymmetry.

Constantinides and Grundy (1989) argue that a convertible bonds issue, combined with a partial stock repurchase, creates a positive signal to the market

[1] Myers and Majluf (1984) argue that an asymmetric access to information about a company's future cash flow may contribute to underestimating the value of newly-issued securities by the market. This may lead to *adverse selection* problems which result in missing profitable investment projects by managers. An information asymmetry can be mitigate through, inter alia, *signaling*. Myers and Majluf (1984) consider that the type of an issued security may pose a credible signal for the market about the true value of the issuer. For this reason the aim of the company should be to maximize the difference between the value of the newly-issued instruments and their true value estimated by the market. The issue of the class of security enables investors to match the issuer to a specific type of firm: either to a "good firm" or to a "bad firm", which may allow the companies to effectively finance new investment projects. This idea was frequently used by the researchers dealing with the problems of hybrid debt financing.

about the future operating performance of the company. Kim (1990) presents a model showing that such a signal can be generated through a conversion ratio determined in terms of the issue. He proves that the lower the conversion ratio, the higher the level of revenues the company expects in the future.

Stein (1992) considers that convertible bonds can mitigate the negative effects of adverse selection when raising capital through stock issue is unprofitable due to information asymmetry. Equity issuance may be perceived as managers' willingness to sell overpriced securities, and the market would price them below their true value. The convertibles issue, in turn, implies that insiders have favourable information about the financial prospects of the firm. Indeed, managers must be confident that the underlying stock price will be high enough that bondholders will decide to convert debt into equity. For that reason Stein (1992) suggests that convertible bonds can be perceived of as "delayed equity" and are designed to raise it through the backdoor (*backdoor equity hypothesis*).

An agency theory likewise plays a key role in explaining the theoretical premises of the issuance of convertibles. The term "agency costs", coined by Jensen and Meckling (1976), has become a cornerstone of further publications concerning conflicts of interests between managers–shareholders, managers–bondholders or shareholders–bondholders, which directly bias the operating activity of companies.

Green (1984) says that convertibles can mitigate agency problems arising from shareholders–bondholders conflicts. According to "risk-shifting" and "asset substitution" theories, shareholders very often undertake risky investment projects in order to transfer wealth from the bondholders. Such actions are very precarious for the bondholders because in case of financial distress or an issuer's bankruptcy, they may not recover their claims. However, a conversion option attached to convertible bond enables investors to participate in any potential profits from higher-than-average investment options.

Mayers (1998) considers that well-designed convertibles allow for avoiding the negative effects of both *underinvestment* and *overinvestment* problems. His so-called *sequential financing hypothesis* is based on the issuer's uncertainty regarding the value of their future investment options (*real options*). If their value is so low that the issuer decides not to carry them out, convertibles will be simply redeemed by the issuer at maturity and the company will not face the problem of excess capital which was raised to finance an initial investment project (avoiding the *overinvestment* problem). But if the issuer thinks that realizing a real option is somehow profitable, then exercising a conversion option will enable him to raise equity in order to finance a new investment project (avoiding the *underinvestment* problem).

Isagawa (2000) comes to similar conclusions. He shows that convertible bonds are financial instruments which may be very helpful in controlling managerial opportunism. It is assumed that managers strive for an excessive expansion of their companies and tend to over-invest. It turns out that depending on market conditions ("good" or "bad") and alternative investment decisions ("expansive" or "defensive"), managers always decide to carry out an "expansive" strategy. Convertible bonds are thought to counteract such activities. Isagawa (2002) also deals with the issue of so-called *managerial entrenchment*. According to this theory, entrenched managers do not maximize shareholders wealth but, on the contrary, they mainly concentrate on their own interests, which then determines the companies' financial policy. Well-designed convertibles may eliminate the risk of both a hostile takeover and a bankruptcy associated with undertaking excessively risky investment projects. The terms of the issue should be specified in such way that a conversion takes place only if the issuer undertakes profitable investments. Otherwise it should guarantee that converting bonds into equity do not take place.

Besides the theories based on *information asymmetry* and *agency theory*, several other studies have appeared concerning the premises of convertibles issues. Jalan and Barone-Adesi (1995) think that managers decide to use convertibles financing because of the differential tax treatments of coupon interest and dividend payments. Lewis et al. (2001) believe that hybrid debt may be a profitable source of capital under conditions of equity rationing (*equity rationing hypothesis*).

3. The call and the put provisions in convertible bonds

Many issuers decide to include several provisions which make convertible securities particularly valuable, both for companies and bondholders. These are the *call* options and the *put* options. Exercising them allows both parties to either have the bonds redeemed before their maturity or to convert them into equity. This then raises an interesting two-part question: Why has hybrid debt with built-in *call/put* options become so popular and how does it influence the financing policy of the issuers?

As far as ordinary convertibles are concerned, depending on the market conditions at their maturity, the bondholders have the right either to convert them into underlying shares or to refrain from converting and wait to have them

redeemed at par by the issuer.[2] The *call/put* provisions do not affect the right either to convert the bonds or to have them redeemed, but the options may be exercised before debt maturity. Exercising the *call* option falls exclusively to the issuer. After he announces the exercise of the *call* provision (*call announcement*), the bondholders have certain number of days (*call notice period*) to decide to either convert the hybrid debt into equity or to have it redeemed at the *call price*. Assuming that the company issues convertibles in order to raise capital for the financing of certain investment project(s), *callable convertibles* may be particularly beneficial for the issuer. Firstly, they can be used as an instrument that enables the firm to force conversion when the bonds are *in-the-money* and thus increase equity (thereby reducing a company's debt level), which positively affects the company's capital structure. Secondly, exercising the *call* option may be linked with a willingness to replace previous debt with new debt with a lower coupon. This may happen in the case of decreasing market interest rates or in the event of a significant upturn in the issuer's financial results. Moreover, adding the *call* option may enhance managers' flexibility to take actions in order to counteract a deterioration in market conditions. Forcing conversion allow the issuers to not redeem debt during such period. On the other hand, exercising the *call* clause may be associated with managers' desire to cover up the unfavourable financial performance of the firm. Such a situation may occur if managers are willing to involve bondholders in excessively risky investment projects.

Ingersoll (1977a) and Brennan and Schwartz (1977) consider that under perfect market conditions and without a *call notice* period, the optimal call policy is to exercise the *call* option as soon as the conversion price exceeds the *call price*. This maximizes the market value of equity and minimizes the value of the conversion option owned by bondholders. However, Ingersoll (1977b) observed that the issuers of *callable convertibles* usually delay the calls and wait until the conversion value exceeds the call price by 43.9% on average. Since then, researchers have been trying to find the reasons behind such delay, which is not in accordance with the optimal call policy in the perfect market

Harris and Raviv (1985) tried to explain the call delay on the basis of a signalling theory. According to their theory, the investors interpret the call as unfavourable information about the issuer's financial performance, and this results in a drop of the underlying shares price. For this reason, the firm decides to exercise the *call* option when, from its perspective, the costs of the reduction in the value of the underlying stocks are less than the costs of premature redemption

[2] Convertible bonds are *in-the-money* when the conversion value > conversion price (bondholders will probably decide to convert them into equity) and they are *out-of-the-money* when the conversion price > conversion value (bondholders will probably refrain from converting them into equity).

of the debentures from the bondholders if they do not decide to convert. In other words, the managers call the convertibles in order to force the bondholders to participate in a future decrease of the underlying shares' price.

Jaffee and Shleifer (1990) argue that a call delay is connected with a company's desire to avoid financial distress. A possible bondholders' decision not to convert the bonds after the call means that the issuer might have to redeem the convertibles at face value. In order to do so the firm might have to raise additional cash from other sources, which may lead to liquidity problems and financial distress. For this reason, companies delay the call to make sure that the probability of getting into financial trouble is as minimal as possible.

Asquith and Mullins (1991) suggest that a call delay is linked with the issuer's future cash flow level (*cash flow advantage hypothesis*). Cash flow advantage is defined as the difference between the after-tax coupon payment on convertible debt and the dividends which would be paid on newly issued stocks. If this difference is negative (after tax interest payment < dividends), it is better not to call the bond. By not calling, the company saves cash which would be used for dividends paid on converted shares, which is also beneficial for the current shareholders.

As for *putable convertibles*, these instruments are profitable particularly for the investors, because the right to exercise the *put* option before debt maturity falls to the bondholders. They decide whether and when to convert bonds into equity or wait and have the convertibles redeemed by the issuer. Chemmanur and Simonyan (2010) consider that the motives behind a *putable convertibles* issue may be explained on the basis of an asymmetric information framework, an agency theory framework, or tax-advantage-based theories. Going back to the earlier part of this article concerning the theoretical premises of issuing convertibles, it can be concluded that convertibles may mitigate agency problems arising from the conflicts between shareholders and bondholders (Green 1984). Exercising the conversion option enables the investors to participate in any increase in the market value of the issuer which results from undertaking risky investment projects. *Putable convertibles* may diminish the shareholders' incentive to take excessively risky investment projects because the bondholders can withdraw their capital whenever they notice any unfavourable actions taken by managers. Therefore it can be assumed that companies with favourable private information about their value more often decide to issue convertibles with the *put* provision. In such case, the probability of exercising the option by the investors is relatively low. As for tax motives for the issuers, it is worth noting that about 1/3 of the *putables* issues encompass zero-coupon convertibles. The bondholders do not get any interest payments

until the maturity date, thus the *put* option plays a role of a "sweetener" for the investors which compensates them for the lack of coupon payments.

The companies very often decide to attach the two options - the *call* and the *put* - to ordinary convertibles at the same time. They aim to make the instrument more profitable for both sides: the issuer and the bondholder. Such a security is called a *put/call convertible*.

4. Sample description and methodology

The main aim of our empirical research is to characterize the issuers of particular types of convertible bonds: ordinary convertibles (hereafter: CB) and put/call convertibles (hereafter: P/C CB) and to show potential differences among these two populations. It should be noted that unlike the previous studies, our analysis concerns companies operating only in the American market. The data for the research has been collected from the Bloomberg Database.

We began our research by singling out 2,564 American issuers of hybrid debt between 2002 and 2011. We next removed the issues carried out by financial institutions, as they use hybrid securities mostly for optimizing their capital structure as required by the financial supervision regulations, hence including financial institutions in our sample could lead to false conclusions and misleading generalizations. Afterwards, we removed the issuers of the convertibles with solely a *call* option (*callable convertibles*), solely a *put* option (*putable convertibles*) and *sinkable convertibles.*[3] Thus, only the issuers of *CB* and *P/C CB* were left in the sample. Unfortunately, a part of data regarding some companies was incomplete (e.g. no specific information about conversion price or conversion ratio), and hence we could not include them in our analysis. In the end, the final sample consisted of 379 companies: 206 *CB* issuers and 173 *P/C CB* issuers.

The next step was to create 16 financial indicators which allow us to show the characteristics of the analyzed issuers and demonstrate a potential differentiation among them. We mainly focused on indicators concerning:

1. Issue value to certain companies' balance sheet items (e.g. issue value/total assets) (see Table 1; Panel A);

[3] A *sinkable convertible* is a convertible bond which is backed by a so-called *sinking fund*, which ensures the bondholders that the bond's par value and all interest payments will be repaid and thereby protects them from the issuer's bankruptcy. *Sinkable convertibles* reduce the interest rates of newly-issued securities.

2. Their asset and capital structure (e.g. equity/total assets; equity/total interest and liabilities) (see Table 1; Panel B);
3. Their profitability and performance (i.a. ROA, ROE, EBIT/revenues) (see Table 1; Panel C).

