The debt management in time of crisis: survey evidence from Poland and Silesia

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Abstract:
Purpose of the article: The purpose of the article is to present partial results of the research project conducted in Poland and Silesia aiming at analyzing changes in the financial condition of non-financial companies in time of financial crisis. This article presents the results of the project's part which was related to the analysis of debt management and capital structure decisions.
Methodology/methods: The research findings are based on the authors' research method with the application of financial ratio analysis and financial statements as basic tools. The observations are conducted with regard to Poland and are a subject for the comparative analysis of the pre- and post-crisis state. The analyzed period covers years 2006–2010.
Scientific aim: The paper aims at revealing the consequences of debt management and capital structure decisions in time of global financial crisis with regard to companies as the representatives of the real sphere of the economy.
Findings: In general, the result of the researches indicate that in 2007 and 2008 as a crisis observation and in 2009–2010 as the post-crisis observation there were no significant changes of the debt management reflected in the capital structure and the level of financial risk. The differences were observed only with regard to the level of long-term debt implementation.
Conclusions: The research findings bring a valuable and original perspective for analysing the impact of financial crisis on the debt management decisions reflected in the changes of companies' capital structure. These results might be applied in the cross-country comparative studies aiming at analysing changes in the financial situation of the companies operating in different countries and regions, finding similarities and explaining differences.

Keywords: debt management, capital structure, financial risk, financial crisis

JEL Classification: D22, D24, G32

Introduction

The very first consequences of the financial crisis were observed in the financial sector of the economies. Later on, the crisis caused turbulences in the real sphere of the economies as it exerted a strong impact on the operations of non-financial business entities as well. From the corporate finance perspective, numerous types of such turbulences might be analysed. Taking into account the scope of company's debt management decisions, the problem of shaping the capital structure and its consequences is of particular importance. Its significance comes from the fact that the decisions concerning so called financing-mix influence the level of financial risk and thus the cost of capital and the value of a company.

However, the global financial crisis is not a subject of wider discussions with regard to its impact on the companies as a valid element of the real sphere of the economy. This gap was the inspiration for undertaking the researches focused on observing the changes in the financial situation of companies operating in Poland with the purpose of revealing the main areas of problems they faced. For the purposes of the research project the authors' method was applied: The CFS Watch, which is an acronym of Corporate Financial Situation Watch as it is useful in researches dedicated to watch the financial performance of analysed samples of companies over a defined period of time. The CFS Watch method is based on financial ratios analysis that is conducted in five basic areas of companies' financial performance: general financial condition, liquidity, indebtedness, profitability and efficiency. The CFS Watch method was applied to gather observations of the period 2006–2010 and thus followed the changes of companies' financial situation before, during and after the global financial crisis. The project aims at comparative analysis of Poland and Silesian Region. The focus on Silesia was caused by the growing interest and promotion of Silesian Region autonomy and in this movement economic arguments are also validated. It is taken into consideration that the Silesian Region is very specific due to high industrialisation. In this region lives 4,6 million persons, which forms 12,2% of the total population of Poland. The leading industrial branches in the Silesian Region are mining, quarrying and manufacturing and 41% of the population is employed in the industry (Silesian Voivodship Yearbook 2010). Also, the importance of the Silesian Region comes from the fact that the second biggest group of the companies analysed in the Polish central statistic has their headquarters in the Silesian Region (Voivodship) – 13% (while the first group is located in the Mazovian Voivodship – 16%).

This paper aims at presenting the results of these researches conducted within one element of the authors' developed CFS Watch method – the DMA (Debt Management Analysis) module, with regard to the consequences of debt management depicted in the changes of capital structure and thus the changes of financial risk. The study is focused on the debt management patterns in all companies operating in Poland and in companies operating in the Silesian Region. Within the DMA module, the applied method, data and tools were directed to support the following hypotheses:

H.1. In the period of financial crisis the debt management decisions caused visible turbulences in the capital structure both in the companies operating in Silesian Region and in Poland.

H.2. The debt management in companies operating in Silesian Region imposed a higher level of financial risk as compared to all Polish companies.

H.3. Companies operating in the Silesian Region had a better position to implement long-term debt finance in their capital structure as they possessed better collateral with regard to fixed assets.

The paper is structured as follows. Section 1 provides a theoretical insight into the problem concerning the implications of capital structure decisions of a company and its impact on the level of financial risk. Section 2 extends the methodology of the empirical researches with regard to sampled companies, research tools and the variables tested. Section 3 presents the results of the empirical research, whereas section 4 discusses the findings. Section 5 concludes the paper.

1. Theoretical insights

The global financial crisis exerted turbulences in the real sphere of the economies worldwide. However, it is rare to find a pattern useful in following these turbulences and explaining the mechanisms of the crisis transmission. To some extend, the transmission of the financial crisis might be supported by the theories explaining the existence of companies in a model version. In particular, the set-of-contract model, the investment-vehicle model and the accounting model indicate the possible paths of crisis transmission.

