

IS THERE A MEANINGFUL LINK BETWEEN FINANCIAL PERFORMANCE AND CAPITAL STRUCTURE IN MANUFACTURING SECTOR? EVIDENCE FROM CZECH REPUBLIC

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Abstract: The paper presents the results of analyzes of the relationship of profitability and debt in the industrial sectors of the Czech economy. Formed return on equity ranking shows significant differences among sectors. ROE margins in sectors are from -8% in Manufacture of computer, electronic and optical equipment up to 24% in sectors Manufacture of rubber and plastic products and Manufacture of other transport equipment. The average ROE in the manufacturing industry is 12.01% with debt ratio 48.31% in the years 2010 - 2014. There are many studies aimed at finding meaningful link between financial performance and capital structure in many countries in different sectors of economy. These studies have yielded conflicting results. In this study Spearman correlation test showed link between ROE and debt ratio in branches of manufacturing industry. Against it the relationship between ROA and debt ratio has not confirmed with statistical significance. The question for future study is, if the growth of ROE has resulted to a decrease of debt ratio or vice versa.

Keywords: prosperity, return on equity, return on assets, debt ratio, manufacturing industry

JEL Classification: C12, G32, L60

1. INTRODUCTION

The company prosperity is the key factor for fulfilment of all basic goals on which the company establishing was based and for its subsequent operation. The prosperous company should be profitable and solvent. But the relation to the indebtedness does not necessarily need to be defined by the relation: high profitability = low indebtedness. On the one hand the company of which the economy negatively develops gets usually more and more indebted and heads to the insolvency, on the other hand even a prosperous company gets indebted when it intends to promptly increase its production that is being demanded at the market. Can we unambiguously state that the increasing indebtedness is harmful? Of course, we cannot. Just the company profitability shall be considered in parallel with the indebtedness, as well as the possible company undercapitalization. It is generally known that some industries are more lucrative than the others. This text is aimed to present results of the analysis of profitability and indebtedness relation within sectors of the Czech economy and at the same time to answer the question whether the higher profitability leads to the lower indebtedness of Czech companies or to the contrary.

2. ISSUE ANALYSIS

The economic sectors of national economics include the groups of companies that have the same or similar scope of business. Due to the same production a series of same macro environment factors (political, economic, social, technical, legislative, and others) as well as some micro environment factors (competitive environment, suppliers, and customers) influence the companies. The used production factors and production process shall be also similar. This results in specificities in property and capital structure of companies when compared among sectors. Then it is obvious that even the basic ratio indicators of financial analysis including activity, profitability, liquidity

and indebtedness will not be the same. In addition, according to [10] or [3], the interconnections of economic processes in the company result in the mutual interconnection of economic (ratio) indicators that describe the economic reality of the company. Some of these interconnections are shown as follows [4].

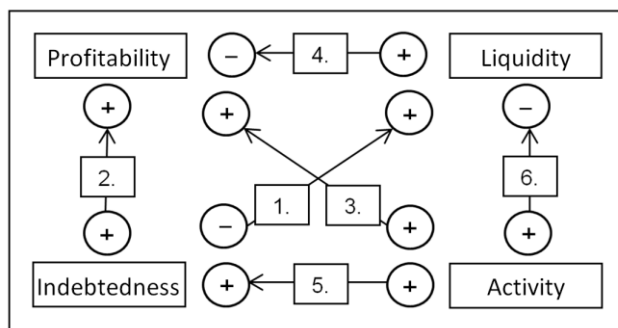


Figure 1 Interconnections of ratio indicators

Source: [4]

With regard to the goal of investigation it is suitable to give attention to comments by which the author of the figure 1 comments the chosen connection no. 2 between profitability and indebtedness: The profitability and the total indebtedness – “With growing indebtedness the profitability of equity grows too to some limit.” This is not valid if the costs of foreign capital are higher than the profitability of assets as this can also happen in the practice.

The investigation from other countries does not imply any unambiguous results, for example:

- Latvia [1]: ROE of agriculture companies is not generally associated and correlated with other company characteristics. In the case of food production companies, one can find that during the recession more profitable companies have less debt (regardless of maturity). For retail companies, it can be concluded that bigger companies have a higher ROE, yet asset structure

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and long-term debt ratio are negatively correlated with ROE.