The selection of these definite indicators is not coincidental. The analysis of issue value to specific assets and liability elements helps us answer the question whether there is any connection between the choice of certain convertible types or the issuer's size. It may turn out that the P/C CB issuers are small enterprises which can make use of the high flexibility of such instruments. Depending on the market conditions, financial performance of the company, and the value of its future investment options, exercising the *call* option may enable the small issuers to force conversion and thereby increase equity. Adding the *put* option to the convertible bond, in turn, may facilitate the companies to find sufficient investors who will acquire the newly issued hybrid debt. This is particularly important for SMEs, which very often decide do carry out a private placement by selling their securities to a small number of chosen investors. The amount of the issue may be also associated with the value of total assets, especially tangible assets, which are potential collateral for the issue. In order to verify this hypothesis we carry out an analysis of the issuers' asset structure.

Furthermore, it is also possible that the P/C CB issuers (presumably SMEs) are characterized by a higher level of indebtedness. It cannot be ruled out that SMEs take advantage more often than usual of financial leverage for multiplying their profitability. They may be in the initial phase of their development and do not have a sufficient amount of equity to finance new investment projects. For this reason, we examine several indicators of the issuers' capital structure and the level of the their financial leverage. In addition, the level of debt is strongly associated with a firms' ability to repay coupon payments on time. It would seem that companies should avoid issuing P/C CBs if they anticipate a decline in their future cash flows and general deterioration of their financial performance. In such case, when the bondholders exercise the *put* option before convertibles mature, the issuers have to raise cash for early redemption which can lead to financial distress or even bankruptcy.

Our sample was preliminarily analyzed using basic statistical measures, such as arithmetic mean, median, standard deviation, and coefficient of variation. As a result, it was possible to determine the variability of the studied traits within the study groups of issued securities. We than tested the statistical significance of differences between independent populations identified by possible additional options included in the bond structure – with the *put/call* option or without it. Our testing of the significance of differences between groups was conducted using parametric methods (comparing the expected value

of the dependent variable in populations) and nonparametric (comparing the cumulative distribution of the dependent variable distribution in populations).

The first group of tests required to satisfy two premises:

1. Normal distribution of dependent variable in populations distinguished by the levels of factor,
2. The homogeneity of variance of the dependent variable within a population distinguished by the levels of factor.

Normality of distribution was assessed using the Shapiro-Wilk test. Assessment of the variance homogeneity was prepared using the Levene's test. Both of those tests preceded the Student's t-test. Due to the strong skewness of the collected data, the Mann-Whitney test was used as an alternative to the t-test for dependent samples in case of failure of the assumption of variable distribution normality. This test requires at least an ordinal level of the dependent variable measurement. It is used to compare two independent populations. Since the null hypothesis assumes that two independent samples come from populations of the same distribution, the differences between populations is considered to be statistically significant if the probability of the Mann-Whitney test is lower than the level of significance α.

The null hypothesis is:

H_0: $F_1 = F_2$ towards H_1: ~ H_0, where F_1 and F_2 are the distributions of the dependent variable probability distributions in the compared populations. The verification of the test is the statistic (Szymczak 2010, pp. 198-200):

$$Z = \frac{U - \frac{1}{2} \cdot n_1 \cdot n_2}{\sqrt{\frac{n_1 \cdot n_2}{n \cdot (n-1)}} \cdot \left[\frac{n^3 - n}{12} - \Sigma \frac{t_i^3 - t_i}{12}\right]} \quad (1)$$

where:

$$U = n_1 \cdot n_2 + \frac{n_1 \cdot (n_1 + 1)}{2} - R_1$$

$n = n_1 + n_2$, t – number of observations related to the rank

R_1 – sum of ranks for the first sample.

The Z statistics has a normal distribution with the parameters 0 and 1. Since the null hypothesis assumes that two independent samples come from populations with the same distribution, the differences between populations were considered as statistically significant if the probability of the Mann-Whitney test was lower than the level of significance α.

The statistical analysis was supplemented by logistic regression. This made it possible to estimate the probability of issuing traditional convertible bonds when possible determinants (explanatory variables) are defined. Therefore the result is a binary variable, expressed as "1-0", where, where 1 means the convertible bonds traditional issuance, while 0 - the opposite situation.

Th logistic regression equation is (Szymczak 2010, p. 171):

$$P(Y=1)=\frac{1}{1+\exp(-(-B_0+B_1X_1+...+B_nX_n))} \tag{2}$$

The model parameters were estimated using the maximum likelihood method and the assessment of the model quality included:

1. The omnibus test of model coefficients, which allows to check whether any variable from the adopted set of explanatory variables may be estimated as a probable important determinant. The null hypothesis is: H_0: B_1=…B_k towards H_1: ~ H_0. If the probability of the test is lower than the assumed level, it was considered that at least one of the explanatory variables significantly determine the probability of traditional convertible bonds issuance;
2. Evaluation of the classification accuracy - the quality of the classification is normally accepted if at least 95% of the cases when Y = 1 and at least 90% of the cases when Y = 0 are correctly classified.

To assess the contribution of the model predictors, the Wald statistic was examined. It helped to assess the significance of particular coefficients and support the conclusions from the Mann-Whitney test analysis.

5. Research results

The results of our research are provided in Table 1. In general, they show a high diversity of investigated characteristics among each group of issuers. This is proved by high values of standard deviation and significant differences between mean and median values. However, it is difficult to unequivocally claim which of the population (the P/C CB or CB issuers) is more differentiated.

Table 1. Statistical analysis of the sample. Key findings

Ratio	Convertible type	Mean	Median	Standard Deviation	p-value
Panel A: Issue value to selected balance sheet elements					
Issue value/Total assets (1.)	P/C CB	3.165	6.874	16.489	0.032**
	CB	2.117	6.712	8.127	
Issue value + Long-term liabilities/Total assets (2.)	P/C CB	6.696	6.988	2.736	0.135
	CB	6.649	6.845	2.215	
13.490	0.042**	3.130	0.159		
	CB	2.440	0.357	6.843	
Issue value/Long-term liabilities (4.)	P/C CB	11.169	0.617	58.417	0.006**
	CB	19.645	0.932	81.985	
Panel B: Asset structure and capital structure ratios					
Equity/Total assets (5.)	P/C CB	0.477	0.478	0.215	0.572
	CB	0.489	0.488	0.217	
Equity/Interest expenses (6.)	P/C CB	2.556	1.605	2.956	0.520
	CB	2.612	1.635	2.793	
Equity/Tangible assets (7.)	P/C CB	0.675	0.612	0.549	0.630
	CB	0.688	0.624	0.477	
Equity + Long-term liabilities/Tangible assets (8.)	P/C CB	0.928	0.844	0.467	0.976
	CB	0.928	0.832	0.427	
Financial leverage (9.)	P/C CB	2.328	0.443	14.383	0.068*
	CB	5.779	0.75	15.952	
Debt/EBITDA (10.)	P/C CB	1.609	1.240	1.292	0.057*
	CB	1.510	0.992	1.387	
Odsetki / EBITDA (11.)	P/C CB	0.168	0.135	0.119	0.075*
	CB	0.147	0.119	0.107	
Panel C: Profitability and performance ratios					
EBIT/Revenues (12.)	P/C CB	0.147	0.104	0.14	0.366
	CB	0.135	0.095	0.122	
Total assets/Revenues (13.)	P/C CB	14.831	1.654	132.897	0.241
	CB	16.171	1.418	108.583	
Tangible assets/Revenues (14.)	P/C CB	8.155	1.197	87.71	0.019**
	CB	14.931	0.923	108.375	
ROE (15.)	P/C CB	0.176	0.076	0.856	0.649
	CB	0.178	0.071	1.032	
ROA (16.)	P/C CB	-0.017	0.037	0.248	0.094*
	CB	-0.064	0.016	0.225	

p-value - the probability of the Mann-Whitney test
* - statistically significant differences at α=0,10
** - statistically significant differences at α=0,05

Source: own elaboration.

Looking at the research findings more precisely, it is apparent that the issue value to total assets (1.) and the issue value to tangible assets (3.) are lower for the CB issuers compared to the companies issuing the P/C CB (see Panel A). Moreover, for both groups of companies the hybrid debt makes up a majority of their long-term liabilities (2. and 4.), which means that convertible bonds are their primary resource of outside capital. According to (1.), the level of indebtedness increases more in case of the P/C CB issuers, but on the other hand (4.) proves that the firms which decide to issue the CB incur more long-term debt. This implies that the C/P CB issuers may either pursue more cautious financial strategies or they may be smaller entities in comparison with the companies issuing CB.

This then begs the question why smaller enterprises are more willing to add *call* and *put* provisions to ordinary convertible securities. Basically, it is a matter of perceiving these options as very profitable for both issuers and bondholders. The *call* option enables the companies to act more flexibly depending on market conditions, their financial performance, or the value of their future investment options. The managers can either force conversion or redeem convertibles at par, both before and at maturity. The *put* option, in turn, guarantees the bondholders the right to have the bonds redeemed in any cases of companies' financial distress or when the bond owners do not want to participate in too risky investment projects. In other words, the put option may serve as a "sweetener" for the investors which compensates them for uncertainty regarding issuers' future financial results and potential activities.

Hence, the P/C CB issue may indicate a limited confidence of the investors toward the issuers, which is quite common among small companies. The differences in (3.) are the proof of that. The P/C CB issue is secured by a lower level of tangible assets, which is associated with higher risk for the bondholders. Therefore it can be assumed that adding the *call* and *put* provisions may be managers' attempt to reduce such risk in order not to increase the cost of raising capital, which can considerably hinder the value of outside financial resources.

Admittedly, the research results show a strong differentiation among the investigated populations, but on the other hand it does not have an unitary character. For example, the mean value of (3.) and (4.) exceeds its median value whereas in (1.) it is exactly the opposite. But despite such a high differentiation, all the differences between both groups of the issuers, except for (2.), are statistically significant.

The analysis of the findings with respect to differentiation in capital structure of the CB and the P/C CB issuers does not allow for formulating many generalizations (see Panel B; 5.-8.). None of the differences in the investigated

ratios are statistically significant, hence there are no significant differences among the two groups of issuers, which is clearly proved by the Mann-Whitney test. An adequate equity to tangible assets ratio is observed (7.), whereas the constant capital to tangible assets ratio is thought to be too low (8.), which, in the case of the P/C CB issuers, is further evidence of pursuing a cautious financial strategy. However, the first statistically significant differences are noted in connection with the test of the issuers' financial risk. It turns out that the CB issuers are exposed to less risk - they have a lower level of (10.) and (11.) - but on the other hand they can benefit more from financial leverage (9.). This means that the P/C CB issue may apply to companies with higher risk exposure, and adding the *call* and *put* options to ordinary convertibles may stem from the requirements of the investors. This conclusions are consistent with the previous observations.

It can be observed that the P/C CB issuers are more exposed to risk. Their convertible issues have more impact on the total liabilities structure (1.) than on the long-term-liabilities structure (4.). The operating performance of such firms is much more laden with the costs of outside financing. Hence, an additional debt issue significantly increases their risk exposure.