In the set-of-contract model the company is presented in its business environment, which is extend-

ed by the stakeholders concept (Thomsen, 2004, p. 30; Neale and McElroy, 2004, p.6, Damodaran, 2001, p. 15). The model assumes that a company is affected by its market (competitive) environment which is a result of the direct relations with the market participants, capital providers and regulators. Also, the model underlines the consequences of the macro environment of a company, such as the impact of the technology transfer, demographic and social phenomena, internationalisation, political conditions etc. Here the consequences are indirect and are unavoidable by the company as it has no power to influence these conditions. In particular, the business environment approach indicates the direct or indirect paths of crisis transmission.

The investment-vehicle model extends the connections of a company with the financial market. The model underlines that on the financial market the company exchanges money and the financial assets (both the obligations and rights) (Emery and Finnerty, 2004, p. 9, Lumby and Jones, 2011, p. 15). This channel might be the prime path of financial crisis transmission with regard to the debt management issues.

The accounting model is based on the balance-sheet picture of a company. With regard to the problem of funding, it indicates the capital structure of a company as a result of financing decisions. These decisions should follow the financing principle which requires a company to choose the optimal financing-mix from the value maximization perspective and the reduction of the potential financial risk (Baker and Powell, 2005, p.7; Emery, Finnerty and Stowe, 2004, p. 3; Smart, Megginson and Gitman, 2004, p. 3; Ross, Westerfield and Jaffe, 2005, p. 6). The connection between the financing-mix, the value of the company and financial risk was a subject for the MM theory and developed further in the trade-off theory based on the assumption that optimal capital structure does exist and it helps to maximize the company's value. The optimal capital structure balances the financial risk of the company and potential bankruptcy costs with the advantages of the tax-shield effect arising from the application of the debt finance. Thus the main problem can be defined as searching for the balance between the increasing value of the company and the increasing level of the financial risk (Berk and DeMarzo, 2007, p. 501; Megginson and Smart, 2006, p. 517, Fabozzi and Peterson, 2003, p. 22). In times of the increasing turbulences in the financial system, the companies can face the difficulties in the access to the preferred sources of funds (either equity or debt) in terms of the optimal capital structure, which may disturb their financial performance. Thus, the potential problems connected with acquiring additional funds should be treated as a valid channel of the financial crisis transmission.

For the debt management problem extended further in this paper, two assumptions concerning the definition of capital structure and financial risk are relevant. The capital structure might be perceived and analysed from different perspectives. According to the most common one, a capital structure reflects the balance sheet perspective, with regard to the proportion of equity and debt in the total capital. Such meaning is accepted in this paper. However, other perspectives are also met. The capital structure might be perceived from the long- and short-time perspectives indicating the share of fixed capital (equity and long-term debt) and current liabilities (short-term debt). Also, the capital structure might be associated with so called employed capital perspective, based on the share of equity and debt capital charged with interests (Fabozzi and Peterson, 2003, p.328, Shapiro and Balbirer, 2000, p.464; Masulis 1988, p.1; Higgins, 2007, p.565, Weston and Copeland, 1991, p.53; Lumby, 1994, p. 435; Tirole, 2006, p.76). As to the financial risk, the paper assumes that its level is growing as the level of debt in the capital structure increases. In such circumstances the company is exposed to higher risk of inability to repay the debt and interest charges on time. Obviously, the level of financial risk is a result of debt management decisions within the problem of shaping the capital structure (Baker and Powell, 2005, p.7; Ross *et al.*, 2005, p.6; Emery *et al.*, 2004, p.3; Smart *et al.*, 2004, p.3).

2. Methodology

2.1. The research sample, data source and research horizon

The purpose of our research was to conduct a comparative analysis of the debt management decisions with regard to the changes in the capital structure and the level of financial risk between two samples of companies. The first sample, denoted as the MAPP sample, includes the general financial data for all companies operating in Poland. The second sample, denoted as the MEPP sample, includes the general financial data for all companies operating in one of the Polish regions – the Silesian Region associated with the Silesian Voivodship (1).

The presented researches are based on the aggregated statistical data provided continuously by the Polish Central Statistical Office (the GUS). These data, structured with regard to numerous criteria i.e.

Table 1 The number of companies providing statistical data to Polish Central Statistical Office statistics.

Examined companies	2006	2007	2008	2009	2010
MAPP sample	47048	48165	53847	53148	53220
MEPP sample	6042	6341	6740	6823	6751

Source: Author's own study based on: (Financial Results, 2007–2010).

the voivodship belonging, concern business entities operating in Poland that are keeping account ledgers and where the number of employees exceeds 9 persons (2). Thus, the collected data enabled us to apply the DMA module both to the MEPP and the MAPP sample. The precise number of companies covered by the Polish Central Statistical Office researches in the analysed period is provided in Table 1.

