THE FINANCIAL SOURCES OF INVESTMENT ACTIVITY – A CASE OF POLISH ENTERPRISES

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Abstract: The main objective of the article is the diagnosis of investment activity's financial sources in Polish enterprises. In this respect the special emphasise was put on the examinations of the following funding sources for enterprises' investment expenditures: own means, budgetary means, domestic loans and borrowings, total means directly from overseas, means directly from overseas (of which bank loan), other sources. Moreover, the particular attention was focused on comparative analysis of enterprises' investment activity financial sources in NUTS of Poland scope. The research was based on measures of position and cluster analysis on the base which was isolated space groups. The examinations were based on data from Central Statistical Office of Poland in the scope of the period 2008-2013.

Keywords: financial sources of investment activity, investment activity.

1. Introduction

Turbulent conditions of the contemporary enterprises' functioning require undertaking a set of activities that aims to adjust to the changing surrounding. Due to the dynamic surrounding the maintenance of enterprises on the market and remain competitive involve taking actions at various levels of business activity. In this respect the special place constitute investment processes, which contribute to increase the adaptability of enterprises to the surrounding.

The enterprises' activity in terms of investment is closely connected with the availability of funding sources for investment expenditures. Restrictions or deficiency of capital essential for investment activity might determine a significant barrier of enterprises' development.

The main aim of the research is the diagnosis of investment activity's financial sources in the Polish enterprises scope and its diversity between particular NUTS of Poland. The studies use data from Central Statistical Office of Poland. The examinations were concerned on the period 2008-2013.

2. The issue of enterprises' investment activity

Maintenance and increase the competitive position of the enterprises is closely linked nowadays to their investment activity. The investment is the base of improving the enterprises' resources usage and successfully realization their strategies. In its issue enterprises' investment activity is strictly connected with regions development. Noticeable duality in that aspect is expressed mainly in considering the investment as an essential factor of the regions' competitiveness. In consequences, improving enterprises' entrepreneurship might increase regions' competiveness[1]. In this respect investment activity is included to the factors which determining the endogenous region's capacity to respond at changes in the macro surrounding. These group of determinants expressed regions reaction force on the exogenous changes[2].

On the other hand, enterprises' investment activity should be stimulate from regional level. From this point of view, it is necessary to create appropriate conditions to stimulation enterprises' investment activity.

The issue of investment activity is closely related to the selection of financial sources for investment expenditures. In this context, financial capital should be regard as the base for regions'

development[3]. However, it should be emphasize that the issues connected with choice of the financial sources for investment activity distinguish complexity. In this respect enterprises should put the special attention, among others, on capital structure, cost of capital, financial risk and enterprises' financial situation.

3. The methodology of the research

The undertaken examinations were concerned on the sources of financing investment activity of Polish enterprises. Particular attention was put on such financial sources as: own means, budgetary means, domestic loans and borrowings, total means directly from overseas, means directly from overseas (of which bank loan) and other sources.

The studies were divided into two parts. Firstly, it was made the diagnosis of the particular investment activity's financial sources dynamics in the period 2008-2013. To analysis were used dynamics and structure measure and measures of position.

Secondly, the examinations were concentrated on the comparison of enterprises' financial sources for investment activity between regions in Poland (NUTS). For this reason was used cluster analysis on the base which was isolated space groups, which allowed to indicate enterprises' investment activity financial sources in NUTS of Poland scope. To research were chosen the following variables:

x_1 – the average value of own means in financing enterprises' investment activity in particular NUTS of Poland scope (PLN).
x_2 – the average value of budgetary means in financing enterprises' investment activity in particular NUTS of Poland scope (PLN).
x_3 – the average value of domestic loans and borrowings in financing enterprises' investment activity in particular NUTS of Poland scope (PLN).
x_4 – the average value of total means directly from overseas in financing enterprises' investment activity in particular NUTS of Poland scope (PLN).
x_5 – the average value of means directly from overseas (of which bank loan) in financing enterprises' investment activity in particular NUTS of Poland scope (PLN).
x_6 – the average value of other sources in financing enterprises' investment activity in particular NUTS of Poland scope (PLN).
x_7 – the average value of enterprises' investment expenditures in particular NUTS of Poland scope (PLN).
x_8 – the average number of enterprises per 10 thousand inhabitants in particular NUTS of Poland scope.

