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Comparative analysis of liquidity ratios of bankrupt manufacturing companies

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Permanent monitoring of the financial condition of the market increases the chances of survival of the company among of increasing competition in the market. Integrated models are used in the evaluation of corporate bankruptcy. The author has analyzed five liquidity ratios (which have a predictive characteristics) of bankrupt and operating companies in the manufacturing sector in the period 2007-2012. In order to reflect changes in the financial condition of the examined companies, the author has analyzed the above-mentioned indicators during the year prior to bankruptcy. This article has attempted to designate the range limit of the liquidity ratios, below or above which there is over liquidity or the lack of liquidity in the manufacturing sector. The limit values were established for three analyzed indicators. However, for two liquidity ratios it was difficult to specify its limits values because of its positive values (caused by selling fixed assets by insolvent companies).

JEL Classifications: G01, G33, L6

Keywords: Bankruptcy, integrated models, liquidity, manufacturing

Introduction

Running a business in the conditions of increasing competition in the market and a constantly evolving customer preferences involves uncertainty regarding "intentional" success. Therefore, companies need to continuously adapt to changes. Businesses that are unable to adapt to changes in the market, are threatened by bankruptcy. At the end of 2012 according to data provided by the Central Statistical Office on Polish territory functioned almost four million businesses. More and more companies are operating in the market, only in 2009 and 2011, there were more companies that declared bankruptcy rather than established (see Figure 1).

In the second half of 2007 in the United States broke out the economic crisis that the domino effect (Mączyńska, 2008, p 13) moved to the whole world. Therefore, the outbreak of the economic crisis intensified the wave of bankruptcies. In Poland, the number of declared bankruptcy by courts since 2008 is growing steadily (see Figure 2). This is an unfavorable phenomenon, because companies can not cope with the changing market conditions.

The vast majority of companies that goes bankrupt has been liquidated - more than 80% in 2013 (see Figure 3).

To predict the bankruptcy of companies are used different types of integrated models. Such models allow us to evaluate a company holistically, quickly and low-cost. Using these tools, you can classify a company into one of the specified classes (healthy or sick). The result of typological classification of the company is its presence or absence in the market. For example, if a company is classified as a sick, this means that in the next reporting period will go bankrupt. Models of discriminant analysis are the most frequently used (Korol, 2010, p 96).

The initiator of using this analysis to predict corporate bankruptcy is E. Altman. He has developed many models. His first created model was presented in 1968 and consisted of five financial ratios (Altman, 1983). In Poland, the creation of similar models has started after the economic transformation in the 90-ies of XX century. Mączyńska is considered as one of the most famous Polish researchers in the bankruptcy of individuals and their forecasting. She has created many models of discrimination (Mączyńska, 1994; Mączyńska, Zawadzki, 2006). Mączyńska is not the only author of discriminatory models we can distinguish authors such as: Appenzeller i Szarzec (Appenzeller, Szarzec, 2004); Gajdka i Stos (Zaleska, 2002); Hadasik (Hadasik, 1998); Hamrol, Czajka i Piechocki (Hamrol, 2004); Holda (Holda, Micherda, 2007); Janek i Żuchowski (Prusak, 2005); Pogodzińska i Sojak (Pogodzińskiej i Sojaka, 1995); Prusak (Korol, Prusak, 2005). It should be emphasized that the Polish models are better in predicting financial condition of the companies in Polish economy than overseas models (Tomczak, 2009; Tomczak, 2010). It should also be noted that these models should not be the only analytical tool, based on which there is an assessment of the financial situation of the company (Adamska, Mączyńska, 2013, p. 193-209).

Integrated models are usually constructed on the basis of financial indicators. The basis source for many of these models are similar financial, in many cases they are even identical. The author analyzed 34 integrated models. He observed that the most frequently recurring indicator in the models is the current ratio. It is found in models such as Beaver, INE PAN, Gajdka i Stos, Prusak, Holda, Appenzeller (Hadasik). Besides the above-mentioned indicator it is used many others. What's more Altman constructed his models based on some of these indicators. It should be noted that the liquidity ratios have predictive characteristics. These distinguishing marks were observed by Tomczak and Górski (2011); Tomczak (2012), Tomczak and Górski (2012) in the study of the approaching insolvency of analyzed groups of companies. Due to the limit volume of the article, more information about the integrated models can be found in (Holda, Micherda, 2007; Kowalak 2008; Prusak, 2007).