We examined the data gathered by the Polish Central Statistical office in the years 2006–2009. The observations in 2006 are treated as the pre-crisis indicators. The observations in 2007 and 2008 are treated in our study as the period of global financial crisis influence. These observations are believed to reveal turbulences as compared to 2006. The observations in 2009 and in 2010 are treated as the indicators of the post-crisis situation.

The methodology of the research is based on the comparative and trend analysis. In particular, whenever applicable, the dynamics indices for the analysed elements of the capital structure in both of the examined samples of companies were applied to support the interpretation of the observations.

2.2 The variables tested

The authors' CFS Watch method developed for the purposes of our research project includes among others the DMA (Debt Management Analysis) module which is focused on following the changes of capital structure and financial risk in the analysed samples of companies. The DMA module, hereafter denoted as $DMA(M)$ is a set of the following elements:

$$DMA(M) = (DMA(1),\ DMA(2),\ DMA(3),\ DMA(4),\ DMA(5))$$

and

$$DMA(1) = \frac{D}{A},$$

$$DMA(2) = \frac{D_{LT}}{A},$$

$$DMA(3) = \frac{D}{E},$$

$$DMA(4) = \frac{D_{LT}}{E},$$

$$DMA(5) = \frac{A_F}{D_{LT}},$$

where:

D	debt,
A	assets (capital) in total,
E	equity in total,
D_{LT}	long-term debt,
A_F	tangible fixed assets (plant & property).

The $DMA(M)$ is a set of five financial ratios that are commonly used to review the consequences of a company's debt management decisions reflected in the changes of the capital structure. As a consequence, the applied ratios allow assessing the company's financial situation in the field of the financial risk caused by the changes in the financing-mix. These ratios are based on the balance-sheet information regarding sources of corporate funds (liabilities) and the elements of assets and are widely discussed in literature (Baker and Powell, 2005, pp. 52–54; Damodaran, 2001, p.105; Ehrhardt and Brigham, 2009, p. 95; Fabozzi and Peterson, 2003, p. 742; Higgins, 2007, p. 46; Shaprio and Balbirer, 2000, p. 44: Gorczyńska *et al.*, 2008, p.71).

The $DMA(1)$ ratio is the most popular debt management ratio. It indicates a part of the company's assets financed by the total debt capital. The normative, theoretical value for this ratio is set between 50% and 70%, thus the acceptable level of the debt to assets ranges on average in such interval. The $DMA(1)$ ratio above 70% is on average unacceptable (Błach, 2009, p. 92; Sierpińska and Jachna, 2007, p. 89). However, one should be aware that the debt to assets ratio is partially dependant on the industrial branch the company operates in (3). Certain level of debt finance is always present in companies as they may take advantage of the tax-shield and thus of the positive effects of the financial leverage. Higher values of the $DMA(1)$ ratio indicate higher level of the financial risk which may lead to the problems with long-term solvency of the company and higher level of the bankruptcy costs. Lower level of the $DMA(1)$

ratio informs about the preferences for the equity finance which increases the creditworthiness of the company, long-term stability and solvency. However, the lower level of the *DMA*(1) ratio is usually accompanied by lower efficiency (due to the lower tax shield and financial leverage) and higher level of the WACC (weighted average cost of capital) as the company employs more expensive sources of funds. The problem of the decrease in efficiency, however, is not in the prime concern of this study. Thus, the *DMA*(1) ratio is assessed only in the context of the increase in the financial risk.

The *DMA*(2) ratio provides more accurate information with regard to the level of the long-term debt applied. There are no normative values for this ratio. However, the results should be compared to the *DMA*(1) ratio and thus the indirect information about the debt structure would be obtained. A comparable values of the *DMA*(1) and the *DMA*(2) ratios indicate the low level of the short-term debt, which is important with regard to the company's liquidity risk. The higher values of the *DMA*(2) ratio as compared to the *DMA*(1) ratio indicate the higher level of long-term debt financing and thus the higher level of the financial risk.

The *DMA*(3) ratio represents the core capital structure ratio, as it indicates the proportion between total debt and total equity. The ratio is often called the financial leverage ratio as it indicates the level of financial risk resulting from the debt to equity fraction. Generally, the higher the value of the debt to equity ratio, the higher is the level of financial risk. Under the assumption that the *DMA*(1) ratio should not be higher than 70%, the *DMA*(3) ratio should not be higher than 2,33. In the literature, however, it is often stated that the ratio should be kept below 3, which means that per one unit of equity no more than three units of debt should be applied (Sierpińska and Jachna, 2007, p. 89).