Serious consideration should also be given to the profitability ratios (see Panel C). The research findings show that the companies issuing the CB achieve relatively worse financial results in comparison with their P/C CB counterparts. However, it should be emphasized that observed differences do not give us the basis to make any generalizations. Although the P/C CB issuers are characterized by a higher return on assets (16.), the mean and median values suggest a high differentiation among each group. The average profitability is negative, whereas the half of the firms do not incur a loss. This arises from several significant negative ROAs in our sample. As for ROE, the results are almost identical (15.). For this reason, return on equity may not affect the decision whether to attach *call* and the *put* provisions to ordinary convertibles. This is also proved by Mann-Whitney test values. In turn, in the case of ROA the differences are statistically significant but they are barely within the accepted confidence intervals.

The research findings about the effectiveness of the issuers are ambiguous as well. The statistically significant differences are observed only for tangible assets turnover (14.). The P/C CB issuers appear to be more effective on average, but half of them achieve worse results than the companies that issue CB. In case of total assets turnover (13.) and the effectiveness of operating performance (12.), these ratios are close to each other, which results in their statistical significance.

Using some characteristics of the convertible bonds issuers an assessment of the P/C CB issuance likelihood was carried out. For this purpose logistic regression was used. As the explanatory variables, we took into consideration only the parameters previously shown as statistically significant for the differences between the CB and the P/C CB. The analysis was focused on following parameters: (1), (3), (4), (9), (10), (14), (16). An outcome variable is a dummy variable equals 1 for the P/C CB bond, 0 - for the other.

Table 2. The results of the logistic regression model estimation describing the probability of the P/C CB bond issuance

Explanatory variable	B	S(B)	Wald statistic	exp(B)	R^2_{Nag}
Intercept	4.012	0.441	61.249	37.847	0.7149
Debt/EBITDA	0.002	0.000	59.843	1.008	
Issued amount/fixed assets	0.001	0.000	53.678	1.003	
Fixed assets/revenues	0.024	0.009	12.001	1.004	

R^2_{Nag} – Nagelkerke's R squared

Source: own elaboration.

Among all the considered factors, three parameters had the most important influence on the probablility of P/C CB issuance: issued amount relative to fixed assets, fixed assets to income. and debt/EBITDA ratio. The debt/EBITDA ratio is associated with a probability of the P/C CB issuance 1.008 times higher. An increase of the issued amount in relation to non-current assets by 1% increases the probability P/C CB issuance average of 1.003-fold (ceteris paribus). Growth of the fixed assets/revenues ratio by 1% causes the probability of the P/C CB issuance to be higher on average by 1.004 times. The estimated model correctly classified 96.1% of the P/C CB and 82.3% of the remaining bonds.

The results confirm previous observations. The increase of investment risk makes firms more likely to add an early redemption option to offered convertible bonds. The more debt relative to EBITDA or issued amount uncovered by owned fixed assets, the higher the risk for a potential bond investor. An interesting role can be observed with respect to fixed assets. Their scarcity limits the ability to secure investors, therefore P/C CB is more probable. On the other hand, an excess of fixed assets results in their low efficiency, which also increases the probability of issuance of a convertible bond expanded by additional options.

6. Conclusions

The issuance of convertible bonds can effectively alleviate tensions between investors and managers of a company. Adding the option of early redemption increases the range of possible agreement between them. It also gives the ability to change the terms of financing during the bond's lifetime. It may be particularly important in case of higher-than-average risk exposure of a company. It is also worth noting that regardless of the option type – *call* or *put*, the decision about a conversion is made by the investors, which means that they have a great impact on the choice of the final form of the hybrid capital financing. If the bondholders decide to withdraw the invested capital before debt maturity, they will demand the early redemption of convertibles by exercising the *put* option. If the right of redeeming convertibles falls to the issuer (the *call* option), the investors will simply not decide to make conversion. However, if the bondholders regard the overall market conditions and the issuer's financial performance as favorable and thereby wish to subscribe for the underlying shares, they will choose a conversion in case of both *callable* and *putable* convertibles. In each scenario, the *put/call* provisions gives the investors a greater influence on the convertible bonds financing until their maturity.

Our research shows that the main factor which determines the use of the *put/call* convertibles is the financial risk of the issuer. Although the companies issuing ordinary convertibles and those with additional *put/call* provisions are very similar by virtue of their financial characteristics, we confirmed some differences between both groups. In general, they concern the operating performance and interest payments to debt, which indicates that the P/C CB issuers are more exposed to the financial risk. This is also proved by the higher value of issued convertibles relative to total assets and fixed assets, which are potential bond collateral. We can therefore assume that the convertible *put/call* extension is strongly associated with the above-mentioned differences. Adding the *call* and the *put* option to ordinary convertibles may be explained by the issuers' attempt to reduce their risk exposure. As a consequence, the investors have a greater impact on the financing process, able to make optimal decisions based on the current financial performance of the firm. Thus, the use of PC CBs may facilitate raising outside capital and contribute to reducing the expected rate of return. The use of the *put/call* options in issues of higher risk is consistent with the theory of financing under imperfect market conditions and is strongly related to business practice. The information asymmetry between investors and managers favours the application of hybrid financing. The bondholders can adjust their capital commitment depending on the risk involved. The early redemption options may appear to be especially beneficial in such a case.

Finally, it should be emphasized that convertible bonds are issued in different countries, which may vary in terms of their formal regulations or financial supervision. For that reason, the characteristics of convertibles issuers in each country may be different. Our research applies only to the U.S. market. It therefore seems that broader generalizations require a broader study. Most previous research on *put/call convertibles* has concentrated mostly on the securities issued all over the world, without a division into specific countries or certain economic sectors. Some of them are focused mainly on the bond premiums (e.g. Greiner *et al.*, 2002) or particular issuance parameters. The the best of our knowledge, there are no articles concerning the characteristics of the *put/call convertibles* issuers showing the differences among them across several countries. This is a research gap which should be further investigated.

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Streszczenie

DETERMINANTY EMISJI OBLIGACJI ZAMIENNYCH Z OPCJĄ PUT/CALL NA RYNKU AMERYKAŃSKIM. ANALIZA SEKTORA NIEFINANSOWEGO

Celem artykułu jest scharakteryzowanie i wykazanie różnic między emitentami zwykłych obligacji zamiennych i obligacji zamiennych z dołączoną opcją put/call. Badanie zostało przeprowadzone na podstawie 379 emitentów tych instrumentów na rynku amerykańskim w latach 2002-2011 spoza sektora finansowego. Okazuje się, że decyzje o emisji put/call convertibles podejmują spółki obarczone wyższym ryzykiem inwestycyjnym, o czym świadczy m.in. wyższy poziom zadłużenia czy gorsza relacja wartości emisji to wartości aktywów trwałych. Dołączenie opcji call/put do zwykłych obligacji zamiennych ma na celu obniżenie ryzyka inwestycyjnego emitenta, co może spowodować zwiększenie popytu na ten rodzaj papierów wartościowych ze strony inwestorów.

***Słowa kluczowe**: finansowanie, obligacje zamienne, klauzule put/call, rynek amerykański*

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Does Risk Aversion Matter For Foreign Asset Holdings Of Pension Funds – The Case Of Poland

Abstract

In this study we explore the issue of foreign assets in mandatory pension funds portfolios. First we provide an overview of the regulatory policies regarding international assets and indicate the externalitieswhich may account for the observed differences among the CEE states. Then, taking the perspective of portfolio theory, we run a simulation study to measure the diversification benefits that may be achieved by greater international asset allocation. By applying the specific constraints and exchange rate volatility to our optimization procedure, the study reflects the perspective of the Polish pensioner. However, the findings regarding risk aversion intensity and the discussed directions of further research should be of a universal character.

Keywords: *pensions funds, currency risk, international portfolios*

1. Introduction

Successful financial investing means managing the expected risk and return to achieve the desirable balance. It is no different in case of future retirees,if they keep at least part of their pension savings in financial assets. Additionally, if we consider the mandatory pension systems, which are oriented

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towards minimizing the risk of poverty in old age rather than maximizing the expected return, the question of risk-reduction opportunities seems to be crucially important.This investment objective may be achieved by holding a portfolio of different assets. The conclusion from the Markowitz (1952) seminal paper states that in such conditions the diversification benefits emerge (reducing the portfolio risk while keeping the return constant). The diversification potential is greater, all other things being the same, whenever the correlation coefficient between asset returns is lower. Consequently, investors should look for securities that do not exhibit strong returns co-movement.

In this paper we argue that that Polish Open Pension Funds (OPF), which constitutes the mandatory capital pension pillar in Poland, should change their strategic asset allocation. We provide evidence that OPF would achieve additional diversification benefits if they were investing more in foreign assets.Viceira (2010 p. 220) points out thatemerging economies are typically characterized by small national stock markets and are subject to significant country-specific risks. Frequently, emerging markets do not have a widely diversified productive sector and instead are heavily concentrated in specific industries or services. Therefore, the need for international diversification may be even more pronounced in case of the economies like Poland.

The structure of this paper is as follows: In the next section we present an overview of the regulatorypolicy regarding the OPF and the countries that established mandatory capital pension pillars (second (II) pillars). We discuss the external effects of the regulations, which should explain the observed cross-country variation in this area. Finally, we present a review of the literature, indicating the gap we would like to close. Next we move to the Methodology and Data section, describing the assumptions of our analysis and the detailed characteristics of the time series employed. Finally, we present the results of our verification procedure together with the interpretation and discussion of the obtained estimates. In the last part we indicate the possible policy recommendations and frame the directions for further research.

2. Second pillar and its regulatory policies

Recently we have witnessed in the CEE states large policy changes regarding the second pension pillar (known as pillar II). First of all, the existence of the mandatory capital pillar has been questioned, as some of the countries reduced the size of the capital pillar. This move enabled the governments to obtain short term relief during the period of public finance distress.

Table 1. Current changes in the II pillar contribution rates in selected countries

Country	Historical II pillar contributions (% of gross salary)	Weakening of the second pillar
Bulgaria	5	Planned increases in the contribution rate delayed
Estonia	6	Transfers to II pillar temporarily suspended from 1 June 2009 until 31 December 2010. and also partly suspended in 2011. In 2014-2017 a compensation mechanism is planned that will transfer additional social tax revenues to the funded scheme.
Hungary	9,5	Nationalized private system.
Latvia	8	8% reducedtemporarily to 2%.
Lithuania	5,5	Second pillar contributions temporarily reduced from 5.5% to 2% , with additional contributions from individuals now proposed.
Poland	7,3	In 2011 the second pillar contribution was reduced from 7.3% to 2.3%, with a possible increase to 3.5% in 2017 and beyond . Currently the existence of the mandatory capital pillar is under debate.
Romania	2	Postponed a planned increase in second pillar contributions in 2010, but reintroduced increases beginning in 2011.
Slovakia	9	Contributions were reduced from 9% to 4% of gross wages and, conversely, contributions to the first pillar increased from 9% to 14%.

Source: Own study based on Égert, (2012, p. 8), Segaert and Võrk (2012, p. 8), and Schwartz (2012, p. 31).

We should be aware that this solution has become so popular because it is leads to a quick budgetary improvement and is not so costly in political terms, compared to structural reforms. Therefore, many argue that itresembles a painkiller rather than serious therapy.

At the same time regulatory shifts regarding the second pillar have been discussed. In the case of Poland the proposed ideas have covered the following topics: age-dependent portfolios, establishing an external benchmark, passive portfolio management, and finally greater foreign assets allocation. This last shift was additionally motivated by the ruling of the European Court of Justice of 21Dec 2011, which forced Polish government to increase the 5% limit on foreign assets allocation to comply with the rule of free movement of capital.[1]

[1] The limit will be rising gradually to 30% of the overall portfolio value.