Above variables were used to construct the matrix ($X=[x_{ij}]$), which constitute the basis for comparison of enterprises' investment activity financial sources in NUTS of Poland scope. In the following step the define data matrix ($X=[x_{ij}]$) was standardized, according to the following formula[4]:

$$z_{ij} = \frac{x_{ij} - \overline{x}_j}{S_j} \quad \text{, when } x_j \text{ is stimulant} \tag{1}$$

or

$$z_{ij} = \frac{\overline{x}_j - x_{ij}}{S_j} \quad \text{, when } x_j \text{ jest destimulant} \tag{2}$$

where:

z_{ij}– standardized diagnostic atribute x_{ij},

$$\overline{x}_j = \frac{1}{n} \sum_{j=1}^{n} x_{ij} \tag{3}$$

[1] Zygmunt, A.: *R&D Expenditures in Poland. Voivodship Perspective*, „*Regional Barometer*", Tom 12 Nr 2 2014, ISSN 1644-9398, pp. 14.
[2] Brol, R.: *Rozwój regionalny jako kategoria ekonomiczna* [in] Strahl, D. (ed.): *Metody oceny rozwoju regionalnego*, Wrocław: Wydawnictwo Akademii Ekonomicznej im. Oskara Langego, 2006. ISBN 83-7011-723-6. pp 16-19; Kogut-Jaworska, M: *Instrumenty interwencjonizmu lokalnego w stymulowaniu rozwoju gospodarczego*, Warszawa: CeDeWu, 2008. 978-83-7556-108-1. pp. 28.
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$$S_j = \sqrt{\frac{1}{n}\sum_{i=1}^{n}\left(x_{ij} - \overline{x}_j\right)^2} \qquad (4)$$

Next, it was selected the probability measure[5]:

$$d_{ij} = \sqrt{\sum_{k=1}^{m}\left(z_{ik} - z_{jk}\right)^2} \qquad (5)$$

where:

d_{ij} – taxonomic distance defined as the Euclidean distance in n-dimensional space between two test objects; m - the number of attributes (variables); i = 1, ..., n; n = 1, ..., n; n - the number of objects, z_{ik}, z_{jk} – standardized size of diagnostic attributes.

Above procedure allowed to isolate space groups (the clusters of the first order)[6], which enabled the comparison of enterprises' investment activity financial sources in NUTS of Poland scope. The examinations included the period 2008–2013 which was conditioned by the availability of data from Central Statistical Office of Poland.

4. The dynamics of financial sources of Polish enterprises' investment - research results

The effects of examinations conduct to the conclusions about the changing dynamics of the various sources of financing investment activity in Polish enterprises' in the period 2008–2013 (table 1–table 7). Identified appearance might results from very dynamics surrounding of enterprises' activity, which performed during analysed period and was mainly associated with world economy trends. Consequently, external factors might impact on enterprises' financial situation and their competeveness level. As a result, these processes might affected on the risk of investment activity and its financial sources. Hence, the calculated dynamics might constitute the implication of the enterprises' necessity to adaptation to the changes in the economy.

Table 1. The dynamics of the total average value of financial sources for investment activity in Polish enterprises in the period 2008–2013 (according to the measures of position).

Quartile	2009	2010	2011	2012	2013	2009 –2013
First	-21%	-11%	6%	-13%	-5%	-9%
Median	-17%	-2%	11%	-3%	0%	-2%
Third	-10%	4%	23%	1%	10%	5%

Legend: Previous year = 100
Source: Own calculations based on data from Central Statistical Office of Poland:
http://stat.gov.pl/bdl/app/dane_podgrup.display?p_id=545869&p_token=0.16510106120341306 [access: 14.12.2015].

Table 2. The dynamics of the average value of own means in financing investment activity in Polish enterprises in the period 2008–2013 (according to the measures of position).