These differences are caused by the various presentations of debt in the capital structure. Currently, according to the Polish accounting standards, total capital (total liabilities and equity) of a company include equity and debt, and in the debt group the following items are presented: (a) provisions for liabilities, (b) long-term debt, (c) short-term debt and (d) deferred and accrued expenses (Accounting Act...). Thus, to avoid misunderstandings for the purposes of financial analysis it is often assumed that the debt equals total capital less equity. Such assumption is also accepted for the purposes of this paper. The normative value of 3 is provided for the debt to equity under the assumption that debt is a sum of the long- and short-term debt to the value of equity (which means that the volume of provisions for liabilities and deferred and accrued expenses is not treated as neither debt nor equity and simply omitted in the analysis).

The *DMA*(4) ratio extends the analysis of the *DMA*(3) ratio as it indicates the proportion between the long-term debt and the total equity. The interpretation is quite similar to the *DMA*(3) ratio. However, the recommended values of the *DMA*(4) ratio are 0,5 to 1 (Sierpińska and Jachna, 2007, p. 89). An increase in the *DMA*(4) indicates the increase of the financial risk.

The *DMA*(5) ratio informs about the company's ability to cover its long-term debt by tangible fixed assets (plant & equipment). Thus the ratio indicates how far the long-term debts are secured by the company's tangible fixed assets. Also, the ratio indicates the perspectives for further borrowings. Higher values of the *DMA*(5) ratio indicate higher possibilities of the company to acquire additional debt capital in the future, as its borrowing capacity and creditworthiness is relatively high (Jaworski, 2010, p. 157).

3. Results

The elements of the *DMA*(M) set were a subject of a comparative and trend analysis as the indicators of the debt management decisions with regard to the worsening or the improvement of the capital structure of the analysed samples of companies. As a consequence, the applied variables allowed testing whether there was the increase or the decrease in the level of financial risk. Whenever applicable, the findings were supported with the trend analysis of the balance-sheet data (the data are provided in annex A and B).

In both samples of the examined companies the *DMA*(1) ratio fluctuated slightly over the analysed period of time (compare Figure 1). In the MAPP sample, in 2006 the *DMA*(1) reached 48,92% and in 2007 the ratio declined slightly to 46,85%. In the following period (2008) the *DMA*(1) achieved the value of 49,53%, then in 2009 declined to 48,42% and in 2010 remained stable (48,48%). Such results indicate that on average there were no significant changes in the capital structure in the MAPP sample and thus there was no significant increase of the financial risk. Also, in the MEPP sample the *DMA*(1) did not fluctuate significantly, however it varied in a more visible manner. In 2006 the *DMA*(1) reached 50,15% (so it was higher as compared to the MAPP sample), then it declined to 46% (which was lower as compared to the MAPP sample). In 2008 the situ-

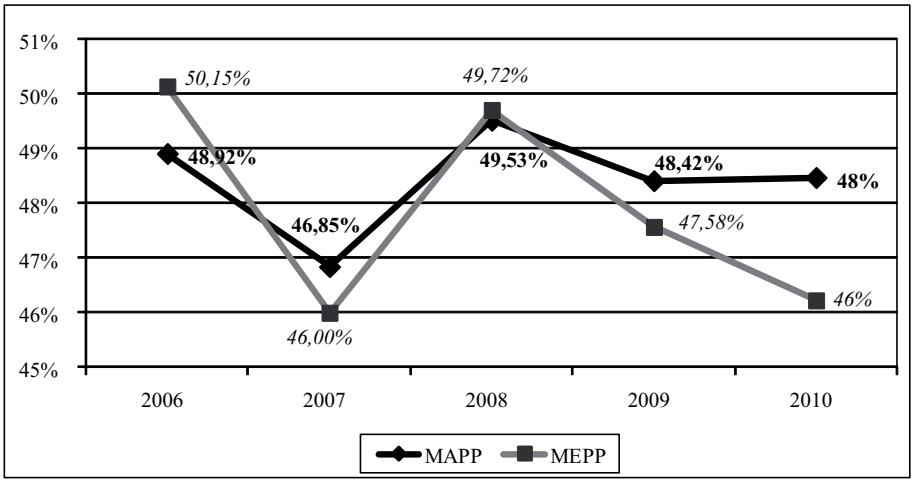

Figure 1 The DMA(1) ratio for the MAPP and the MEPP sample of companies in 2006–2010. Source: Authors' own study.

ation got worse (the *DMA*(1) increased to 49,72%, which is comparable to the level observed in 2006) and then improved visibly as the *DMA*(1) ratio declined to 47,58% in 2009 and then to 46,23 in 2010.

