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The Asset Self-Financing Level and Debt Service Coverage Conducted by Bankrupting Companies within 1–3 Years Before Their Bankruptcy

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Abstract: This article analysed two selected ratios of the financial analysis in two extremely different groups of companies. The aim of the research is to evaluate the diversification of the development of variability ranges of the business self-financing ratio and the debt service coverage ratio in bankrupting companies (3 years prior to the bankruptcy declared by the court) and in sound companies. The research sample was comprised of 190 companies which declared bankruptcy in the years 2007–2011 and 190 solvent companies. The results of the conducted research prove the research hypothesis that there are such financial analysis ratios that effectively classify the analysed company one or two years or even three years in advance to one of two groups: companies that face bankruptcy threats or alternatively – solvent companies (sound). The research results demonstrated in the article are part of the author's broader studies on seeking one-dimensional predictors of the companies' bankruptcy to be used to develop multi-dimensional early warning systems.

Keywords: bankruptcy, insolvency, financial analysis, ratio analysis

Introduction

The essential issue in strategic company management is to determine sources of financing its business activity. A relevant proportion between equity capitals and foreign capitals involved in business processes constitutes a crucial issue not only in the company management theory, but most notably in commonplace business practice. Therefore, at the outset of these considerations, there may be advanced a clear thesis that the involvement of foreign capitals is reasonable and proper as long as the return on invested capital is greater than the Weighted Average Cost of Capital (WACC). In the company's current operation this rule is obvious and it does not need to be commented on. There arises, however, a doubt in a horizontal and strategic way of thinking. Since there might be drawn an analogy between the company's short-term goal, for instance the profit maximization, and the company's long-term goal, for instance a broadly defined development and creation of values not only for the owners, but also for various groups of the company's stakeholders.

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The aforesaid doubt pertains to two aspects of the company's operation, most notably on an unstable market affected by business fluctuations called a turbulent market. On the one hand, the company's continuous operation is internally guaranteed by, among others, possibilities that ensure the continuous inflow of capital. This means that it is easier for the company to operate in wobbly conditions provided that it has a good rating, a high credit rating and it is financially reliable for a perspective lender or a new investor. It is necessary to remember, however, that these stakeholders' evaluations are highly affected by a previous level of self-financing business that proves financial safety for a prospective capital donor. Too high a level of foreign capitals may be considered as discreditable according to, e.g. a financial institution. This problem affects each company that strives for the external financing, e.g. a bank loan. On the other hand, the company's financial reliability evaluated by its strategic business partners is also partly a derivative of this company's structure of financing. In both cases, too high a level of external financing may determine a lower rating that results from too low a level of financial security from the company's own financial resources. Further, hypothetically, even if WACC is lower than the return on invested capital, in a horizontal perspective, there may occur another problem, viz.: a level of fixed costs that obviously can be financed by current contracts (if we are talking about WACC < return on capital), but it does not necessarily need to be financed from a portfolio of future contracts (sometimes they are difficult to be estimated on a present day).

In order to make these considerations pragmatic, obviously, it would be necessary to specify them for a specific group of companies, e.g. a selected sector. In this article, however, the author decided to direct the course of these considerations with respect to two contrary groups of business entities, going beyond characteristics that differentiate them in a sectorial structure itself. The aim of this article is to discuss the differences in the structure of financing a company's assets and the debt service in two outmost groups of business entities. On the other hand, the author conducted a financial analysis of 190 companies subject to economic bankruptcy, and hence suffering from extreme financial problems and finally being declared bankrupt by the court in the years 2007–2011. On the other hand, there was a selected group of financially sound and prosperous companies that is analogous with respect to three criteria[1]. At the outset of this studies, the author formulated the following research hypothesis: as early as one year, or even two or three years before their bankruptcy is declared by the court bankrupt companies are characterized by a different level of financing their business activities from their equity capitals and by a lower debt service level than those companies that, as a result of developing their business activities, are not at a risk of bankruptcy. This research hypothesis proves that bankruptcy is not surprising (Nogalski, Macinkiewicz 2004), as it results from an escalating and developing crisis (Gurgul 2006). Consequently, the marginalization of its growing number of distinct symptoms leads the company to the so-called proper crisis stage that may, as an extreme scenario of events, result in declaring the insolvent debtor bankrupt by the court.