Table 2. Investment limits on foreign assets for mandatory pension funds in selected CEE countries (% of assets)

Country	Foreign investments
Bulgaria	15%
Croatia	15%
Estonia	No limits on investments in the European Economic Area, OECD countries and certain other countries.
Hungary	Within investments made abroad, the ratio of investments in non-OECD countries shall not exceed 20%.
Latvia	No maximum limit for international investments, as long as pension funds invest in securities listed on stock exchanges in the Baltics, other EU member countries or the European Free Trade Area.
Poland	5%
Romania	No specific limits on investments in foreign assets. The limits are established for each asset class.
Slovakia	70% (Pension funds have to invest at least 30% of their assets into instruments of Slovak issuers).

Source: Own study based on OECD (2013), Pension Funds Online (2013).

As can be observed the diversity of the implemented solutions among the CEE states is large. We should be aware that the existence of the mandatory capital pillar leads to both some positive and some negative external effects.

First of all, pension funds create additional demand for the securities, supporting the development of the local capital markets. Nonetheless, if the demand rises much faster than the supply of securities, the risk of an asset bubble emerges. Therefore, the regulatory authorities must balance these two opposing effects. If the risk of a speculative bubble is significant, it should be more desirable to establish a stricter limit on foreign investments.

Secondly, purchases of foreign assets may lead to a depreciation of the local currency. As Roldos (2004, p. 20.) states, this exchange rate effect was observed in Chile (20% depreciation of the peso) after it increased the limit from 2% by end-1997 to 12 percent by end-1999, and in Canada (10 percent depreciation of the Canadian dollar) when the limit was raised by 10 percentage points to an overall 30% share in the period from January 2000 to January 2002. Later, following a similar policy shift in 2005 in Peru, a significant depreciation of local currency was also observed (Carmona 2006, p. 40.). Of course, the currency depreciation has both positive and negative consequences on the economy and the prevailing effect depends on the local economy's conditions (inflation, the openness of the economy, trade balance).

Somewhat surprisingly, despite this excessively restrictive constraint in case of Poland,OPF do not fully exploit this low limit on investing abroad, and

investments in foreign assets accounted for less than 1%of the overall assets value in 2012. In fact, numerous studies identified the phenomenon of *home bias* (insufficient international diversification) among the private (Baxter and Jermann 1997) and institutional investors (Suh 2001). Sercu and Vanpee (2007) distinguish the possible explanations of home bias into five large groups, where the main attention is focused on: hedging domestic risk, implicit and explicit costs of foreign investments, information asymmetries, corporate governance and transparency, and behavioural biases.Additionally, due to the established investment limits, reaching the optimal mean-variance trade-off may not be possible. However, it is also quite likely that by exploiting the existing regulatory opportunities, the improvement of investment performance may be obtained.

We find only a few papers discussing the international diversification opportunities for mandatory pension funds.Mandatory capital pillars were implemented around the globe mostly in the late 1990s, and in some countries even later, so the scarcity of literature is not very surprising. In this study we would like to discuss two studies, as they reflect the perspective of the CEE pensioner.

Swinkels *et al*. (2005) analysed the case of Latvia by comparing the risk-return characteristics of simulated portfolios. The MSCI World total return index and the S&P/IFC Emerging markets index were used as the proxies of foreign equity investments for the developed and emerging economies respectively. Swinkeles *et al*. (2005) found out that Latvian pensioners would benefit from international asset allocation no matter whether they were investing more in the emerging or developed economies. One should be aware however that Latvia is a special case because of the exchange rate peg of the Latvian Lat to the Euro sincethe end of 2004. This eliminates a substantial part of the exchange rate risk, and since July 2005 there are no restrictions on the asset allocation across the Eurozone markets. Hence, Swinkles *et al*. (2005) analysed the simulated portfolios characteristics where the share of foreign equities from the developed countries was 50% or even greater. For this reason the results cannot be easily transferred to those countries with highly restrictive regulatory policies.

Pfau (2011) addressed the problem of international diversification gains, running a broad comparative study. Using the traditional mean-variance framework, Pfau (2011) was looking for the portfolio that was maximizing the expected utility of the investor from a particular emerging market economy. The opportunity set was comprised at all times of local and foreign equities and fixed income instruments. The results of the conducted research exhibited that international diversification benefits may be highly cross-country variable. While China's optimal share of foreign assets was found to be extremely high (99.78%), Columbia, Hungary, Poland, and Turkey were found to require no international diversification. The results obtained by Pfau (2011) tend to raise

the new research questions. First of all, the published results were obtained by using the utility function that reflected the preferences of rather conservative investors. Secondly, similarly to Swinkels*et al*. (2005), there were no constraints on foreign asset allocation, which is an assumption rather far from the reality of the mandatory capital pillars. Finally, the deliveredestimates may be sensitive to the chosen sample period, especially in the case of expected asset returns.

3. Methodology and data

In this study we employ the mean-variance Markowitz (1952) framework. Just to recall, we must assume the normal distribution of asset returns, hence, the portfolio's expected return (R_v) and risk (σ_v)measured by standard deviation is presented as follows:

$$E(R_p) = \sum_{i=1}^{n} w_i E(R_i), \tag{1}$$

$$\sigma_p = \left(\sum_{i=1}^{n} w_i^2 \sigma_i^2 + \sum_{i=1}^{n-1} \sum_{j=i+1}^{n} w_i w_j \sigma_i \sigma_j \rho_{ij}\right)^{0,5}, \tag{2}$$

where R_i is the return on asset, *i*,w_i is the weighting of component asset, *i*, σ_i^2 denotes its variance, and ρ_{ij} is the correlation coefficients between the returns of asset *i* and j.

In the optimization process, the investor is maximizing the utility function:

$$u = R_p - 0{,}5A\sigma^2 \tag{3}$$

where the parameter *A* reflects varying degree of risk aversion. An aggressive investor is thought to have a value of *A* about one;a value of three describesmoderate risk aversion; while a value of five characterizes a rather conservative risk-return attitude. In our study all of the conducted simulations are done separately for each risk aversion level.

In order to more closely match reality, we apply a set of constraints during the portfolio selection process. First of all, the portfolio weights must be non-negative as the OPF are not allowed to take short positions. Secondly, as was mentioned earlier, the regulatory authorities apply the investment limits to several asset classes, especially to foreign investments, being the concern of our study.

The asset universe in our study contains the local (Polish) equity and government bond indices, together with the indices of the international equity

and bond markets.Therefore, we utilized the following proxies: MSCI Poland (Polish equities; Reuters code: MSPLNDL), Thomson Reuters Polish Sovereign Polish Bond 10Y Index (Polish treasuries; Reuters code: BMPO10Y), MSCI World Index (World equities; Reuters code: MSWRLD$(PI)), Thomson Reuters European Monetary Union Sovereign Bond 10Y Index (World Bonds; Reuters Code: BMEM10Y). It is worth noting that the MSCI World index consists of the markets of the 24 developed countries. Therefore, it should wellthe foreign allocation opportunities of OPF, whichare allowed to invest mainly in the securities listed on the OECD markets.

The sample period spans the last ten years (2003-2012) and the data has a weekly frequency. A higher frequency is not recommended in the cross-country studies due to the different time zones around the Globe. In order to mirror closely the perspective of the Polish investor, all of the foreign indices values were converted into PLN using the USDPLN or EURPLN spot rate.

The use of the ten-years data period (522 observations for every series) should enable the attainment of relatively stable estimates of variances and covariances.

However, in case of the expected returns the story is a bit different. Dimson *et al.* (2006) provided a comprehensive analysis of the equity premia of the seventeen countries and a World index over a 106-year sample. He found that on average the investors expected a premium on the World index of around 3-3,5% on a geometric mean basis. What is also quite appealing is that the variation of the estimates through the decades was extremely high. It was possible to find decades with positivetwo digit excess returns, as well as prolonged periods of negative equity market premia. Consequently, Dimson*et al*. (2006, p. 11) conclude that it would be misleading to project the future equity premium from data for the previous decade. This statement seems to be even more justified if we take in account the extremely long perspective ofa future pensioner. Because of this, we have decided to base the expected returns on assets on economictheory rather than short term statistics.

First of all, in the long run bond yields should equalize the nominal GDP growth, as it represents the opportunity cost of holding a government bond both in terms of investment opportunities (real GDP) and the time value of money (inflation). Additionally, in the long run income growth should be in line with the economy's potential output rate. Therefore, we should think first about the expected potential GDP and inflation rates for Poland and then the rest of the World.

The literature on potential output estimate is quite broad, but to the best of our knowledge PwC (2013) is the only study that projects the real GDP growth rate over a very long time horizon. According to this report, the average real GDP growth rate for Poland is expected to reach 2.5% yearly, while the developed

economies should experience a 2% output growth up to the year 2050. It is somewhat surprising that Polish economic growth is projected to be only a bit higher than that of countries like Germany, because Poland is still perceived as a catching-up economy. However, the authors note that after 2030 the rapid economic growth may drastically slow down due merely to worsening demographic conditions. Today Poland has one of the lowest fertility rates in the European Union (1.3), so it is expected that the total number of Polish working age population (people aged 15-64) will be 14% below the current figure (PwC 2013, p. 12).

In addressing the problem of expected inflation we base our figures on the inflation targets of the central banks. In Poland, since 2004 the National Bank of Poland has pursued a continuous inflation target at the level of 2.5%, with a permissible fluctuation band of +/- 1 percentage point. The inflation target[2] of the European Central Bank and Federal Reserve is considered to be 2% yearly.

Taking into account the output and inflation considerations together we receive an approximate 4% expected return on World government bonds and 5% on Polish treasuries. Then we assume a 3% equity premium for World bonds and 3.5% premium for Polish bonds. Consequently, the expected equity returns are 7% and 8.5% respectively. We decided to set the equity premium for the Polish market at a higher rate to compensate for the risks typical for the emerging markets (lower liquidity, inadequate sectoral diversifications), resulting in higher overallvolatility.

All of the time series used in this study have been obtained from Reuters Datastream.

4. Empirical results

We start our verification procedure by analyzing the expected return, risk, and co-movement measures to formulate initial remarks about the diversification potential of foreign assets.

First of all, looking at Table 1 we note that the most risky asset is the Polish equity index, while the least risky is the index of Polish treasuries. It is quite surprising that Polish bonds are less volatile than EMU bonds. To find the explanation of this phenomenon we should recall that after the emergence of the sovereign debt crisis in some of the EMU countries the disparity between the bond yields of the membership states has risen dramatically. We could observefalling yields of the German Bunds and at the same plunging prices of the PIIGS

[2] Neither the ECB nor the Fed explicitly realize the DIT strategy, but 2% is considered to be a targeted value. (European Central Bank, 2013; Federal Reserve System, 2013).

treasuries. Currently, the situation on the sovereign debt market has become stabilized. However, still the large divergence between the bond yields, unknown during the pre-crisis period, is still present and it is hard to say if it is temporary or rather persistent state.

Table 3. Return and risk

	Eq_PL	*Bd_PL*	*Eq_F*	*Bd_F*
R_{p_w}	0.16%	0.09%	0.13%	0.08%
σ_{p_w}	3.57%	0.98%	2.37%	1.88%
R_{p_y}	8.50%	5.00%	7.00%	4.00%
σ_{p_y}	25.74%	7.04%	17.06%	13.53%

Note: *Eq_PL*, *Bd_PL*, *Eq_F*, *Bd_F* denotes Polish equities, Polish bonds, foreign equity, and foreign bonds respectively. R_{p_w} stands for a weekly expected return, σ_{p_w} weekly standard deviation, R_{p_y} and σ_{p_y} are the returns and standard deviations on a yearly basis.