Quartile	2009	2010	2011	2012	2013	2009 –2013
First	-20%	-10%	7%	-9%	-7%	-8%
Median	-15%	-1%	12%	-4%	-1%	-2%
Third	-7%	9%	24%	8%	11%	9%

Legend: Previous year = 100
Source: see table 1.

Table 3. The dynamics of the average value of budgetary means in financing investment activity in Polish enterprises in the period 2008–2013 (according to the measures of position).

Quartile	2009	2010	2011	2012	2013	2009 –2013
First	-4%	0%	-12%	-15%	-15%	-9%
Median	3%	18%	7%	-4%	7%	6%
Third	30%	51%	24%	14%	26%	29%

Legend: Previous year = 100
Source: See table 1.

Table 4. The dynamics of the average value of domestic loans and borrowings in financing investment activity in Polish enterprises in the period 2008–2013 (according to the measures of position).

Quartile	2009	2010	2011	2012	2013	2009 –2013
First	-33%	-31%	-9%	-22%	-11%	-21%
Median	-27%	-12%	17%	-12%	1%	-6%
Third	-1%	1%	49%	-1%	46%	19%

Legend: Previous year = 100
Source: See table 1.

Table 5. The dynamics of the average value of total means directly from overseas in financing investment activity in Polish enterprises in the period 2008–2013 (according to the measures of position).

Quartile	2009	2010	2011	2012	2013	2009 –2013
First	-40%	-34%	-43%	-38%	-14%	-34%
Median	-12%	1%	-3%	-9%	19%	-1%
Third	15%	39%	45%	32%	63%	39%

Legend: Previous year = 100
Source: See table 1.

Table 6. The dynamics of the average value of means directly from overseas (of which bank loan) in financing investment activity in Polish enterprises in the period 2008–2013 (according to the measures of position).

Quartile	2009	2010	2011	2012	2013	2009 –2013
First	-82%	-66%	-75%	-88%	-48%	-72%
Median	-18%	-27%	-12%	-51%	11%	-20%
Third	52%	31%	250%	115%	123%	114%

Legend: Previous year = 100
Source: See table 1.

Table 7. The dynamics of the average value of other sources in financing investment activity in Polish enterprises in the period 2008–2013 (according to the measures of position).

Quartile	2009	2010	2011	2012	2013	2009 –2013
First	68%	71%	90%	68%	91%	77%
Median	97%	118%	130%	81%	101%	105%
Third	125%	146%	264%	108%	167%	162%

Legend: Previous year = 100
Source: See table 1.

The calculations show that among analysed investment activity's sources of financing the most significant dynamics distinguish other sources (table 7). The conducted research indicate the increasing rank of above financial source of investment activity during analysed period. During the years 2008–2013 in half of Polish enterprises dynamics of other sources of investment financing was higher on average than 105%, while in three quarters of enterprises higher on average than 77%. This occurrence means that Polish enterprises notice the importance of searching new sources of financing investment expenditures.

The results of studies indicate also relatively high discrepancy between dynamics of means directly from overseas (of which bank loan) in Polish enterprises (table 6). During analysed period

[5] Młodak, A.: *Analiza taksonomiczna w statystyce regionalnej*. Warszawa: Difin, 2006. ISBN 8372516057. pp. 48.
[6] Heffner, K., Gibas, P.: *Analiza ekonomiczno-przestrzenna*, Katowice: Wydawnictwo Akademii Ekonomicznej w Katowicach, 2007. ISBN 9788372468451, pp. 69-72.

the dynamics of financial source in question was in one quarter of enterprises higher on average than 114%, while in another one quarter lower on average than -22%. Identified dynamics, in connection with relatively lower dynamics of total means directly from overseas (table 5), allows to the conclusion about a comparatively decrease in analysed sources of financing enterprises' investment activity. This situation might result from increased financial risk and the level of means directly from overseas availability. Furthermore, financial risk level and the financial sources' availability might also cause the dynamics decrease in usage of domestic loans and borrowings as financial sources of investment activity by the majority of Polish enterprises. The effects of research emphasise that in period 2008–2013 in half of enterprises the dynamics of analysed source of financing investment activity was higher on average than -6%.