Conducted research that basically came down to calculating values of liquidity ratios was based on financial reports of companies, which was taken from Emerging Markets Information Service (EMIS). In this database one can find the most important information regarding markets and companies.

In this article the author focuses on the sector in which most frequently announced bankruptcy - the manufacturing sector (see Figure 4). In the analyzed period has been specified more than 10,000 companies in the sector. The study period covers 6 years, from 2007 to 2012. Then, for listed companies liquidity ratios have been calculated, because many companies have difficulties with liquidity (Report Coface Poland, 2012).

The results of the calculated indicators are presented in graphical form. For the purpose of the article, the author has selected nearly 600 insolvent companies in the sector.

Since Polish accession to the European Union the most manufacturing companies went bankrupt (see Figure 4).

The purpose of this article is to evaluate the liquidity of insolvent companies in the year prior to bankruptcy in a given year and comparing these values with the values calculated for the sector. As a result, it will enable to evaluate the selected sample of bankrupt companies, and will indicate the level of risk of losing liquidity for companies in the sector. Analysis of liquidity has been treated as a complement to integrated models.

The study used the following methods:

- Studying literature.
- Case Studies.
- The study of financial liquidity ratios on the example of companies from the manufacturing sector.

Methodology of research

Companies declared bankrupt for many reasons. Bankruptcy can be considered as a tool for cleaning diseased companies from the market. One of the causes of business failure is the lack of monitoring of financial condition by companies (Mączyńska, 2013, p 24). Coface Poland has concluded in its report that in many cases the coming crisis in the company is possible to predict, because the deterioration of financial condition often does not come suddenly. The financial condition is gradually decreasing. The reason is often observed the decline in the company's liquidity (Report Coface Poland, 2012).

The article focuses on the analysis of liquidity of insolvent companies. Nearly 600 companies were analyzed which declared bankruptcy during 2008-2013 (since the outbreak of the crisis). First, these reports of companies were selected which has been available for a year prior to bankruptcy for each year from 2007 to 2012. One year before bankruptcy for 2007 was access to 51 reports, for 2008 was access to 30, 2009 was access to 42, 2010 was access to 78, 2011 was access to 87 and for 2012 was access to 23. A total of 311 reports, it gives slightly more than 50% of the analyzed reports. Then, the mean values were calculated of liquidity ratios for the manufacturing sector. The research sector has been done comprehensively because it was analyzed over 10,000 companies in the sector. After which, the average value of insolvent companies were compared with the average for the manufacturing sector. This comparison allows you to specify whether is significantly different mean value of indicators of insolvent companies from value industry average.

The selection of the sample companies

For the analysis were selected nearly 600 of insolvent companies in the manufacturing sector. Most of the analyzed companies are limited liability companies (see Figure 5).

In addition to the legal form of the analyzed companies it is worth showing the age of insolvent companies (see Figure 6). Assessing age of insolvent companies can be noted that the largest group of the analyzed companies were between 11 and 20 years of their "lives" on the market. Thus, the companies were not early-stage in the market, which means that they do not disappear from the market immediately after their establishment. Therefore they had a chance to react to the deteriorating financial condition, by using such as integrated models and financial analysis. In addition, it is worth noting that the total analyzed bankrupt companies employed 80,000 workers. This figure is the number of size of a small town. The manufacturing sector employs the highest number of people in the economy. If even one manufacturing company goes bankrupt it results in significant consequences for many people. So it is reasonable to analyze especially manufacturing companies.

Besides the analysis of bankrupt companies liquidity in the article was also performed an assessment of the manufacturing sector liquidity. The calculation of the average value of each financial ratios provides benchmarks for the selected industry, which will allow for an assessment of existing companies in the industry.