[1] The "healthy" group of companies was selected on the basis of the following criteria: the basic code of the conducted business activity; a comparable value of revenues from sales; a comparable value of a balance amount; and the identical organizational and legal form.

1. The structure of financing business activity at the stage preceding companies' bankruptcy

Companies whose economic and financial condition is sound and who finance almost half of their own businesses from their own resources. According to the author's own studies on this aspect, the partial results of which are shown in Table 1 and Figure 1, these business entities finance their businesses from their equity capitals at 47%. These results considerably differ from those shown by companies subject to bankruptcy, i.e. even three years prior to declaring their bankruptcy by the court. It emerges that the bankrupting companies three years prior to their bankruptcy cover the costs of their businesses from their own financial resources at only 29%.

Table 1

The ability to self-finance businesses by bankrupting companies three years before bankruptcy declared by the court and by companies whose economic and financial position is sound

Chosen indicator 3 years before bankruptcy / Basic statistics for the variable	The ability to self-finance businesses			
	Bankrupt enterprises ($N_{B(-1)}$=165)	Bankrupt enterprises ($N_{B(-1)}$=186)	Bankrupt enterprises ($N_{B(-1)}$=47)	Healthy enterprises (N_H=190)
	y_{-3}	y_{-2}	y_{-1}	
N-important observations	165	186	47	190
Missing data	25	4	143	0
MIN - minimum	-2,15	-16,04	-3,38	-0,32
MAX - maximum	0,85	0,95	0,82	0,99
Average value (for all variables)	0,22	0,09	0,05	0,47
Standard deviation	0,44	1,30	0,80	0,25
Average value (for all variables QI-QIII)	**0,29**	**0,26**	**0,23**	**0,47**
- n important observations (QI-QIII)	83	92	23	94
- n important observations [%]	50,30%	49,46%	48,94%	49,47%
Average value (for all variables DeI-DeIX)	**0,29**	**0,26**	**0,21**	**0,47**
- n important observations (DeI-DeIX)	131	148	37	152
- n important observations [%]	79,39%	79,57%	78,72%	80,00%
QI - quartile I	0,12	0,09	0,09	0,28
Me - median	0,30	0,26	0,23	0,46
QIII - quartile III	0,45	0,43	0,38	0,66
DeI - decile I	-0,08	-0,12	-0,21	0,15
DeIX - decile IX	0,57	0,53	0,49	0,79
Typical areas of variability:				
- 50% of group <QI - QIII>	**0,12 - 0,45**	**0,09 - 0,43**	**0,09 - 0,38**	**0,28 - 0,66**
- 80% of group <DeI - DeIX>	**-0,08 - 0,57**	**-0,12 - 0,53**	**-0,21 - 0,49**	**0,15 - 0,79**

Source: own calculations on the basis of the analysis of the financial statements of 190 companies.

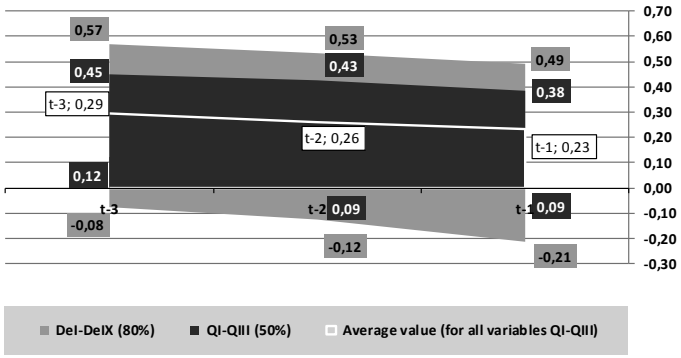

Figure 1. The ability to self-finance businesses by bankrupting companies three years before bankruptcy declared by the court

Source: own calculations on the basis of the analysis of the financial statements of 190 companies.