The observed changes of the *DMA*(1) ratios indicate that in the period of financial crisis the financial risk increased and then in 2009 and 2010 the situation improved. With regard to the normative and recommended level of the *DMA*(1) ratio it should be clarified that in both samples of examined companies the *DMA*(1) ratio was relatively low as the tested variables kept values below 50%. These results indicate relatively low level of financial risk as obviously companies on average preferred the equity which is considered as safe and long-lasting source of funding. In both samples of companies the total capital (assets) were continuously growing over the analysed period of time. The quite stable level of the *DMA*(1) ratios indicate that the companies did not have problems with acquiring additional debt funding. However, it is recommended to test whether the structure of debt funding remained stable over the analysed period. The *DMA*(2) analysis is useful in this context as it tests the use of long-term debt funding applied. The *DMA*(2) ratios for the MAPP and the MEPP sample are presented in Figure 2.

The analysis narrowed to the *DMA*(2) ratio indicates significant differences between the examined

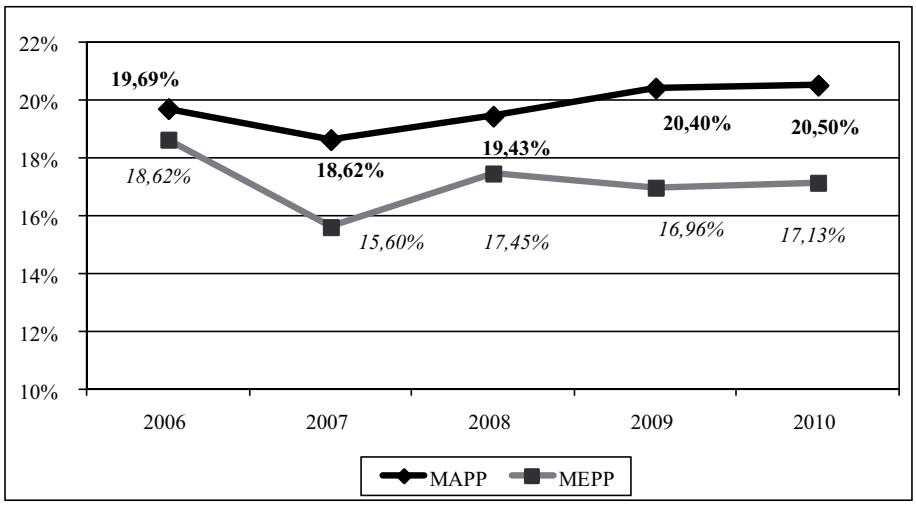

Figure 2 The DMA(2) ratio for the MAPP and the MEPP sample of companies in 2006–2010. Source: Authors' own study.

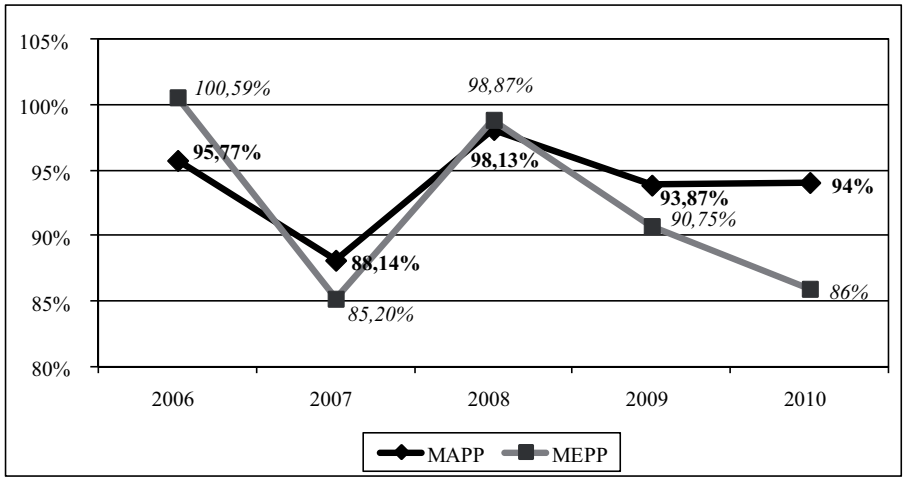

Figure 3 The DMA(3) ratio for the MAPP and the MEPP sample of companies in 2006 – 2010. Source: Authors' own study.