Liquidity analysis of selected companies in the manufacturing sector

More than 10 thousand companies from the sector were analyzed. Mean values of selected indicators, median and standard deviation were calculated on the basis of companies' financial statements. The summarized results of the research are presented in tables 1-5. The summarized results were used as a model to try to assess the liquidity of the insolvent companies for each specified year. Nearly 600 of bankrupt companies have been analyzed. Due to the lack of access to the financial statements for the one year prior to bankruptcy, the tested sample was only 311 companies.

In this section, it will be presented the following liquidity ratios:

- Size of working capital ratio (1),
- Size of working capital ratio (2),
- Current ratio,
- Quick ratio,
- Ccash ratio.

The first analyzed indicator is the size of working capital ratio (see table 1). It is assumed that a high level of working capital ratio means great involvement of working capital in the total assets, as well as high liquidity of the company. However, it should be noted that on the size of ratio influences the degree of wear and tear of fixed assets. Indicator value is relatively high, when the firm will have low level of fixed assets or a significant degree of wear. In this case, it will not mean a favorable situation of the company (Kusak, 2006 p. 46-47).

Analyzing the first indicator, it can be concluded that the size of working capital in the period fluctuates in the range of 0,04-0,23. Whereas, the median values oscillate between 0,19-0,23. Average values of the indicator test every second year increased or decreased. The other hand the median values were growing during the period, except for last year. Given the fact that large deviations from the industry average in the years 2008, 2010 and 2012, more appropriate measure in this case is the median. Increasing the value of this indicator means that the involvement of working capital in total assets could be increased, which is a good thing.

Analyzing Figure 7, it can be seen that at the beginning of the period for the year prior to bankruptcy the level of indicator was negative, but in later years the value of the indicator grew and the level was positive. However, a positive value of the ratio is not favorable. Because looking at the reports of the analyzed sample companies, it is noted that companies for the year prior to bankruptcy significantly reduced the proportion of its fixed assets in total assets. This proves that companies had already experienced the difficulties and had begun to sell off its assets. Comparing value of insolvent companies to the preferred value of industry, it can be observed significantly lower values of the insolvent companies, which means that companies already had financial difficulties.

The second analyzed indicator is the size of working capital ratio (see table 2). This is similar to the already mentioned the size of working capital ratio (1), the difference lies in the denominator. The value of working capital is divided in this case by fixed assets.

Analyzing the second indicator, it can be inferred that the size of working capital ratio (2) is very high and during the period considered fluctuates in the range of 2,39-3,44. The other hand the median values oscillate between 0,39-0,49. Also in this case there are very large deviations from the industry average in the period. Therefore, a more appropriate measurement could be median. High values of this ratio may indicate that the involvement of working capital in fixed assets is large.

Also on the Figure 8, a similar trend can be seen as indicators of the size of the working capital (1). The values of this ratio evidenced as before on the sale of assets because of financial difficulties.

The third analyzed indicator is current liquidity ratio (see table 3). According to the literature, the value of this ratio should fluctuate between 1,2-2,0 (Walczak, 2007, pp. 356-357). However, for each sector, the optimum value of this ratio can vary.

Analyzing the third indicator, we can say that the average values of the current ratio from 2007 to 2012 fluctuate between 2,44-4,03. The other hand the median values are significantly lower and oscillate in the range of 1,50-1,66. The median values of this ratio are comparable with preferred values given in the literature. However, it should be noted that the deviation from the industry average in the period are significant, which may affect the wrong interpretation, by a more appropriate measurement could be median.

Analyzing Figure 9, it should be noted that the value of current ratio in the period both for the median industry and insolvent companies is stable. For most of insolvent companies is lower by 0,5 and it is approximately 1, and means the lack of liquidity. For the rest is higher which means over liquidity.

The fourth considered indicator is quick ratio (see table 4). It is assumed that the rate of value should be about 1,0 and it is sufficient to maintain the financial liquidity (Michalski, 2010, p 95). Contrast a lower values of 1,0 means great difficulties to handle current liabilities. However, this rule does not work when there are significant differences between the short-term receivables collection period, and the period of payment of liabilities.