The conducted studies allow to highlight variable dynamics of budgetary means in financing investment activity of Polish enterprises in the period 2008–2013 (table 3). According to obtained results in one quarter of Polish enterprises the dynamics of budgetary means use for investment activity was higher on average than 29%, while in another quarter lower on average than -9%. The fluctuation of budgetary means' dynamics as a financial source of investment activity might constitute in analysed period from the conditions of their availability for enterprises and, in consequences, might influence on investment expenditures of enterprises.

Moreover, the estimations emphasize the lowest dynamics of own means, in comparison to other analysed enterprises' financial sources of investment activity (table 2). The calculations shows that in the period 2008–2013 the dynamics of financial source in question was in half of Polish enterprises lower than -2%.

4. The effects of the comparison of enterprises' financial sources for investment activity between regions in NUTS of Poland scope

The results of conducted research allow to isolate four space groups involving regions of Poland in terms of enterprises' financial sources for investment activity in the period 2008–2013 (table 8–table 11).

Obtained results indicate the greatest similarity in financial sources of enterprises' investment activity in the period 2008–2013 between regions NUTS PL33 (8) and NUTS PL62 (16) (table 11). Regions in question distinguish the similar average number of enterprises per 10 thousand inhabitants as well as the similar average value of enterprises' investment expenditures. In relations to other regions enterprises from highlighted regions characterize relatively low average value of own means and total means directly from overseas as the sources of investment expenditure covering. Moreover, for specified regions was recognized relatively low average value of other sources in financing enterprises' investment activity.

Taking into account accepted variables the relatively high similarity in usage of enterprises' financial sources for investment activity appeared in analysed period between regions NUTS PL34 (7) and NUTS PL62 (16) and between regions NUTS PL43 (9) and NUTS PL52 (13) (table 10 and table 11). In comparison to NUTS PL62 (16), NUTS PL34 (7) differentiate higher average usage of total means directly from overseas and other sources and simultaneously relatively lower average value of means directly from overseas (of which bank loan). On the other hand, regions NUTS PL43 (9) and NUTS PL52 (13) characterize relatively the slightest average number of enterprises per 10 thousand inhabitants in comparison to other regions in Poland. Enterprises from these regions distinguish relatively high (on average) value of investment expenditures with relatively high average involvement of domestic loans and borrowings and other sources. Furthermore, regions in question, in relations to the others, have relatively the lowest average

value of budgetary means as the source of financing investment processes.

Table 8. The presentation of the first order clusters (I group)

I group			
Region symbol		5	6
Variables	x_1	3079	2401
	x_2	182	171
	x_3	337	580
	x_4	161	176
	x_5	9	38
	x_6	66	126
	x_7	749	714
	x_8	4068	4778
Summary of the closest elements		5-6	
Miminal taxonomic distance		0.44	

Legend: 5 – NUTS PL31, 6 – NUTS PL32
Source: Own calculations based on data from Central Statistical Office of Poland:
http://stat.gov.pl/bdl/app/dane_podgrup.display?p_id=545869&p_token=0.16510106120341306 [access: 14.12.2015];
http://stat.gov.pl/bdl/app/dane_podgrup.display?p_id=73167&p_token=0.6954289305055666 [access: 14.12.2015];
http://stat.gov.pl/bdl/app/dane_podgrup.display?p_id=73269&p_token=0.5784680957681978 [access: 14.12.2015].

Table 9. The presentation of the first order clusters (II group)

II group							
Region symbol		2	3	4	10	12	15
Variables	x_1	28800	5916	11084	8392	7042	4939
	x_2	2188	295	432	208	196	161
	x_3	3312	890	1529	1149	1212	990
	x_4	3543	329	491	445	559	1682
	x_5	739	50	139	178	154	1385
	x_6	1705	607	545	428	244	460
	x_7	1290	987	961	1094	1135	1136
	x_8	28920	8030	17072	10747	11827	8480
Summary of the closest elements		2-4	3-10	4-10	10-12	10-15	
Miminal taxonomic distance		7.49	1.09	1.49	0.61	3.78	

Legend: 2 – NUTS PL12, 3 – NUTS PL21, 4 – NUTS PL22, 10 –NUTS PL41, 12 – NUTS PL51, 15 –NUTS PL63.
Source: See table 8.