samples of companies (see Figure 2). A comparatively higher level of long-term debt was used by the companies included in the MAPP sample, with the increasing tendency observed since 2007. As a result, the highest *DMA*(2) ratio was observed in 2010 (20,50%). In case of the MEPP sample, the *DMA*(2) ratios were fluctuating over the analysed period of time and in 2010 the ratio achieved the value above 17,13%, which is lower as compared to the value observed in 2006 (18,62%). As the *DMA*(1) ratios were more or less at the same level for both groups of companies and followed the same direction of changes, the differences in the *DMA*(2) ratios indicate the higher use of short-term debt in the capital structure in the MEPP sample as compared to the MAPP sample. The analysis of the short-term debt structure supports these findings. In both samples of companies the accounts payable were dominating in the short-term liabilities structure with the highest share observed in 2006, followed by a slight decrease in 2007–2008 and there again a slight increase in 2009 and 2010 (compare the data presented in annex B). In the MAPP sample, however, the share of accounts payable (with the ratios of 52,28% in 2006 and 51,1% in 2010) was significantly lower as compared to the MEPP sample (with the ratios of 59,23% in 2006 and 55,60% in 2010). It should be also noticed that in the MAPP sample the share of short-term credit and loans in the short-term debt was stable over the analysed period (ca.22–26%), whereas in the MEPP sample it declined significantly in 2008 (from 28,59% to 18,32%) and continued decreasing in the following years. In both of analysed samples other sources of short-term debt (such as e.g. liabilities from taxes, customs, duties, insurance, wages, salaries and other benefits) formed the significant part of short-term liabilities. In the MEPP sample their share increased visibly in 2008 and 2010 (to 28–25%). With regard to these data, the probable reason of the lower level of the *DMA*(2) ratio in the MEPP sample as compared to the MAPP sample lies in the higher level of accounts payable and the important role of other short-term debts, but definitively not due to the increase of short-term credit and loans.

In both of examined samples of companies, the *DMA*(3) ratios were fluctuating slightly over the analysed period of time, as presented in Figure 3. However, the ratio varied more visibly in case of the MEPP sample as compared to the MAPP sample. As for the MEPP sample the *DMA*(3) ratio ranged from 100,59% in 2006 to 85,20% in 2007 and for the MAPP sample – from 98,13% in 2008 to 88,14% in 2007. Thus, it should be stated that over the analysed period of time, the level of debt to equity remained relatively low which indicates low level of financial risk and high potential to obtain additional debt in future. The observations indicate that in the analysed samples the equity capital prevailed debt, as the *DMA*(3) ratios were below 100% (with the exception of the observation in 2006 for the MEPP sample when the ratio reached almost 101%). This indicates that the analysed companies preferred safe and stable sources of funds in the form of equity capital.

As mentioned previously, the *DMA*(4) extends the observations within the *DMA*(3) ratio. The data pro-

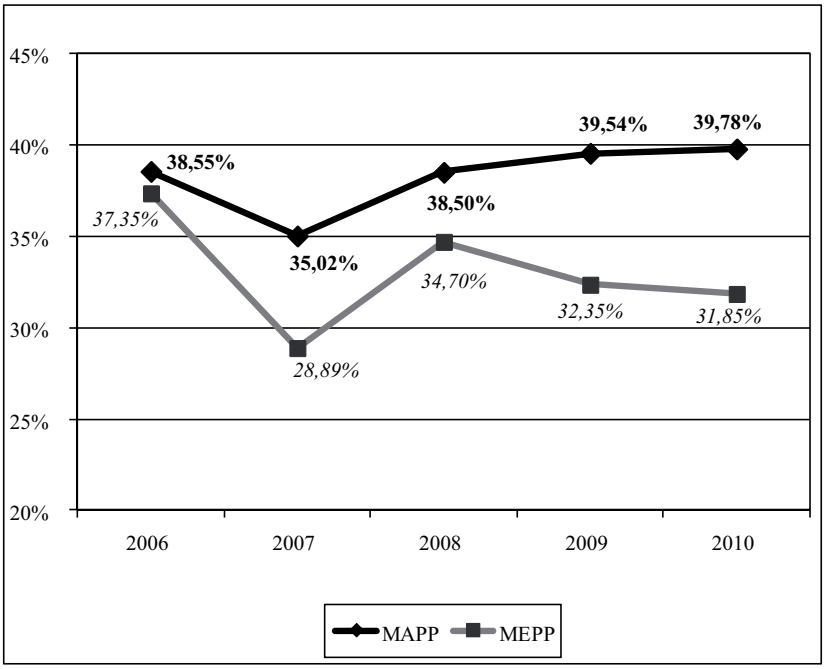

Figure 4 The DMA(4) ratio for the MAPP and the MEPP sample of companies in 2006 – 2010. Source: Authors' own study.

vided in Figure 4 indicate that in case of the MEPP sample the relation of long-term debt to equity was lower as compared to the MAPP sample which informs about the lower level of financial risk. In addition, it is worth to notice the increasing tendency in the value of the *DMA*(4) ratio for the MAPP sample of companies observed from 2007, while the *DMA*(4) ratio for the MEPP companies fluctuated slightly. These observations lead to similar findings as in case of the *DMA*(2) ratio. The companies in the MEPP sample implemented a lower level of long-term debt in the capital structure as compared to the MAPP sample and used more short-term debt funding. With regard to the volume of equity in the MEPP sample, the *DMA*(4) ratio indicates a safer position and thus higher capabilities and prospects for implementing additional debt to the capital structure.