Analyzing the fourth indicator, It can be deduced that the average values of the quick ratio during the period oscillate between 1,70-3,05. The other hand the median values are significantly lower and oscillate in the range of 0,96-1,08. The median values of this ratio are comparable with preferred values given in the literature. However, it should be noted that the deviation from the industry average in the period are significant, which may affect the wrong interpretation, by a more appropriate measurement could be median.

Analyzing the Figure 10, it can be concluded that one year before the bankruptcy of companies is characterized by a lack of liquidity. There is the greater difference between the values of industry and the values of insolvent companies than in the previous indicator.

The last analyzed indicator is cash ratio (see table 5). This ratio shows the ability of companies to process his payment immediately. It shows what proportion of short-term liabilities will be realized immediately, assuming that possessed cash is the source of their coverage. It is assumed that the value of the indicator should oscillate in the range 0,1-0,2 (Dudycz, et al., 2005, p 3). The higher ratio, the higher ability to realize short-term liabilities, and conversely, the lower level of the ratio, the lower liquidity, the more difficult conditions of payment.

Analyzing the fifth indicator, we can say that the average values of cash liquidity ratio during the period are in the range of 0,67-1,56. The other hand the median values are much lower and ranges from 0,16 to 0,21. However, also in this case it should be noted that the deviation from the industry average in the period are significant, which may affect the wrong interpretation, by a more appropriate measurement could be median.

Taking into account Figure 11, and the two previous of liquidity, it can be concluded that the companies for the year prior to bankruptcy do not maintained liquidity. Lack of liquidity was one of the causes of bankruptcy. In contrast, some companies have sold their fixed assets, therefore they have over liquidity. The result of sales of all fixed assets for manufacturing companies were terminated their activity by bankruptcy.

Analysis of the results

The analysis of liquidity ratios did not allow assessment of companies as a whole. It is limited only to the analysis of the sphere of business. It is advisable to carry out a comprehensive analysis of financial condition of companies based on an integrated analysis and by supplementing it with the different spheres of business activity such as analysis of liquidity that has been done in this study.

In table 6 is presented a summary of results - the limit values of the liquidity of the year prior to bankruptcy for companies in the sector.

Before analyzing the values contained in table 6, it should be noted that the liquidity ratios assume a range of values that is appropriate (optimal). For example, the calculated values of current ratio, according to the article, should oscillate between 1,50-1,66. The values significantly higher mean that there is too large share of capital in circulation, which means over liquidity. Although significant lower values mean a lack of liquidity. Manufacturing companies at the time of increasing competition and rapid change in market should maintain an optimal level of liquidity ratios.

In the article, the median values of the indicators were taken as the reference values because it observed large deviations in the manufacturing sector. The limit values of the current, quick and cash liquidity ratios decrease equally every 0.5, from 0.97 to 0.06.

These values are lower than the value of used as a model for the industry. If a company is characterized by those values of liquidity ratios there is a high probability of bankruptcy in the next reporting period. In contrast the mean values of the size of the working capital can be confusing, because the values of these indicators for the insolvent companies are positive and close to the reference values adopted for the sector. Nevertheless, this level of the size of working capital is cause by the sale of fixed assets. The companies sometimes sell all the fixed assets. Due to the warning values for a company should be negative or excessively high.

Thus, assessment of liquidity ratios is not easy. Therefore, it is worth noting that a slight deviations from the reference range of values do not immediately mean lack of liquidity or over liquidity. However, should be taken into consideration by the management of company. The company should react to the deviation from the standard liquidity values, and especially acts when there is continued decline in liquidity ratios year by year.

Conclusion

The present study assesses the manufacturing sector during 2007-2012. To assess the liquidity of the sector, the author selected the five most popular liquidity ratios. Financial reports of listed companies in the sector were used in paper - 10,000 company reports. The source of these financial reports are EMIS database. The results of the calculated ratios are presented in the form of tables and charts. Calculated median of liquidity ratios were used as a benchmark to assess the sample of bankrupt companies. It was also an attempt to designate the critical liquidity values of ratios, below which it may be considered that the manufacturing company had lost liquidity. It should be noted that due to lack of access to the financial statements for year prior to bankruptcy enterprises, the tested sample decreased from 600 companies down to 311.