Source: Own study.

Table 4. Correlation matrix

	Eq_PL	*Bd_PL*	*Eq_W*	*Bd_W*
Eq_PL	1			
Bd_PL	0.26154	1		
Eq_F	0.38726	-0.1037	1	
Bd_F	-0.5173	-0.2179	-0.0511	1

Source: Own study.

The data displayed in Table 2. tellsus the most about the diversification potential of the foreign assets. It is evident that foreign bonds should provide the greatest risk-reduction opportunities, as the correlation coefficients are negative. The interdependence between the Polish and World equity returns is also moderate. Summing up this point we can expect that foreign assets should account for a large share of the optimized portfolios. However, the international assets mix (World equities vs World bonds) may depend on the risk aversionintensity and the established investment limits. To address these issueswe runa three-step procedure.

Firstly, we examine the case with the current 5% limit on foreign assets. Then, we deal with the cases of the projected targeted limit of 30%. Finally, we run the optimization procedure for the hypothetical “no limit” case to see the extent to which the discussed regulatory solutions are binding. The results of this procedure are displayed in Tables 5-7.

Table 5. Optimal portfolios: 5% limit on foreign assets

A	1	3	5
w_{Eq_PL}	52.00%	16.51%	9.41%
w_{Bd_PL}	43.00%	78.49%	85.59%
w_{Eq_F}	5.00%	5.00%	5.00%
w_{Bd_F}	0.00%	0.00%	0.00%
R_{p_w}	0.13%	0.11%	0.10%
σ_{p_w}	2.05%	1.11%	0.99%
u	0.001075	0.000878	0.00077
R_{p_y}	6.91%	5.67%	5.42%
σ_{p_y}	14.80%	7.97%	7.15%
$\sum F$	5.00%	5.00%	5.00%
σ/R	1596.69%	1042.14%	975.97%

Note: A stands for the risk aversion parameter value, w denotes a portfolio weight, u is the portfolio utility, $\sum F$ is the total weight of foreign assets in the portfolio, σ/R is the risk/return ratio on a weekly basis.

Source: Own study.

Table 6. Optimal portfolios: 30% limit on foreign assets

A	1	3	5
w_{Eq_PL}	44.41%	15.01%	10.38%
w_{Bd_PL}	25.59%	54.99%	59.62%
w_{Eq_F}	30.00%	19.14%	14.75%
w_{Bd_F}	0.00%	10.86%	15.25%
R_{p_w}	0.13%	0.11%	0.10%
σ_{p_w}	2.03%	0.97%	0.81%
u	0.001121	0.000942	0.000866
R_{p_y}	7.15%	5.79%	5.50%
σ_{p_y}	14.67%	6.99%	5.84%
$\sum F$	30.00%	30.00%	30.00%
σ/R	1531.42%	895.07%	786.20%

Source: Own study.

Table 7. Optimal portfolios: no limit on foreign assets

A	1	3	5
w_{Eq_PL}	39.05%	15.47%	10.76%
w_{Bd_PL}	11.49%	44.38%	50.96%
w_{Eq_F}	48.47%	22.97%	17.87%
w_{Bd_F}	0.98%	17.17%	20.41%
R_{p_w}	0.14%	0.11%	0.10%
σ_{p_w}	2.13%	0.97%	0.80%
u	0.001132	0.000948	0.000872
R_{p_y}	7.32%	5.82%	5.52%
σ_{p_y}	15.39%	6.98%	5.80%
$\sum F$	49.45%	40.15%	38.28%
σ/R	1569.69%	889.31%	778.04%

Source: Own study.

Following an inspection and analysis of the obtained numbers, a few important facts can be noted.

Irrespective of the assumed foreign asset constraint, the weights of international securities reach their maximum limit for every given level of risk aversion. Therefore, relaxing the current international allocation restriction is definitely recommended from the point of view of portfolio theory.

The optimal mix of foreign assets depends heavily on the chosen risk aversion coefficient. The conservative and moderate risk-averse investors should put a greater weight to foreign bonds, while the low risk-averse investorsshould invest mostly in international stocks (in 5% of cases there were no foreign bonds in the optimized portfolio).

The improvement in the utility values between "30%" and "no limit" is very slight, and the optimal weights of foreign assets varies from 49.45% to 38.28%. Therefore, the targeted investment limit of 30% does not reduce the diversification opportunities very significantly. Additionally, we note that the current limit on domestic equities (40%) is not binding for conservative and moderately risk-averse investors, but reduces the investment opportunities of the investors who are looking merely for higher return.

We also repeated this three-step procedure for different scenarios varying in the level of expected returns. However, in each case the following relation:$R_{Eq\ PL} > R_{Eq\ F} > R_{Bd\ PL} > R_{Bd\ F}$ held, so it is hard to deliver strong arguments against it. The obtained results were not very different from the presented numbers, hence, the soundness of the formulated findings was additionally supported.

5. Conclusions

In this study we have presented the argument in favour of greater international diversification of OPF portfolios, confirming the presence of the *home bias*phenomenon.The conducted research proved that the specificoutcomes depend on the assumed investment restrictions and the degree of risk aversion. Therefore, in comparison to the previous literature our results better reflect the available policy choices and are more useful in terms of formulating the regulatory recommendations.

Besides the research objective we have addressed, new questions arise. First of all, OPF managers frequently argue that the observed low allocation in foreign assets results from a legal ban on currency hedging. In fact, the need forthe use of FX derivatives is quite debatable. Viceira (2010, p. 220) notes that full currency hedging is a conventional practice among institutional equity investors in developed economies. This practice is optimal when equity excess returns are uncorrelated with currency excess returns. Applying the perspective of the emerging market investor, however, the recommendations may be quite different. Campbell *et al*. (2007), in examining the currency and equity returns over the period 1975-2005, found the currencies traditionally considered as reserve ones (e.g. USD, EUR, CHF) to be negatively correlated with global stock markets. During periods of equity market plunges, global investors rebalance their portfolios toward the less risky and more liquid assets like US treasury bonds or Swiss deposits, leading to appreciation of the reserve currencies. This phenomenon, known as the flight to liquidity/quality, has been confirmed by many studies (Gonzalo and Olmo 2005,Beber*et al*. 2006) Therefore, the need for currency hedging seems to be less justified in the case of foreign investors having international equity exposure denominated in reserve currencies.

Secondly, the optimal portfolios differ greatly for varying degrees of risk aversion. We may assume that risk aversion grows in line with the pension fund participants' age. The older the investors, the more portfolios should be oriented towards the protection of capital rather than maximizing the expected return. In this context the establishment of age-dependent portfolios seems evident, but this requires deeper research. We think that studies based on the dynamic portfolio theory may provide a valuable contribution in this respect.

Thirdly, the Markowitz approach assumes multivariate normal distribution. It is nowadays a well-recognized phenomenon that the empirical distributions are usually leptokurtic, which results in the underestimation of extreme events under the mean-variance framework. Again, this issue may be especially relevant for the wealth-protecting portfolios.Successful modeling of the higher

moments of the joint distribution is then necessary. The approach using copula functions (Deng*et al*. 2011,Boubaker and Sghaier 2013) and the introduction of other measurements of risk (Sortino and Satchell 2001,Sortino and van der Meer 1991) seems to be potentially promising, but this area definitelyneeds further exploration.

Last but not least, the results of the conducted research may be even more favourable for the use of foreign assets if we take a broader perspective. In Poland, the mandatory pension system is based on a defined contribution rule and consists of two pillars: the non-financial pillar and the capital pillar (pillar II). In 2012 the overall contribution to the pension system was 19.55% of the gross salary, but only 11.8% percent of this sum (2.3% of the gross salary)was transferred to pillar II. If we keep in mind that the indexation of the receivables in the first pillar depends merely on the economy's wage bill (in the long run equal to nominal output growth), we can see that the overall pension savings portfolio is based on relatively low-risk assets (receivables from the I pillar + treasuries in the II pillar). Therefore, it is quite likely that the share of equity in pillar II, both local and foreign, may be even greater than our study predicts. In the furtherresearch we hope to explore this issue by adding non-market government commitments to the portfolio.

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Streszczenie

CZY AWERSJA DO RYZYKA WPŁYWA NA UDZIAŁ AKTYWÓW ZAGRANICZNYCH W PORTFELACH FUNDUSZY EMERYTALNYCH – PRZYPADEK POLSKI

W artykule podjęto zagadnienie inwestycji w aktywa zagraniczne dokonywanych przez fundusze emerytalne. W części pierwszej opracowania dokonano przeglądu polityk nadzorczych oraz wskazano efekty zewnętrzne inwestycji zagranicznych, które mogą odpowiadać za obserwowane różnice w regulacjach pomiędzy krajami Europy Środkowo-Wschodniej. Następnie wykorzystując teorię portfela przeprowadzono symulacje mające na celu oszacowanie korzyści dywersyfikacyjnych, jakie mogłyby zostać osiągnięte poprzez wyższy udziałaktywów zagranicznych. Stosując specyficzne ograniczenia oraz biorąc pod uwagę zmienność kursu walutowego, zaprezentowane badanie oddaje perspektywę członka polskiego funduszu emerytalnego. Z drugiej strony, wnioski dotyczące stopnia awersji do ryzyka oraz wskazane kierunki dla dalszych badań powinny mieć charakter uniwersalny.

Słowa kluczowe: *fundusze emerytalne, ryzyko walutowe, portfele międzynarodowe*

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Share Capital Increase Strategies And The Efficiency Of Listed Companies – A Polish-German Comparative Analytical Study

Abstract

This paper presents a theoretical-empirical study comprising a comparative analysis of the influence of specific strategies for increasing share capital on the economic efficiency of companies listed on the Polish and German capital markets. The paper consists of three parts. The first part includes the evaluation of possible relations between the efficiency of a company's activities and the process of share capital increase. The second part contains the results of empirical research on changes in share capital in the examined companies, which are listed on the WIG-20 and DAX indices. The third part presents the results of the study on their efficiency in the context of methods applied in order to increase share capital.

The assessment of the efficiency of publicly-listed companies was conducted by means of the nonparametric DEA method, using measures oriented on input and constant returns-to-scale. The effects (results) are shown by means of the following ratios: return on sales, return on equity, and return on assets, whereas the inputs are illustrated by ratios of share capital dynamics, financing total assets by share capital and equity dilution.

Keywords: *share capital, share capital increase, efficiency, Polish and German joint-stock companies*

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1. Introduction

The key problem in the strategic management of corporate finance is shaping the level and structure of equity, which implies the need for assessment of the efficiency of business units and multiplying their value. The issue is usually accompanied with the problem of raising equity, both from internal sources (capital generated as a result of current economic processes) and external sources (capital related to acquiring financial means in the business environment). Worth mentioning in this context is the analysis of changes in the efficiency of units induced by the increase in share capital value and structure.

The main purpose of this study was to examine the degree of diversification in the efficiency of Polish and German publicly-listed companies which were increasing share capital in different ways, i.e. in the ordinary mode and in the form of a conditional share capital increase, increase on the basis of authorized share capital, and increase from the company's own resources. The analysis was performed to test the general research hypothesis that stipulated that the form of increasing share capital basically differentiates the efficiency of public companies.

The research comprised joint-stock companies listed on the Warsaw Stock Exchange and included in WIG-20 Index, as well as the companies listed on the Frankfurt Stock Exchange (germ. Frankfurter Wertpapierbörse – FWB)[1] and included in DAX Index.