The latter of the tested variables – the *DMA*(5) ratio – helps to indicate the level of collateral with regard to the amount of tangible fixed assets (plant & equipment) in the analysed samples of companies. The data provided in Figure 5 indicate that the

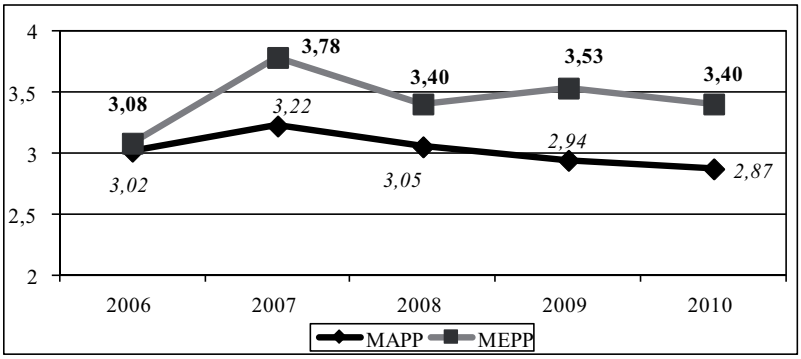

Figure 5 The DMA(5) ratio for the MAPP and the MEPP sample of companies in 2006 – 2010. Source: Authors' own study.

companies in the MEPP sample had a better possibilities to increase long-term debt as the *DMA*(5) ratios were significantly higher as compared to the MAPP sample. In case of the MAPP sample, the capability to rise long-term debt was decreasing over the analysed period of time as the *DMA*(5) decreased continuously and ranged between 3,015 in 2006 and 2,87 in 2010. In case of the MEPP sample, the ratio increased visibly in 2007 (achieving 3,78), then in 2008 declined and remained stable in 2010 (with the level of ca. 3,40). In case of the MAPP sample the ratio declined due to the higher dynamics of the long-term debt as compared to the dynamics of tangible fixed assets in the period of 2006–2008. A similar explanation concerns the MEPP sample observations.

4. Discussion

As outlined previously, the were three plausible hypotheses concerning the debt management decisions in Polish and Silesian companies with regard to the pre- and post-crisis observations. The results of our research lent some support to the third hypothesis, but no evidence was found to support the first and the second one.

In line with the first hypothesis about the impact of debt management decisions on the turbulences in the capital structure both in the companies operating in Silesian Region and in Poland no evidence was found. The observations of the *DMA*(1), *DMA*(2), *DMA*(3) and *DMA*(4) ratios do not indicate significant changes in the capital structure of examined samples of companies. In 2007 the *DMA*(1) and the *DMA*(3) ratios decreased visibly which means the relative decrease of debt funding as compared to the volume of assets or equity. In 2008 these ratios increased but in 2009 reached the level comparable to the observed in 2006. In the period of 2006 to 2008 the *DMA*(2) and the *DMA*(4) ratios followed similar pattern. The observations in 2009 and 2010 for all Polish companies indicate the increase of the level of long-term debt funding as compared to the volume of assets or equity, whereas, the observations for the Silesian companies give contrary results. However, the scale of variations of the observed ratios does not indicate that there were turbulences in the capital structure. Moreover, there are no significant symptoms indicating the turbulences in the 2007 and 2008 as the crisis observations and in 2009 and 2010 as the post-crisis observation.

The research lent no support to the second hypothesis about the higher level of financial risk as a consequence of debt management in Silesian companies as compared to all Polish companies. First of all, the observations of the *DMA*(1) and the *DMA*(3) ratios indicate that there were no significant differences with regard to the total amount of debt implemented in the capital structure. Thus, with regard to the total amount of debt, the level of financial risk should be judged as comparable. Moreover, the debt management in Silesian companies imposed a lower level of long-term debt as compared to all Polish companies, which is visible in the *DMA*(2) and *DMA*(4) observations. In this context, the financial risk in Silesian companies should be assessed as lower. However, it should be noticed that with a comparable level of debt and relatively lower implementation of long-term debt, the Silesian companies are exposed to the higher level of liquidity risk which also increases the level of financial risk. The analysis of the structure of the short-term liabilities of Silesian companies indicated that in 2009 and 2010 the share of accounts payable remained relatively stable over the analysed period, but the level of short-term credit and loans declined visibly in 2008–2009. In our opinion it indicates the impact of global financial crisis that limited the access to debt funding in the banking system and should not be connected with the financial performance of Silesian companies within debt management consequences as well as in other fields.

The researches lent some support to the third hypothesis about better perspectives to implement long-term debt finance in the capital structure in the Silesian companies. The *DMA*(2) and the *DMA*(4) ratios indicated that the debt management in Silesian companies was characterised by the lower level of the long-term debt implementation as compared to all Polish companies. Thus, in the Silesian companies the capability to increase long-term debt funding should be assessed as higher. Also, the *DMA*(5) ratio observations provide the support for the third hypothesis. If the tangible fixed assets are treated as collateral, the situation of Silesian companies was significantly better as compared to all Polish companies indicating the greater possibilities to implement more long-term debt funding. This can be partially explained by the fact that Silesian region is highly industrialised part of Poland and thus the level of tangible fixed assets is higher as compared to all Polish companies on average. However, to assess precisely the quality of collateral in the form of tangible fixed assets the deeper analysis of their structure is recommended.