In this article the author analyzes of liquidity has treated as a supplement to use integrated models, so the models themselves were not evaluated.

Analysis of liquidity indicators showed that the standard values of indicators for the selected sector oscillate in the range (mean, median):

- 0,04-0,23 (0,19-0,23) for the size of the working capital ratio (1),
- 2,39-3,44 (0,39-0,49) for the size of the working capital ratio (2),
- 2,44-4,03 (1,50-1,66) for the current liquidity ratio,
- 1,70-3,05 (0,96-1,08) for the quick liquidity ratio,
- 0,67-1,56 (0,16-0,21) for the cash liquidity ratio,

Analyzing the calculated values of the indicators can be said that the industry is characterized by:

- positive working capital, which grows during the period (excluding 2012), which may mean more involvement of working capital in total assets,
- the increasing liquidity of the sector (apart from 2012), the value of each indicator for the sector are similar to those reported in the literature. However, if you take into account the median value as the average in the sector is considerably higher because there is considerable diversity in the sector.

Limit values of liquidity ratios that indicate a lack of liquidity, a year before the bankruptcy for the companies in the sector are:

- 0,97 for the current liquidity ratio,
- 0,47 for the quick liquidity ratio,

- 0,06 for the cash liquidity ratio.

It is difficult to specify the limits values for the size of working capital for businesses because the values of insolvent companies are positive and close to the reference values adopted for the sector. Sales of fixed assets significantly influenced the value of size of working capital. The companies sometimes sell all the fixed assets. Due to the warning values for a company should be negative or excessively high. The excessively high values can inform of selling assets of the company, and negative values may indicate low liquidity.

Assessment of liquidity ratios is not easy, as the liquidity ratios assume a range of values that is appropriate (optimal). Because of this, if there are slight deviations from the reference range of values it does not immediately mean the lack of liquidity or over liquidity. The company should react to the deviation from the standard liquidity ratios, especially when there is the continuous decrease in liquidity ratios year after year. It should be noted that the ratio analysis should be one of the assessment elements of company's financial condition.

It should be noted that the analyzed indicators of liquidity for both bankrupt and operating companies in the sector were characterized by high volatility. This is caused by the fact that in the manufacturing sector there is a diversity of industry. Because there are, among others, companies manufacturing concrete, metal, clothing and food manufacturing. Taking this into account the next step in the research will be to analyze the different sectors of manufacturing and analysis of insolvent of companies in these sectors.

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Appendix

TABLE 1. VALUES OF THE SIZE OF THE WORKING CAPITAL RATIO (1) FOR MANUFACTURING INDUSTRY

Name	2007	2008	2009	2010	2011	2012
Mean	0,19	0,14	0,18	0,17	0,23	0,04
Median	0,19	0,19	0,20	0,21	0,23	0,19
Standard deviation	1,02	2,60	1,07	1,56	1,06	2,13
Maximum value	28,86	5,50	17,71	22,77	28,34	1,50
Minimum value	-65,67	-200,33	-59,81	-120,05	-54,69	-84,50

Source: Own work.

TABLE 2. VALUES OF THE SIZE OF THE WORKING CAPITAL RATIO (2) FOR MANUFACTURING INDUSTRY

Name	2007	2008	2009	2010	2011	2012
Mean	2,39	3,22	2,95	2,93	3,44	3,27
Median	0,41	0,39	0,41	0,43	0,49	0,45
Standard deviation	18,29	25,14	23,77	20,07	24,27	36,56
Maximum value	884,85	734,00	689,96	485,34	627,79	966,00
Minimum value	-123,03	-373,99	-690,40	-308,62	-204,55	-747,00

Source: Own work.