The study shows that relatively high similarity in financial sources of enterprises' investment activity scope is also noticeable between regions NUTS PL31 (5) and NUTS PL32 (6) (table 8). The mentioned regions characterize medium number of enterprises per 10 thousand inhabitants, when from other regions perspective the average value of enterprises' investment expenditures in regions in question is the slightest. This occurrence indicates the necessity to increase efforts in development of investment processes in enterprises scope, which might constitute in enhancing their competitiveness, and in consequences, their regions.

Table 10. The presentation of the first order clusters (II group)

III group			
Region symbol		9	11	13
Variables	x_1	1196	2446	1273
	x_2	58	115	63
	x_3	237	547	282
	x_4	114	284	87
	x_5	24	32	12
	x_6	49	209	60
	x_7	1033	1265	961
	x_8	2641	4592	2679

Summary of the closest elements	9-11	9-13	
Miminal taxonomic distance	1.54	0.43	

Legend: 9 – NUTS PL43, 11 – NUTS PL42, 13 – NUTS PL52.
Source: See table 8.

Table 11. The presentation of the first order clusters (IV group)

		IV group				
Region symbol		1	7	8	14	16
Variables	x_1	5039	1139	1856	2847	1179
	x_2	223	91	116	135	99
	x_3	1509	315	365	559	372
	x_4	362	211	125	285	75
	x_5	218	1	37	16	2
	x_6	235	70	81	170	58
	x_7	917	772	846	897	819
	x_8	8435	2230	3086	6028	2888
Summary of the closest elements		1-14	8-14	8-16	7-16	
Miminal taxonomic distance		1.39	0.76	0.23	0.34	

Legend: 1 – NUTS PL11, 7 – NUTS PL34, 8 – NUTS PL33, 14 – NUTS PL61, 16 – NUTS PL62.
Source: See table 8.

Furthermore, the examinations results distinguish comparatively high similarity in terms of enterprises' investment activity financial sources between regions NUTS PL41 (10) and NUTS PL51 (12) (table 9). The high close match was observed especially in the relatively the highest (in comparison with other Polish regions) average value of financing investment expenditure by own means. Simultaneously, it has to be underline that the enterprises from regions in question highlight (during the period 2008–201) relatively the highest value of domestic loans and borrowings and total means directly from overseas in financing investment activity.

Obtained outcomes, achieved by cluster analysis application, allow to the conclusion about the slightest similarity in enterprises' financial sources of investment activity between regions NUTS PL12 (2) and NUTS PL22 (4) (table 9). Apart from relatively the very high number of average enterprises per 10 thousand inhabitants and the (on average) very high value of own means in financing investment activity, enterprises from mentioned regions differentiate particularly in usage of budgetary means, domestic loans and borrowings, means directly from overseas (of which bank loan) and other sources to financing investment activity.

Additionally, the study shows relatively high discrepancies between regions NUTS PL41 (10) and NUTS PL63 (15) in financial sources for enterprises' investment activity scope (table 9). The results of examinations indicate that region NUTS PL63 (15), compared with the region NUTS PL41 (10) distinguish significantly higher average value of means directly from overseas (of which bank loan), while also significantly lower average value of own means in financing enterprises' investment activity.

Conclusions

The conducted research lead to the several conclusions. First of all, the obtained results allow to the conclusion about differential dynamics of financial sources average value for investment activity in Polish enterprises in the period 2008–2013. Above appearance might arise from business surrounding changes resulted especially from the macroeconomic conditions.

Consequently, this occurrence might affect the level of enterprises' financial risk and thus to chosen particular financial source for investment activity.

Furthermore, the obtained results enable to indicate significant diversity of financial sources for enterprises investment activity between regions in Poland (NUTS) in the period 2008–2013. This situation might results from differ enterprises' availability to particular sources of finance for investment activity.

The complexity of enterprises' financial sources of investment activity requires further studies. They should be concentrated on the identification of the determinants, which might affect the improvement of Polish enterprises' investment activity and their decisions concerning the choice of financial sources for investment expenditures. Moreover, they should also concern on the particular region conditions, which might improve enterprises' investment decisions.

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