The analysis covered financial statements from 50 companies qualified for both indices on 02.09.2013. A ten-year research period, e.g. between 2003-2012, was chosen for conducting the attempted analysis. Empirical data for the study was obtained from the Notoria Serwis S.A. database, stock market bulletins, as well as from the Polish and German stock market websites.

2. Forms and methods of share capital increase in Polish and German joint-stock companies

In discussing the issue of share capital increase in a joint-stock company, the German literature describes two major types that need to be mentioned (Wöhe et al. 2011, p. 82):

[1] Frankfurter Wertpapierbörse (FWB) is the largest of seven stock exchanges in Germany and one of the most important financial centres in the world securities market. The organization of public trading is controlled by Deutsche Börse AG.

- effective increase, connected with introducing new means to a company in the form of cash or in-kind contributions, and
- nominal increase, that relies on using a company's own resources (see Table 1).

Taking into consideration the Polish and German legal regulations, one can point out four methods for increasing share capital in a joint-stock company:

1. Ordinary share capital increase,
2. Conditional share capital increase,
3. Increase on the basis of authorized share capital,
4. Increase from the company's resources (C.C.C. 2000, art. 430-454; AktG 1965, paragraph 182-220).

Table 1. Forms and methods of share capital increase in a joint-stock company

Forms	Methods
Effective increase of share capital	Ordinary increase of share capital
	Conditional increase of share capital
	Increase on the basis of authorized share capital
Nominal increase of share capital	Increase from company resources

Source: own study on the basis of: *Commercial Companies Code* [C.C.C.] and G. Wöhe, J. Bilstein, D. Ernst, J. Häcker, *Grundzüge der Unternehmensfinanzierung*, VahlenVerlag, München 2011, p. 82.

On the basis of the Commercial Companies Code, an ordinary capital increase is effected through the issue of new shares or increasing the nominal value of current shares. According to the provisions of AktG, an ordinary share capital increase involves only the issuance of new shares. As J. Ickiewicz claims, the option of increasing the nominal value of current shares is in practice used by only a very few companies, mainly those which have a small number of shareholders. Hence, the common method of ordinary share capital increase is the issuance of new shares (Ickiewicz 2004, p. 98). Acquisition of such shares can be effected through:

1. Submission of an offer by a company and its acceptance by a specific addressee: acceptance of an offer must be in writing under pain of nullity (private subscription);
2. Offering shares only to shareholders with pre-emptive rights (closed subscription);
3. Offering shares through an announcement to persons without pre-emptive rights (open subscription).

Another method of share capital increase is a conditional increase, which must be accepted at the shareholders' annual general meeting. Under the Polish regulations a decision to use this form of share capital increase can be used to

accomplish such goals as granting rights for the acquisition of shares to bondholders through convertible bonds or pre-emptive bonds, granting employees, board members or the board of supervisors rights to acquire shares in exchange for nonmaterial contributions that are company liabilities they have in return for rights to shares in a company's or subsidiary's profits, or by granting the rights for share acquisition to owners of subscription warrants. Under German law, conditional share capital increases are reserved for the following cases: offering creditors a right to purchase shares arising from a loan or issuance of convertible bonds into shares, planned merger, and execution of the right to acquire shares granted to employees and paid from their guaranteed profit share.

The third method of share capital increase can be introduced on the basis of authorized share capital. Use of this method facilitates the process of share capital increase as it takes a simplified form. The basis for its application is a decision of the company board which cannot be contested. According to the Commercial Companies Code, share capital increase in the mode of authorized share capital relies on granting empowerment to the board, for a maximum three-year period, to implement a share capital increase. It should be stressed that the size of authorized capital cannot exceed three quarters of the share capital on the day of granting the empowerment to the board (Kidyba 2010, *Kodeks spółek handlowych: objaśnienia*, p. 691). In German companies the board can receive such an empowerment for five years, but the degree of authorization amounts to a maximum of 50% of the value of current share capital.

The fourth specific method of share capital increase is based exclusively on internal transformations of equity structure. This is a share capital increase from a company's own resources, alternately described as "capitalization of reserves" (Skawiańczyk 1999; Skowroński, Świrski 2009; Szajkowski, Tarska 2005, p. 565), "internal capitalization" (Kidyba 2010, *Kodeks spółek handlowych. Komentarz*, pp.784-786) or "capitalization issue".[2] In the German literature it is specified, as has been already mentioned, as a nominal increase of share capital.

In the Polish and German legal regulations, increasing share capital from a company's own resources is based on changing the equity structure by transferring spare capital and/or reserve capital obtained from profits into share capital. This kind of increase exists only "on paper", i.e. the value of a company's assets does not increase as a result of this transformation. Capitalization of reserves can be effected either by increasing the number of shares or increasing the nominal value of shares i.e. through, so-called "re-nomination" (Czechowska 2000, p. 59). The first case includes new shares without the necessity of adding resources to the

[2] Capitalization issue – i.e. bonus issue – compare: Davies (1993), pp. 123-129.

company, thus, these shares are called "bonus shares" or a so-called "bonus increase" (Kidyba 2010, *Kodeks spółek handlowych: objaśnienia*, p. 689).

Joint-stock companies that have a number of methods of increasing share capital available must analyse them thoroughly, not only in terms of meeting specific legal requirements but also taking into account their economic goals and the projected functions the increased share capital will serve, in light of an optimum strategy of financing business operations.

3. Strategies of increasing share capital in joint-stock companies

The functions and goals of increased share capital arise from both the general functions performed by this capital as well as those that may refer to expanding or maintaining a company's economic activity. As far as the former are concerned, it should be pointed that increased share capital strengthens mostly the legal, economic and guarantee function of capital (Sajnóg, Duraj 2013, pp. 287-293; Ostaszewski, Cicirko 2005, p. 93; Ickiewicz 2004, pp. 42-44; Woźniak-Sobczak 2005, pp. 2-35). Moreover, increased capital can perform other, additional functions, e.g. development, restructuring, stimulation, credit, and stabilization and marketing functions (Sajnóg 2013, pp. 59-63). **Undeniably, the process chosen for increasing capital reflects the specific strategies of joint-stock companies, which focus not only on strengthening the legal-guarantee function, but mainly the economic one.**

Research presented in the Polish and German literature observes that joint-stock companies, when increasing the value of share capital, take into consideration various strategic goals. These include, among others:

1. Financing intensive and extensive enterprise developments (increase in efficiency, expansion of a company's operations, modernization, increase of production capacity, financing modern technological solutions, etc.),
2. Reorganization and rationalization of activities oriented at lowering costs and increasing the quality and efficiency of investment and financial transactions,
3. Changing the structure and character of capital ownership in financing business activity,
4. Changing the capital structure in order to gain optimal rate of return from investment and capital costs,
5. Increasing an enterprise's financial liquidity (source of debt repayment),
6. Increasing the guarantee basis and improving creditworthiness,
7. Execution of a previously granted right to receive employee shares,

8. Carrying out a merger, consolidation, or the acquisition of other enterprises,
9. Stock market floatation,
10. Implementation of a company's statutory provisions (Ludwig et al. 2007, p. 57; Ickiewicz 1996, p. 66).

It seems apparent that the aim of effectively increasing share capital is the desire to obtain means for the implementation of economic plans. The ordinary increase of share capital is most often applied in order to receive additional financial means which may be required for financing investments, reorganization and rationalization actions, as well as increasing the guarantee base. In the light of our conducted empirical study, the goals of ordinary increases of share capital focus mainly on capital and material investments which result from a specific strategy of company development that includes mostly expansion of a company's activity or acquiring another enterprise. Moreover, companies aiming to strengthen guarantee-stabilization functions most often mention: covering liabilities, improvement of liquidity, regaining financial stability (Sajnóg 2013, pp. 73-75).

It can be generally claimed that the primary aim of transforming the equity structure via capitalization of reserves is the necessity of increasing a company's credibility among shareholders and other groups of stakeholders. Furthermore, a share capital increase without an increase of financial means in a company can also be undertaken in order to, e.g., link the capital and a company more strongly, cope with problems with share sales or a decline in share prices on the market, or issue shares to shareholders instead of a dividend (Sajnóg 2012, pp. 485-486). Shareholders who resign from receiving current income and decide to retain a part, or even the whole of generated profit in a company expect that such steps will increase a company's standing and ensure a high level of efficiency.

Regardless of the forms and methods of increasing share capital it can be assumed that positive changes in share capital value can be correlated with an increase of economic efficiency, which meets the owners' expectations. Thus, there is a need to introduce changes in the value of share capital to achieve better return on equity and multiply the value of invested capital in an enterprise.

In order to formulate and accomplish a specific analysis of the strategies involving share capital increases in financing a company's total assets in order to improve return on equity, the degree of financing total assets through share capital can be calculated by means of the following formula:

$$SCTA = SC/TA \times 100, \quad (1)$$

where:

$SCTA$– share capital to total assets ratio (financing total assets through share capital ratio),

SC– share capital,

TA– total assets.

The strategy of ordinary share capital increases induces not only changes in the capital structure, but also influences the volume of forecast cash flows. Thus, the announcement of a share issue itself, according to the signalling theory, can in a very short time exert a positive influence on shaping share prices in the capital market. Conversely, the long-term reactions of investors can bring about an adverse growth of equity value through the issuance of new shares in the form of so-called "dilution of capital". This is the case when an increase in the number of shares is not accompanied by a proportionate growth of profits generated by a company. This may lead to a decline in the values of return ratios, and as a consequence exacerbate an enterprise's overall financial situation.

In order to assess these kinds of effects a measure must be used for pointing out unit value of enterprise equity per share. Also net book value per share can be used for the purpose of this study, and has been determined as a ratio of equity dilution. It is expressed by the following formula:

$$BVPS = E/NS, \quad (2)$$

where:

$\boldsymbol{BVPS}$– book value per share ratio (equity dilution ratio),

$\boldsymbol{E}$– equity,

$\boldsymbol{NS}$– number of shares.

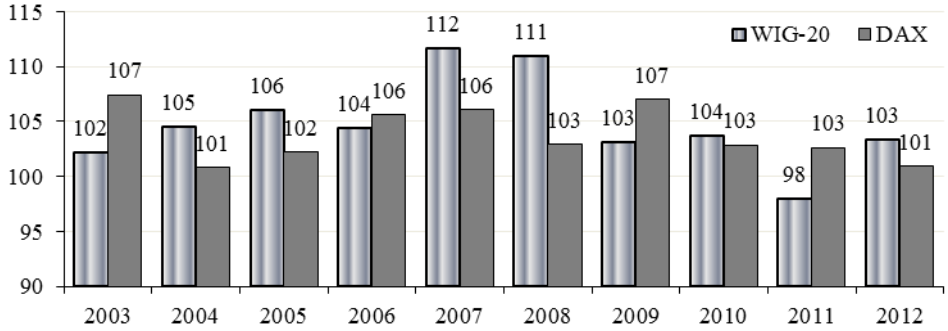
This ratio is extremely useful for the evaluation of company's value. It reflects not only the potential of a company's appreciation, but also the rate of return from a given capital. Moreover, it shows:

- the degree of capital dispersion among shareholders,
- the price that must be paid for one zloty of liquidated company assets which would have been divided among its owners.

4. The results of the study on the changes in share capital value of the companies fromWIG-20 and DAX indices

The results of the empirical studies undertaken confirmed the changes in the book value of share capital in Polish and German joint-stock companies in the period between 2003-2012. This is indicated by calculated average ratios of share capital dynamics.