TABLE 3. VALUES OF THE CURRENT LIQUIDITY RATIO FOR MANUFACTURING INDUSTRY

Name	2007	2008	2009	2010	2011	2012
Mean	2,44	3,36	4,03	3,87	3,64	3,56
Median	1,50	1,51	1,59	1,59	1,66	1,50
Standard deviation	4,67	12,48	20,37	18,53	19,47	20,25
Maximum value	169,79	431,12	886,69	854,49	904,00	945,00
Minimum value	0,00	-0,11	-0,19	-0,11	0,00	-2,00

Source: Own work.

TABLE 4. VALUES OF THE QUICK LIQUIDITY RATIO FOR MANUFACTURING INDUSTRY

Name	2007	2008	2009	2010	2011	2012
Mean	1,70	2,56	3,03	3,05	2,73	2,68
Median	0,96	0,99	1,06	1,04	1,08	1,00
Standard deviation	3,94	11,80	16,27	17,18	16,29	13,11
Maximum value	169,79	421,77	682,85	703,97	581,55	438,50
Minimum value	-13,55	-8,24	-6,47	-6,64	-9,05	-2,00

Source: Own work.

TABLE 5. VALUES OF THE CASH LIQUIDITY RATIO FOR MANUFACTURING INDUSTRY

Name	2007	2008	2009	2010	2011	2012
Mean	0,67	1,27	1,56	1,56	1,28	1,43
Median	0,16	0,17	0,20	0,18	0,18	0,21
Standard deviation	2,20	8,49	10,45	11,37	10,45	11,18
Maximum value	67,16	399,67	357,46	552,20	560,23	408,00
Minimum value	-18,72	-12,54	-7,08	-6,88	-9,07	-2,00

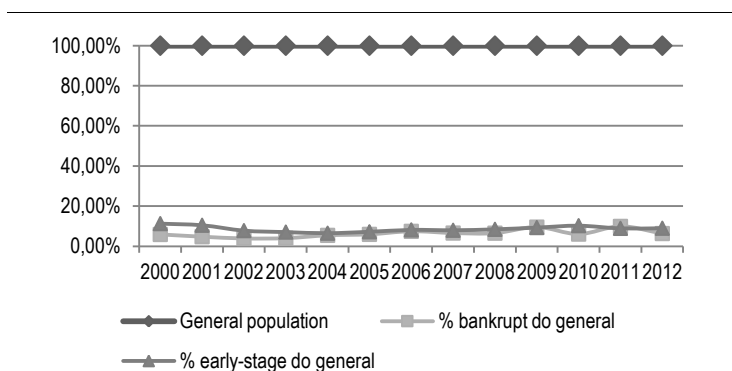
Source: Own work.

TABLE 6. LIMIT VALUES OF LIQUIDITY RATIOS FOR ONE YEAR PRIOR TO BANKRUPT FOR THE COMPANIES FROM THE SECTOR

Ratio	2007	2008	2009	2010	2011	2012	Mean (Median)
Size of the working capital ratio (1)	-0,20 (-0,02)	-0,54 (-0,12)	-0,37 (-0,02)	-0,13 (0,01)	-0,10 (0,05)	0,16 (0,24)	-0,20 (0,02)
Size of the working capital ratio (2)	2,39 (0,41)	3,22 (0,39)	2,95 (0,41)	2,93 (0,43)	3,44 (0,49)	3,27 (0,45)	3,03 (0,43)
Current liquidity	1,18 (0,93)	0,88 (0,80)	1,57 (0,94)	1,54 (1,03)	1,75 (1,03)	2,16 (1,06)	1,51 (0,97)
Quick liquidity	0,75 (0,56)	0,48 (0,36)	1,13 (0,46)	0,78 (0,57)	1,05 (0,50)	1,43 (0,37)	0,94 (0,47)
Cash liquidity	0,14 (0,04)	0,06 (0,03)	0,77 (0,06)	0,23 (0,07)	0,66 (0,07)	1,29 (0,08)	0,53 (0,06)

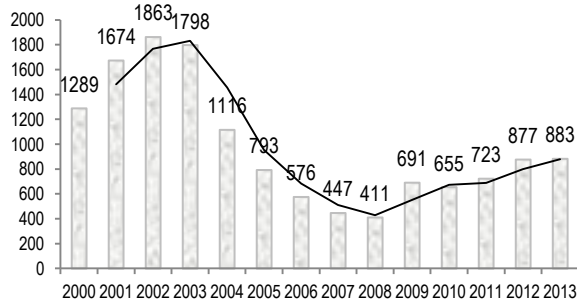
Source: Own work.