As for the assessment of the company's financial reliability this ratio is a stimulant and – as emphasised at the beginning of this study – in some specific situation it may also be considered as a nominal-the-best. This means that the greater level of self-financing the business activity will be interpreted as better, i.e. it guarantees the company's financial security, autonomy and financial independency to a greater extent. Obviously, in order to consider it as such, most notably to be able to determine any required boundaries of its variability (and hence consider it as a nominal-the-best), it is necessary to know at least three variables, among others: cost of the equity capital and foreign capital that considers the lost cost of alternative investment opportunities, return on invested capital, as well as a change in the gradual growth and changes in the structure of fixed costs conditioned by a potential, periodic extension of the conducted business. The fact that this rate is considered negatively at the lower level is proved by a gradual decline in its average level when the analysed companies are coming to the moment of their bankruptcy. From the data shown in Table 1 and Picture 1 there may be drawn conclusions that 80% of the analysed companies which declared bankruptcy in the year t0?, the average level of self-financing their business dropped from 29% three years before their bankruptcy to 26% two years before this event and to 21% one year before the bankruptcy was declared by the court.

The typical area of variability with respect to the co-financing of their business activity by the medium 50% of the analysed "financially sound" companies ranges from 28% to 66%. Whereas, one year prior to their bankruptcy the ability to cover business costs from their own financial resources is in an analogous medium (typical) group of 50% of the bankruptcies at the level ranging from 9% to 38%. On the basis of these studies it may be stated that one of the resultants of the companies' worsening economic and financial conditions that is highly linked to their bankruptcy is to run into debts too excessively and use

external financial resources to a greater extent. This activity is risky from the perspective of the business partners of these companies as their debts may become uncollectable and difficult to collect.

2. The debt service coverage ratio from the generated financial surplus in bankrupting companies and companies with good economic and financial conditions

Another discussed ratio, the average level of which in the conducted research emerged to be diversified for business entities of a different level of economic and financial conditions is the debt service coverage ratio. This ratio is a relation of the company's net financial result and depreciation to the total debt (short- and long-term). Due to this fact that the value of any current depreciation write-offs is not a stream of expenditures, but it is only a cost that reduces the tax base, in the conducted research the author modified the ratio numerator in the form of a net result, in plus, by a value of the depreciation write-offs made. In this way, the ratio numerator included the financial surplus made on a cash basis, not on a memorial basis. This makes the ratio more pragmatic (practical and more objective). This ratio, as shown in Table 2 and Figure 2, and is characterized by a high discrimination level for both groups of companies. In this place, the ratio's discrimination ability is understood as a feature of a given variable which makes it possible to differ to a great extent companies that face the threat of bankruptcy (de facto that are in a specific period preceding bankruptcy) from solvent companies.

A typical ratio variability area ranges from 12% to 50% for 50% of the analysed medium observations (i.e. the analysis covered 94 sound companies of the total number of 190 companies). This means that the solvent and sound companies are able to on average cover the financial surplus generated within a year from 12% to 50% of the average value of their obligations. If we reverse this ratio value (by replacing its numerator with a denominator), we would obtain an average period (expressed in years), in which, by keeping the constant level of generated financial results, the company would hypothetically be able to repay its debts in whole. With respect to sound companies this action means that they would be able to repay on the basis of these considerations their total debts from the generated financial surplus within a period from 2 to 8 years. Table 1 does not show these results due to one reason: it would be justified, only if the value of long-term debts were compared to the financial surplus, whereas in these studies the author discusses the ratio based on the total debt. Therefore, this ratio also comprises short-term debt. Long-term debt is a burden that weighs on the company in a long period of time, whereas short-term debt is a natural value of debts that are difficult to be repaid. Their occurrence is a natural phenomenon that results from a current business activity in which there are some necessary short-term mature payments. They result from the need to make payments in three fundamental directions:

wages for workers, payments of short-term mature invoices (for suppliers) and payments of extraordinary payments such as national insurance contributions and taxes.

Very interesting conclusions can be drawn from the analysis of changes with respect to the ability to repay the debt by companies subject to bankruptcy one, two and three years prior to their bankruptcy. They are shown in detail in Table 2 and Figure 2. According to the data included in this table the average bankrupting companies (80% of the analysed medium companies of a group of 163 bankrupting companies) three years prior to the bankruptcy declared by the court are able to repay by means of the generated financial surplus only 9% of their total liabilities. This means that if they achieved such financial results for the entire time, they would be able to repay their entire debts within 11 years. Their payment ability radically decreases when the moment of their bankruptcy is approaching. Two years before

Table 2

Debt service coverage from the financial surplus by bankrupting companies three years before their bankruptcy and by sound companies