Conclusions

Company's debt management decisions are always reflected in the changes of the capital structure. If

the company increases the level of debt finance, the level of financial risk increases, which may lead to serious consequences, including the bankruptcy. We expected that the global financial crisis caused serious changes in the capital structure of companies operating in Poland and in the Silesian region. In order to confirm these conjectures, we applied the methodology based on the financial ratio analysis and financial statements data. In general, the result of our researches indicate that in 2007 and 2008 as a crisis observation and in 2009 and 2010 as the post-crisis observation there were no significant changes of the debt management reflected in the capital structure and the level of financial risk. The differences were observed only with regard to the level of long-term debt implementation.

The importance of our researches is two-dimensional. In a narrow dimension, the researches brought some original conclusions concerning the performance of companies operating in Poland with regard to the debt management decisions. We are aware that one may assume that the results are narrowly limited to the set of a few financial ratios based on the financial statement data. However, the analysed variables represent one of the core elements of the financial performance assessment.

In a broad dimension, our paper contributes to the researches focused on the empirical analysis of the financial situation, as the applied method (the *DMA* Module) might be widely used for the similar purposes on other samples of companies in the multinational, national, regional or even the individual context. In particular, the results of the research might be applied in the cross-country comparative studies aiming at analysing changes in the financial situation of the companies operating in different countries and regions, finding similarities and explaining differences. A piece of our method presented here with regard to the debt management consequences might be easily supplemented with other ratios, as well as the dynamics and structure analysis.

Notes

Poland is divided into 16 voivodships. Apart from the Silesian Voivodship (which represents the Silesian Region) with Katowice as the governor city, there is also Lower Silesian Voivodship, with Wrocław as the governor city (and this region is not a subject of our study).

The following types of activity are excluded: bank, insurance institutions, brokerage institutions, tertiary education institutions, independent health care institutions and private farms in agriculture (Financial Results, 2007–2010).

The branch of the business influences the assets structure in terms of the required level of fixed assets. Therefore, the debt capacity is dependent on the volume of fixed assets. Companies with large share of fixed assets in the assets structure should rely more on equity capital. This principle is embodied in so called Balance Sheet Golden Rule that requires that all fixed assets of the company should be covered by the equity. Compare: (Sierpińska and Jachna, 2007, pp. 68–69).

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Annex A. Selected balance sheet data for the MAPP and the MEPP sample of companies (in mln of PLN).

Financial statement items:	The MAPP sample					The MEPP sample				
	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010
capital in total	1 457 313	1 728 805	1 900 528	1 987 589	2 132 977	173 029	212 987	223 254	232 898	256392
equity	744 414	918 905	959 243	1 025 195	1 099 006	86 261	115 004	112 263	122 096	137872
debt in total	712 899	809 899	941 286	962 394	1 034 101	86 768	97 983	110 991	110 803	118 519
in this:										
long-term debt	178 634	198 741	229 673	258 301	272 682	13 874	14 550	18 286	18 718	20 211
short-term debt	425 934	488 065	572 008	556 980	596 806	54 547	64 759	72 041	71 304	74 601
other items:	108 331	123 094	139 605	147 112	164 612	18 347	18 674	20 664	20 781	23 705
provisions for liabilities	51 157	58 827	66 851	71 709	79 575	11 328	11 919	13 418	13 936	16 041
deferred and accrued expenses	57 173	64 267	72 753	75 403	85 037	7 019	6 755	7 246	6 845	7 664
tangible fixed assets	637 810	715 216	778 071	810 630	847 172	82 346	91 607	96 832	100 583	102 785

Annex B. The Structure of short-term debt in the MAPP and the MEPP sample of companies.

Financial statement items:	The MAPP sample					The MEPP sample				
	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010
short-term credit and loans	23,75%	25,61%	26,44%	24,29%	22,20%	23,44%	28,59%	18,32%	18,11%	17,79%
short-term liabilities from issuance of debt securities	1,75%	1,34%	1,20%	0,75%	1,00%	0,60%	0,90%	0,54%	0,68%	0,71%
short-term liabilities from deliveries and services (accounts payable)	52,28%	51,40%	47,77%	49,87%	51,1%	59,23%	56,07%	52,92%	55,49%	55,60%
other short-term liabilities	22,22%	21,64%	24,59%	25,09%	25,7%	16,73%	14,45%	28,22%	25,72%	25,90%
short-term debt in total	**100,00%**	**100,00%**	**100,00%**	**100,00%**	**100,00%**	**100,00%**	**100,00%**	**100,00%**	100,00%	100,00%

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