FIGURE 1. RELATION OF BANKRUPT AND EARLY-STAGE COMPANIES TO THE GENERAL POPULATION



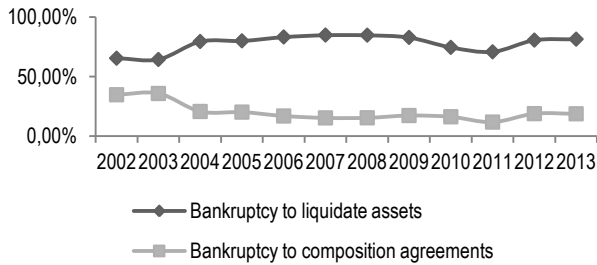
Source: Own work based on data from the Central Statistical Office.

FIGURE 2. NUMBER OF PROCLAIMED BANKRUPTCY IN POLAND IN THE PERIOD 2000-2013



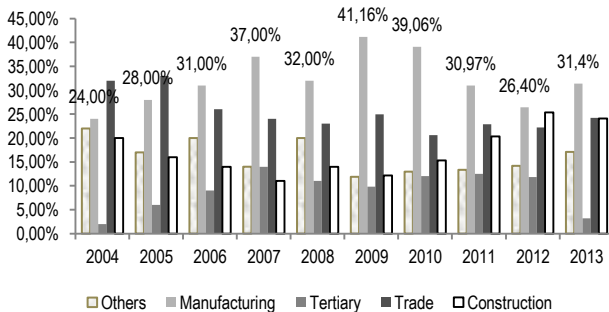
Source: Own work based on the report of Coface Poland.

FIGURE 3. PERCENTAGE OF THE ANNOUNCED BANKRUPTCY TO LIQUIDATION AND TO SIGN THE AGREEMENT



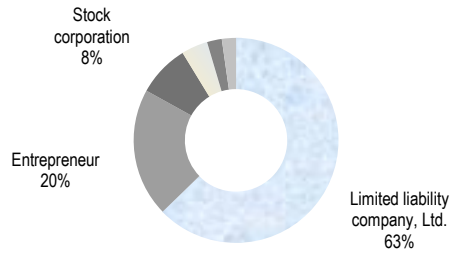
Source: Own work based on National Insolvency Newsletters of Coface Poland.

FIGURE 4. BANKRUPTCY OF COMPANIES BY INDUSTRY DURING 2004-2013



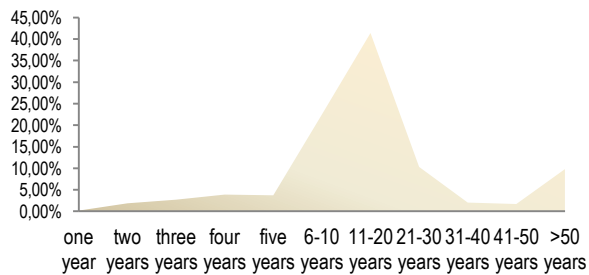
Source: Own work based on the reports of Coface Poland.

FIGURE 5. BANKRUPTCY OF COMPANIES BY LEGAL FORMS FOR SELECTED SAMPLE



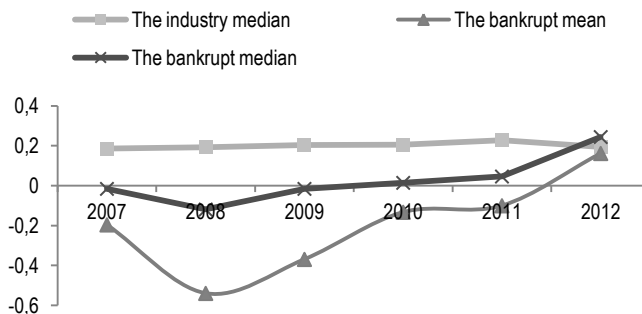
Source: Own work.