Figure 1. Mean values of ratios of share capital value dynamics in companies from WIG-20 and DAX indices between 2003-2012 (previous year = 100)



Source: own study on the basis of data from the Notoria Serwis S.A. database, stock market bulletins, as well as from the Polish and German stock market websites.

The figures presented in Figure 1 show that in the examined decade the biggest positive changes of share capital value in companies in the WIG-20 occurred between 2007-2008, when the share capital of examined companies increased on average by 11-12%. Less visible changes in the value of capital were observed in companies in the DAX index. The highest calculated average values of this capital dynamics (in 2003, 2006, 2007, 2009) showed only a 6-7% increase of share capital book value in relation to the previous year.

The detailed analysis of individual specific financial statements of examined companies between 2003-2012 also showed that a few units, in their financing strategies, focused on maintaining share capital at the same level. Taking into consideration all examined years and companies it should be noted that three companies from WIG-20 (KGHM, PZU, TP) and two from the DAX index (BASF, ThyssenKrupp) did not take any decisions to increase share capital.

The results of our research presented in Table 2 confirm that the proportion of share capital in total assets in the Polish companies was generally higher than in the German companies. This is supported by calculated mean values of ratios of share capital's proportion in financing total assets. Moreover, in the units included in the WIG-20 index, two research sub-periods were observed

(between 2003-2006 and 2007-2012), in which the examined relations showed a declining trend. On the other hand, companies from the DAX index implemented a strategy of greater stability in financing total assets with share capital. The mean values of ratios of share capital's proportion in financing total assets amounted to 3-4%.

Table 2. Mean values of ratios of financing total assets through share capital (SCTA) and equity dilution (BVPS) in companies from WIG-20 and DAX between 2003-2012

Ratios	Companies	Years									
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
SCTA	WIG-20	9.4%	9.0%	7.4%	7.0%	11.1%	10.2%	9.8%	9.5%	6.9%	6.6%
	DAX	4.0%	3.9%	3.6%	3.3%	3.1%	3.2%	4.1%	3.7%	3.5%	3.5%
BVPS	WIG-20	26.0	29.2	25.1	59.3	133.5	86.0	58.8	70.7	52.1	57.1
	DAX	26.9	29.0	34.0	36.4	36.0	33.4	33.7	38.2	40.1	43.6

Source: own study on the basis of data from the Notoria Serwis S.A. database, stock market bulletins, as well as from the Polish and German stock market websites.

When analyzing calculated ratios of equity dilution in the examined decade it can be said that their values were diverse. Similarly as with ratios of share capital's proportion in financing total assets, greater stability was observed in companies from the German trading floor. It must be noted that in spite of increases or declines in share capital's proportion in financing assets of analysed companies, no proportionate growth or decline in the value of equity per share was observed. On the whole, the convergence of changes in values of SCTA and BVPS was noted in the following companies:

- from the WIG-20 index in 2005 and between 2007-2009, as well as in 2011, whereas
- from the DAX index only in 2007, 2009 and 2012.

The examined Polish companies in the research period used only effective share capital increases, without the possibility of using authorized share capital. None of the units engaged in capitalization of reserves (see Table 3). Moreover, among the methods of effective share capital increase the prevalent type was conditioned capital. This was generated as a result of granting the right to share acquisition to employees and/or board members. Share acquisition in the mode of an ordinary share capital increase proceeded mainly through an offer made by the company to a specific addressee (private subscription).

Table 3. Methods of increasing share capital in the companies from the WIG-20 and DAX indices between 2003-2012

Methods of increasing share capital		WIG-20		DAX	
		Number of AGM* decisions	Position on priority list	Number of AGM* decisions	Position on priority list
Ordinary	Private subscription	13	2	10	4
	Closed subscription	5	4	12	2
	Open subscription	8	3	1	8
Conditional	Employee options	24	1	40	1
	Convertible bonds	5	4	3	6
	Subscription warrants	1	5	2	7
Authorized share capital		–	–	11	3
Capitalization of reserves		–	–	7	5

*AGM – annual general meeting, also known as the annual meeting or shareholder's general meeting.

Source: same as in Table 2.

In the examined German public companies all four methods of increasing share capital were used in the analysed period, including capitalization of reserves and authorized share capital. The prevalent method was the conditional increase, which was noted in nearly 56% of resolutions passed at the annual general meeting (AGM). It must also be stressed that a prevalent number of companies from the DAX index (similarly to companies from WIG-20) used employee share offers. With respect to ordinary share capital increases, the shares were offered mainly through closed and private subscription.

5. Analysis of the economic efficiency of Polish and German joint-stock companies that increased share capital

It can be assumed that the choice of the specific form and method of increasing share capital depends on a number of factors/determinants aimed at achieving high economic efficiency for a company. It can be observed that such efficiency shows a different sensitivity to nominal and effective share capital increases. This observation is of great importance in the practice of strategic management of listed companies' equity.

One tool that enables one to calculate, in a synthetic way, measures of economic efficiency is, among others, DEA – Data Envelopment Analysis.[3] The efficiency ratio measured by this method can be described as a quotient of the weighted sum of inputs (Dyckhoff, Allen, pp. 411-436):

$$e = \left(\sum_{r=1}^{s} \mu_r \times Y_r\right) / \left(\sum_{i=1}^{m} v_i \times X_i\right) \tag{3}$$

where:

e– measure of efficiency,
s– number of outputs,
m– number of inputs,
μ_r– weights describing significance of individual outputs,
v_i– weights describing significance of individual inputs.

It is noted in the economic literature that the DEA method does not require previous knowledge of weights which determine the significance of individual outlays and effects, as in the course of calculations weights maximizing the efficiency of each object are generated.[4] Depending on the purpose of the analysis and assumed research assumptions, the DEA method offers an opportunity to calculate three forms of efficiency measures i.e. input-oriented efficiency, output-oriented efficiency, and efficiency without orientation. Moreover, there is the possibility to estimate efficiency measures in three categories: constant economies of scale, changeable economies of scale, and non-growing economies of scale (Banker et al. 1984, pp. 92-1078; Fäare et al. 1985; Kleine 2002, p. 210).

For the needs of this study a variant oriented at inputs with constant economies of scale was applied. The choice of such a model was influenced by the research problem i.e. the assessment of company efficiency in terms of minimizing individual inputs (factors determining economic efficiency). As the outputs, classical measures of unit returns were adopted (sales, total assets and

[3] In the Polish literature the DEA method is known as the frontier analysis method or data envelopment analysis. It must be stressed that there are numerous publications in which the DEA method was applied to assess the efficiency of various entities e.g. power houses, hospitals, insurance companies, colleges, farms, joint-stock companies, industry sectors; or to evaluate efficiency of investment on the capital market. This method is most commonly used in the banking sector. Compare: Varmaz (2006), p. 235; Rogowski (1996), p. 4-48; Feruś (2006); Hülsmann, Peters (2007).

[4] In the DEA method the units are described as decision making units (DMU), whereas the subject of the analysis is the efficiency with which a specific DMU transforms inputs into specific outputs.

equity), whereas inputs were ratios of share capital dynamics, financing total assets with share capital, and equity dilution (see Table 4).[5]

Table 4. Inputs and outputs in the DEA model

Forms of increasing share capital	Methods of increasing share capital	Inputs	Outputs
Effective	Ordinary	$\Delta SC, SCTA, BVPS$	$ROS, ROTA, ROE$
	Conditional		
	Authorized share capital		
Nominal	Capitalization of reserves		

Source: own study.

In analyzing the calculated measures of efficiency of examined companies it must be pointed out that there are significant differences between units included in the WIG-20 and DAX indices. First of all, it can be said that in the analysed decade a much higher efficiency of sales was observed in the Polish companies than in the German ones. This is confirmed by mean values of return ratios in Polish companies, which were several, and in some cases even several dozen percentage points higher than in the companies from the German trading floor (see Table 5). What is especially worth noting here are the deviations between 2008-2009 (sometimes described as the period of economic downturn or crisis)[6], in which companies from WIG-20 achieved a higher return on sales, whereas companies from the DAX index experienced the opposite.

Table 5. Mean values of return on sales (ROS), return on total assets (ROTA) and return on equity (ROE) in companies from WIG-20 and DAX indices between 2003-2012 (in %)

Ratios	Companies /indices	Years									
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
ROS	WIG-20	8.0	12.6	16.8	18.8	20.3	22.2	23.8	26.0	17.1	18.5
	DAX	1.7	5.3	6.3	7.8	9.5	3.4	0.5	7.2	7.8	6.1
ROTA	WIG-20	3.1	6.0	6.7	7.7	7.5	4.9	5.2	6.7	6.0	7.5
	DAX	1.6	4.0	4.2	5.3	5.5	3.1	1.3	4.2	4.4	3.7
ROE	WIG-20	8.0	13.1	16.0	17.0	18.7	13.2	12.5	14.8	13.7	16.3
	DAX	5.0	13.7	14.3	17.9	18.7	8.6	4.2	14.0	13.0	9.8

Source: same as in Table 2.

[5] What must be stressed here is the contractual character of the notions "inputs" and "outputs". As far as connection of the term "output" with returns is justified in this study, the term "inputs", which usually refers to costs, is used only to perform the role of customary terminology used in the terminology of DEA method.

[6] The situation in the financial markets that emerged in 2007 is compared to the Great Depression from the period between 1929-1933. Compare: Dach (2011), pp. 33-36.

Empirical research into the return on total assets ratios indicates the existence of significant differences between the Polish and German enterprises. It must be pointed out that in the companies from WIG-20 mean values of the analysed ratios were a few percentage points higher than in the companies from DAX index. Thus the results of the study confirm a higher economic efficiency of Polish units in terms of using total assets in their operations. What seems extremely interesting here is the similar trend in return on assets in the entire analysed period on both trading floors (see Table 5).

Calculated mean values of return on equity in the companies from WIG-20 index were definitely higher than in the German companies (the only exceptions were the values achieved in 2004 and 2006). The analysis of return on equity in the Polish and German entities in the analysed decade allows one to differentiate three sub-periods:

1. The period between 2003-2007, in which return on equity showed a positive trend,
2. The period between 2008-2009, in which companies achieved definitely lower financial results in relation to equity, and
3. The period between 2010-2012 which was characterized by a higher return of equity than in the previous sub-period; however the changes were diversified in character; the latest analysed research period is worth noting, as a reversal in the trend of changes then appeared.

The observation of changes in the volume of return on sales, total assets and equity ratios allows one to claim that the Polish companies, in a majority of cases, achieved a greater economic efficiency in the analysed decade than the German companies examined. In case of the latter, the major problems in achieving profitability were observed in the period between 2008-2009. It seems that companies from WIG-20 experienced to a lesser extent the negative effect of the collapse in capital markets and the global recession at this time. The results of research on the efficiency of companies from the DAX index confirm the hypotheses then put forward, and it may be stated that the effects of the insolvency of American institutions reached Europe immediately, especially Germany.[7]

The results of the analysis of efficiency measures in those companies increasing share capital,[8] calculated by means of DEA Frontier[9] for the

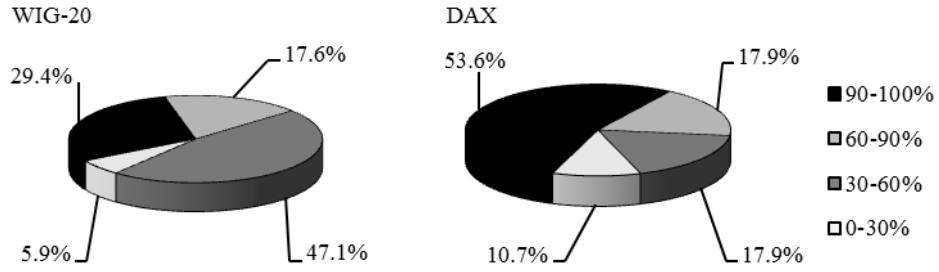
[7] Compare: *Niemcy w obliczu kryzysu finansowego w USA*, www.dw-world.de (access 14.09.2013); *Kryzys finansowy objął Europę*, www.wprost.pl (access 14.09.2013).