Chosen indicator 3 years before bankruptcy / Basic statistics for the variable	Debt service coverage ratio			
	Bankrupt enterprises ($N_{B(-1)}$=163)	Bankrupt enterprises ($N_{B(-1)}$=182)	Bankrupt enterprises ($N_{B(-1)}$=46)	Healthy enterprises (N_H=190)
	y_{-3}	y_{-2}	y_{-1}	
N-important observations	163	182	46	190
Missing data	27	8	144	0
MIN - minimum	-4,46	-12,13	-1,27	-0,99
MAX - maximum	1,79	1,30	97,00	21,21
Average value (for all variables)	0,07	-0,06	1,96	0,64
Standard deviation	0,50	0,95	14,33	1,96
Average value (for all variables QI-QIII)	**0,09**	**0,04**	**-0,06**	**0,26**
- n important observations (QI-QIII)	81	90	22	94
- n important observations [%]	49,69%	49,45%	47,83%	49,47%
Average value (for all variables DeI-DeIX)	**0,09**	**0,03**	**-0,09**	**0,32**
- n important observations (DeI-DeIX)	129	144	36	152
- n important observations [%]	79,14%	79,12%	78,26%	80,00%
QI - quartile I	0,02	-0,08	-0,27	0,12
Me - median	0,09	0,05	-0,06	0,23
QIII - quartile III	0,16	0,12	0,06	0,50
DeI - decile I	-0,19	-0,23	-0,59	0,03
DeIX - decile IX	0,29	0,18	0,14	1,14
Typical areas of variability:				
- 50% of group <QI - QIII>	**0,02 - 0,16**	**-0,08 - 0,12**	**-0,27 - 0,06**	**0,12 - 0,50**
- 80% of group <DeI - DeIX>	**-0,19 - 0,29**	**-0,23 - 0,18**	**-0,59 - 0,14**	**0,03 - 1,14**

Source: own calculations on the basis of the analysis of the financial statements of 190 companies.

this event they are able to repay only 3% of their debts. Whereas, one year before their bankruptcy this ratio reduces to –9%. This means, de facto, that those companies lost their ability to repay their debts on a current basis.

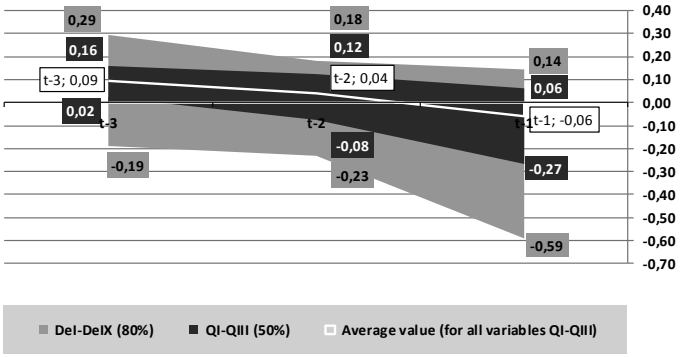

Figure 2. Debt service coverage from the financial surplus by bankrupting companies three years before their bankruptcy

Source: own calculations on the basis of the analysis of the financial statements of 190 companies.

The negative debt service coverage ratio that occurs in the companies subject to bankruptcy one year prior to the bankruptcy declared by the court is caused by the fact that these entities incurred losses with respect to the net financial result. Its value is so great that even a result modified by a value of the made depreciation write-offs still remains negative. Consequently, these companies are not able to repay all mature short-term debts. This ratio is, in some respects, a derivative of the low financial liquidity which in this group of companies will become permanent insolvency, soon. 80% of the analysed medium (average) companies has this ratio in the range of -0.59 – 0,14. This means that for each PLN 1,000 of these companies' debts, they incur a net loss modified by the value of depreciation write-offs amounting to PLN 590 or they begin to generate some small profit up to PLN 140. As shown, these results considerably differ from the results generated by solvent companies, and thus it can be said that this ratio also has good discrimination abilities. Thanks to this information, we can interpret more precisely the companies' results of financial analyses, referring to some boundary normative values characteristic for the bankrupting companies and for the companies whose economic and financial conditions are good.