FIGURE 6. AGE OF BANKRUPT COMPANIES DURING 2008-2013



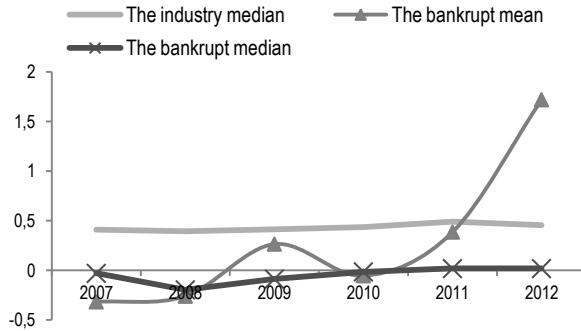
Source: Own work based on data from the Ministry of Justice and corporate financial statements from EMIS database.

FIGURE 7. VALUES OF THE SIZE OF THE WORKING CAPITAL RATIO (1) FOR ONE YEAR PRIOR TO BANKRUPT FOR EACH YEAR FOR SELECTED SAMPLE



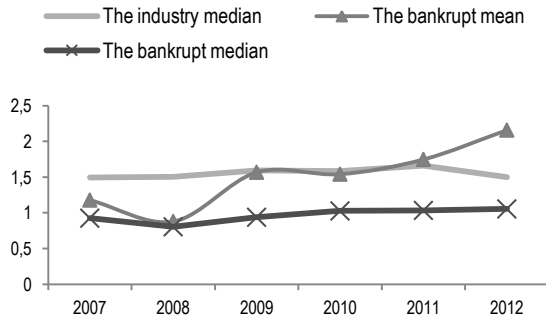
Source: Own work.

FIGURE 8. VALUES OF THE SIZE OF THE WORKING CAPITAL RATIO (2) FOR ONE YEAR PRIOR TO BANKRUPT FOR EACH YEAR FOR SELECTED SAMPLE



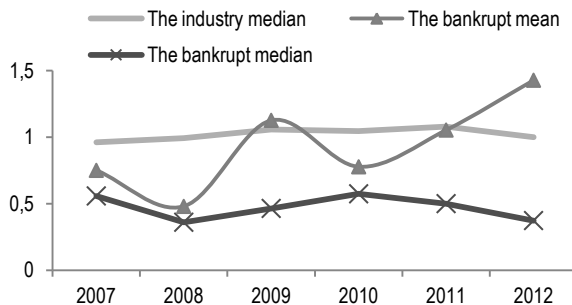
Source: Own work.

FIGURE 9. THE VALUES OF THE CURRENT LIQUIDITY RATIO FOR ONE YEAR PRIOR TO BANKRUPT FOR EACH YEAR FOR SELECTED SAMPLE



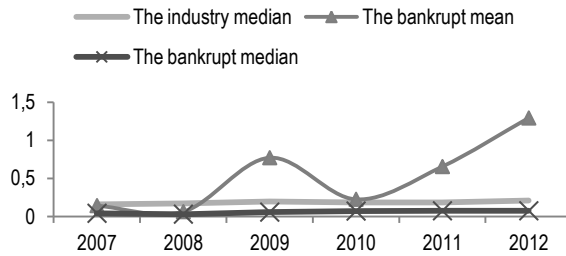
Source: Own work.

FIGURE 10. THE VALUES OF THE QUICK LIQUIDITY RATIO FOR ONE YEAR PRIOR TO BANKRUPT FOR EACH YEAR FOR SELECTED SAMPLE



Source: Own work.

FIGURE 11. THE VALUES OF THE CASH LIQUIDITY RATIO FOR ONE YEAR PRIOR TO BANKRUPT FOR EACH YEAR FOR SELECTED SAMPLE



Source: Own work.