[8] The companies that were excluded from the analysis were those that between 2003-2012 maintained share capital on the same level i.e. three enterprises from the WIG-20 (KGHM, PZU, TP) and two from DAX (BASF, ThyssenKrupp).

[9] Free version available on the website within the study: W.D. Cook, J. Zhu, *Data Envelopment Analysis: Modeling Operational Processes and Measuring Productivity*, 2008.

examined ten periods (i.e. each of the years between 2003-2012)[10] indicated that nearly 30% of companies from the WIG-20 index showed efficiency on the level of 90-100%, based on the assumption that "outputs" took the form of return on sales, total assets, and equity, and that "inputs" took the form of indicators of share capital dynamics, financing total capital with share capital and equity dilution[11] (see Figure 2). High values in efficiency measures were noted in more than 50% of the companies from DAX index. Significant differences between the Polish and German entities were visible also in reference to the DEA measures indicating companies' lower efficiency (30-60%).

Figure 2. The structure of analysed companies from the WIG-20 and DAX indices based on their efficiency between 2003-2012



Source: same as in Figure 1.

A detailed analysis of the examined entities from the WIG-20 index indicates that the highest efficiency was noted in three joint stock companies: Eurocash, GTC, and Kernel (see Table 6). The measures of efficiency in their cases were at the level of 100%. Equally high efficiency, from the point of view of DEA (nearly 100%), was observed in two companies: Pekao and PGNiG. On the other hand, the lowest degree of efficient use of opportunities for increasing share capital was observed in the case of PGE, for which the efficiency measure amounted to only 6%.

When making an attempt to differentiate the efficiency of companies from the WIG-20 index with respect to the methods applied to increase share capital, it must be said that no significant dependence between these variables was

[10] Specific efficiency measures were calculated on the basis of mean values of specific inputs and outputs for the period between 2003-2012.

[11] Taking into consideration the constraints of the DEA method (positive values of inputs and outputs), negative values of specific inputs and outputs were replaced by a zero value. Compare: Feruś (2006), p. 50.

observed. High efficiency from the point of view of DEA was achieved by the companies that, in the analysed period, took a decision to increase ordinary share capital as well as those which chose a conditional increase.

Table 6. Mean values of efficiency of analysed companies from the WIG-20 index and the methods of increasing share capital between 2003-2012

Joint-stock companies	DEA measures	Number of AGM decisions in the division into methods of increasing share capital			
		Ordinary	Conditional	Authorized share capital	Capitalization of reserves
Asseco Poland	0.39	6	1	–	–
Bogdanka	0.34	1	–	–	–
BRE Bank	0.44	2	8	–	–
BZ WBK	0.70	1	1	–	–
Eurocash	1.00	1	7	–	–
Grupa Lotos	0.48	2	–	–	–
GTC	1.00	3	2	–	–
Handlowy	0.49	–	1	–	–
JSW	0.43	1	–	–	–
Kernel	1.00	3	–	–	–
Pekao	0.97	–	9	–	–
PGE	0.06	2	1	–	–
PGNiG	0.91	1	–	–	–
PKN Orlen	0.47	–	2	–	–
PKO BP	0.81	1	–	–	–
Synthos	0.78	1	–	–	–
Tauron	0.37	1	1	–	–

Source: same as in Table 2.

As an example, we can examine companies with 100% efficiency i.e. Eurocash and Kernel. In the former the strategy of share capital increase focused mainly on offering shares to employees within a so-called managerial offer, i.e. a conditioned method of increasing capital. On the other hand, in Kernel strategic decisions concerning capital increase were oriented at offering shares through advertisement aimed at people who did not have pre-emptive rights (open subscription). It must be stressed that companies with a high degree of efficiency (DEA measures higher than 0.9) mostly chose a conditioned share capital increase. This was the case in 76% of the companies.

Table 7. Mean measures of efficiency in the analysed companies from the DAX index and the methods of increasing their share capital between 2003-2012

Joint-stock companies	DEA measures	Number of AGM decisions in the division into methods of increasing share capital			
		Ordinary	Conditional	Authorized share capital	Capitalization of reserves
Adidas	1.00	–	5	–	1
Allianz	1.00	3	10	–	–
BAYER	0.50	–	1	1	
Beiersdorf	1.00	–	–	–	1
BMW	1.00	–	2	–	–
Commerzbank	0.04	3	5	–	–
Continental	0.60	3	5	–	–
Daimler	0.38	5	8	–	–
Deutsche Bank	1.00	1	5	2	–
Deutsche Börse	1.00	–	–	–	1
Deutsche Lufthansa	0.36	2	2	–	–
Deutsche Post	0.68	–	4	–	–
Deutsche Telekom	0.17	3	–	–	–
E.ON	0.83	1	–	–	–
Fresenius	1.00	7	4	1	1
Fresenius Medical Care	1.00	5	2		1
HeidelbergCement	0.72	1	1	5	2
Henkel	1.00	–	–	–	1
Infineon Technologies	0.00	1	2	–	–
K+S	1.00	2	–	–	–
LANXESS	0.36	1	–	1	–
Linde	1.00	1	8	1	–
Merck	1.00	1	3	–	–
MünchenerRück	0.43	1	1	–	–
RWE	1.00	–	–	1	–
SAP	1.00	1	6	1	1
Siemens	0.66	–	2	–	–
Volkswagen	1.00	–	5	–	–

Source: same as in Table 2.

A significant diversification between methods of share capital increase and calculated measures of efficiency was observed in the case of Polish companies with a low or moderate degree of efficiency. In enterprises in which

DEA measures were below 0.9, more than a half of AGM decisions chose to employ an ordinary share capital increase, whereas the others chose a conditioned form. On the other hand, PGE, in which the least efficiency was observed, when making three strategic decisions on increasing share capital twice chose an ordinary mode, including both open and private subscription.

In analysing the entities from the DAX index, it should be noted that in the analysed decade one hundred percent efficiency in increasing share capital was achieved by 15 companies (see Table 7).

Three German companies proved to be inefficient from the DEA point of view: Commerzbank, Deutsche Telekom and Infineon Technologies. In the latter case, as it experienced unprofitability in many analysed periods the calculated measures of efficiency showed zero efficiency of increasing share capital in relation to achieved returns. When assessing the influence of the method of share capital increase on efficiency in companies from the DAX index, it should be noted that in those entities with one hundred percent efficiency, the strategies of increasing share capital were diversified. However, it should also be stressed here is that the most prevalent decisions concerned a conditional capital increase, which was the case in 60% of entities. Strategic decisions in this area focused mainly on offering shares to employees that were paid from their due share in profits.

A conditional increase (also based on employee share schemes) was prevalent among companies with moderate or low efficiency. They did not use capitalization of reserves, inasmuch as the strategy of increasing share capital from a company's own resources was used in those companies with efficiency higher than 60%. However, the least efficient entities from the DEA point of view took decisions about both ordinary share capital increases (mostly in the form of private subscription) and conditional increases. This form of target capital was chosen by the most of companies with efficiency on the level between 60-90%.

6. Conclusions

The analysis of the degree of efficiency diversification in public joint-stock companies that increased their share capital allows one to state that in the analysed period 2003-2012 the companies listed on the Warsaw Stock Exchange and the Frankfurt Stock Exchange implemented diverse financial strategies. However, a certain regularity in the choice of specific methods of share capital increase, as well as shaping their economic efficiency, can be noted.

Taking into consideration all the analysed periods, attention should be drawn to the less significant changes in the book value of share capital in the companies from DAX index than in the companies from WIG-20 index. Moreover, the proportion of share capital in total assets in the Polish companies proved to be higher than in the German ones. Analogical conclusions can be drawn based on an analysis of ratios of equity dilution, which confirmed a greater stability of share capital in the companies from the German trading floor. In spite of this, the analysed relations pointing toward a strategy for shaping share capital in companies from the WIG-20 and DAX indices turned out to be convergent in many analysed periods.

Contrary to the German companies, the Polish entities did not use authorized share capital and capitalization of reserves. They based their financial strategies solely on the methods for effective increasing of share capital. It must be noted that among the companies listed on the Polish and German stock exchanges, the form that prevailed was a conditional share capital increase, especially within employee share schemes. On the other hand, ordinary capital increases were implemented mainly through private or closed subscription.

In both the Polish and German analysed enterprises no explicit impact of the methods for increasing share capital on the economic efficiency achieved was observed. It should also be noted that companies from the WIG-20 index generated, in the examined decade, much higher returns on sales, equity or total assets than companies from DAX index. However, among the latter there were more cases in which DEA measures of efficiency were equal to 1, which attests to the highest degree of using share capital increase in relation to achieved returns. Based on a detailed analysis of the interdependence between methods of increasing book value of share capital in the analysed companies and economic efficiency, measured by the DEA method, it must be noted that the choice of form of capital increase does not differentiate in a clear way the entities' efficiency. The presented empirical research findings thus do not recognize the assumed hypothesis as fully confirmed.

It is worth pointing out that the conducted empirical research refers only to public companies from specific indices, and based on its limited scope and the selected time period, it does not aspire to formulate general conclusions. The findings are just partial evidence that there is some diversified impact of changes in financial strategy on the degree of the efficiency of the Polish and German joint stock companies.

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Streszczenie

STRATEGIE PODWYŻSZANIA KAPITAŁU ZAKŁADOWEGO A EFEKTYWNOŚĆ SPÓŁEK GIEŁDOWYCH – POLSKO-NIEMIECKIE STUDIUM ANALITYCZNO-PORÓWNAWCZE

Wiodącym nurtem badań teoretyczno-empirycznych zaprezentowanych podjętych w opracowaniu stanowi porównawcza analiza wpływu określonych strategii kształtowania kapitału zakładowego na efektywność ekonomiczną spółek notowanych na polskim i niemieckim rynku kapitałowym. Przedstawiony problem badawczy realizowany jest w trzech częściach. Rozważania zawarte w części pierwszej zawierają ocenę możliwych powiązań efektywności działania przedsiębiorstwa z procesem podwyższania kapitału zakładowego. W części drugiej znajdują się wyniki badań empirycznych nad zmianami kapitału zakładowego badanych spółek wchodzących w skład indeksu WIG-20 oraz DAX, zaś część trzecia zawiera wyniki badań ich efektywności w kontekście wykorzystywanych metod podwyższania kapitału zakładowego.

Ocena efektywności publicznych spółek giełdowych została przeprowadzona za pomocą nieparametrycznej metody DEA, z wykorzystaniem miar zorientowanych na nakłady oraz stałych efektów skali. Za efekty(wyniki) przyjęto współczynniki rentowności sprzedaży, kapitału własnego oraz aktywów całkowitych, zaś za nakłady uznano wskaźniki dynamiki kapitału zakładowego, sfinansowania majątku całkowitego kapitałem zakładowym oraz rozwodnienia kapitału własnego.

***Słowa kluczowe**: kapitał zakładowy, podwyższanie kapitału zakładowego, efektywność, polskie i niemieckie spółki akcyjne*

Contents