Conclusions

The partial results of the broader studies on developing variability ranges of the selected ratios of the financial analysis discussed in this article are one of the preparatory stages for

the selection of variables for the early bankruptcy warning models. For this purpose, the author analysed various different financial ratios in two groups of companies whose financial and economic conditions are extremely different. At this stage of research it has emerged that some of the analysed ratios are considerably different in bankrupting companies and in sound companies. Such ratios are called good one-dimensional bankruptcy predictors. Their one-dimensionality means that they effectively evaluate a specific selected area (liquidity, debt, profitability, productivity, effectiveness or turnover) of the company's operation. Whereas, the combination of such selected good one-dimensional bankruptcy predictors to one weighted function (e.g. by using the discrimination analysis method) makes it possible to carry out a multi-dimensional assessment of the bankruptcy threat level of the analyzed company.

These "good" ratios include, among others, two relations discussed in the article in a form of the share of the equity in financing business and the ability to repay the debt from the generated financial surplus. Obviously, they are not the only variables characterized by quite good discriminating properties. The group of financial liquidity ratios also include ratios used to observe the bankruptcy threat to companies one or even two years in advance. It is also interesting that the author's studies conducted to this extent for the last seven years show that the normative variability ranges of most ratios of the financial analysis will not change over time. This thesis seems to be risky, particularly, if it is based on intuitional thinking. Obviously, there are some differences as for their development in the period of the economic boom and downturn; however, there may be another research hypothesis put forward (which, however, needs to be studied in detail) on the relative stability of the postulated (normative) variability ranges of the financial analysis ratios. This hypothesis could indirectly be proved through inductive thinking, i.e. based on many repeated experiences resulting from the conducted studies and analyses of various companies. This is to say that in Polish audit standards certified auditors still use econometric models to verify the potential threat of losing the possibility to continue the business activity that were developed a long time ago and in the conditions of the different economy. This refers to subsequent modifications of the Z-Score initially developed in the 1960s by Prof E.I. Altman (Altman 1968); (Altman, Haldeman, Narayanan 1977). The legitimacy of using these models is proved not only by practice, but also by verification studies conducted by both foreign researchers (Ooghe, Claus, Sierens, Camerlynck) and in Poland (Hamrol, Chodakowski 2008); (Rutkowska 2006); (Antonowicz 2006).

Despite positive verification tests, the application of these models brings about many controversies in the milieu of economists. If the foreign models are, however, applied in practice besides the Polish models, obviously with the required level of effectiveness, this means that there are some premises that make us suppose that the relative stability (both in time and in space) of financial ratios exists. However, this research and its direction towards specific sectors in which the companies operate should be analyzed more broadly. This topic, however, is and will be covered by the author's current and future research.

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POZIOM SAMOFINANSOWANIA MAJĄTKU I ZDOLNOŚĆ OBSŁUGI ZADŁUŻENIA PRZEZ BANKRUTUJĄCE PRZEDSIĘBIORSTWA W OKRESIE 1–3 LAT PRZED OGŁOSZENIEM ICH UPADŁOŚCI

Streszczenie: W artykule poddane zostały badaniom dwa wybrane wskaźniki analizy finansowej w dwóch skrajnych grupach przedsiębiorstw. Celem badań była ocena zróżnicowania kształtowania się przedziałów zmienności wskaźnika samofinansowania działalności gospodarczej oraz wskaźnika zdolności obsługi zadłużenia w przedsiębiorstwach bankrutujących (w okresie 3 lat poprzedzających sądową upadłość) oraz jednostkach zdrowych. Próba badawcza objęła 190 upadłych w latach 2007–2011 przedsiębiorstw oraz 190 dobranych im jednostek wypłacalnych. Wyniki przeprowadzonych badań potwierdzają postawioną hipotezę badawczą, iż istnieją takie wskaźniki analizy finansowej, które pozwalają już na rok, dwa lata a nawet na trzy lata skutecznie zaklasyfikować analizowane przedsiębiorstwo do jednej z dwóch grup: jednostek zagrożonych upadłością, lub alternatywnie – jednostek wypłacalnych (zdrowych). Przedstawione w artykule wyniki badań stanowią fragment szerszych prac autora w zakresie poszukiwania jednowymiarowych predyktorów upadłości przedsiębiorstw, które zostaną wykorzystane do budowy wielowymiarowych systemów wczesnego ostrzegania.

Słowa kluczowe: bankructwo, niewypłacalność, finansowa analiza, wskaźnikowa analiza

Citation

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