- Sri Lanka [11]: The purpose of study was to investigate the relationship between capital structure and profitability of listed Srilankan banks. Results of the analysis show that there is a negative association between capital structure and profitability except the association between debt to equity and return on equity.
- Iran [9]: Results of study of 117 corporates in Tehran Stock Exchange demonstrated that capital structure influences financial performance (ROE included).
- Pakistan [2]: Random effect regression analysis was used to find out the impact of debt on profitability in non-financial sectors of Pakistan. Results indicated a significant but negative relationship between short term debt, long term debt, total debt, and return on assets.

The research question is therefore whether there is link between profitability and indebtedness in manufacturing industry in the Czech Republic. This leads to the following hypotheses:

- 1) Is there a meaningful link between return on equity (ROE) and capital structure?
- 2) Is there a meaningful link between return on assets (ROA) and capital structure?

3. ANALYSIS OF DATA AND ACHIEVED RESULTS

In order to fulfil the goal the data from statistics of the Ministry of industry and trade (hereinafter only as MPO) were used. These summary statistics characterize individual industries and have, pursuant to MPO [8] clear predicative

capability for large and middle companies. The data was used in the form of average level of return on equity (hereinafter only as ROE) and the average total indebtedness for 5 subsequent years from the year 2010 to the year 2014 in 21 sectors.

The table 1 includes the average ROE value in years (2010-2014) and their arithmetical average (\emptyset ROE). In relation to \emptyset ROE the order has been created from the higher to the lowest achieved average profitability. ROE_{max} amounting to 23.94% was achieved by the industry C22, the Production of rubber and plastic products, to the contrary the industry C26, the Production of computers, electronic and optic devices and equipment (the average does not include the value for the year 2011 as such information was not available) showed the lowest profitability ROE_{min} -8.18%. The total scope ROE_{max} - ROE_{min} achieves 32.12 % which clearly confirms the huge differences in prosperity of various industries. It results from the table 1 that except for the mentioned Production of rubber and plastic products also the Production of other transport means and devices occupies the top having the large lead by 8% over the following 3rd place. The manufacturing industry as the whole shows quite stable values of ROE from 10.37% to 14.42% with arithmetical average 12.01%.

ROE is maximizing criterion for the evaluation of prosperity. Thus the zero, even the negative value of ROE is considered as negative condition. It means for owners of the company that their invested capital has not been valorized or was even devaluated. This is the case of sectors C19 and C26.

Table 1 ROE values in sectors in 2010-2014

| CODE* | SECTOR | ROE 2010 | ROE 2011 | ROE 2012 | ROE 2013 | ROE 2014 | \emptyset ROE | RANK |
|----------|---|---------------|---------------|---------------|---------------|---------------|-----------------|----------|
| C22 | Manufacture of rubber and plastic products | 21,65% | 22,48% | 24,59% | 23,93% | 27,05% | 23,94% | 1. |
| C30 | Manufacture of other transport | 22,94% | 27,97% | 26,99% | 22,27% | 18,82% | 23,80% | 2. |
| C32 | Other manufacturing | 22,62% | 13,56% | 12,18% | 12,90% | 17,85% | 15,82% | 3. |
| C29 | Manufacture of motor vehicles | 14,22% | 17,46% | 15,26% | 12,49% | 17,89% | 15,46% | 4. |
| C27 | Manufacture of electrical equipment | 14,84% | 12,81% | 14,18% | 11,60% | 20,33% | 14,75% | 5. |
| C20 | Manufacture of chemicals | 12,61% | 12,36% | 11,35% | 7,25% | 15,51% | 11,82% | 6. |
| C33 | Repair and install. of machinery and equipment | 12,05% | 11,26% | 11,87% | 10,92% | 12,96% | 11,81% | 7. |
| C11 | Manufacture of beverages | 13,94% | 12,17% | 19,06% | 9,10% | 4,72% | 11,80% | 8. |
| C10 | Manufacture of food products | 11,57% | 15,62% | 12,77% | 8,52% | 10,10% | 11,72% | 9. |
| C21 | Manufacture of basic pharmaceutical products | 18,92% | 10,73% | 8,80% | 9,74% | 10,24% | 11,69% | 10. |
| C25 | Manufacture of fabricated metal products | 8,19% | 8,32% | 11,83% | 12,82% | 16,92% | 11,62% | 11. |
| C28 | Manufacture of machinery and equipment | 13,42% | 11,07% | 13,42% | 9,06% | 9,82% | 11,36% | 12. |
| C13 | Manufacture of textiles | 9,82% | 8,67% | 10,64% | 10,12% | 12,93% | 10,44% | 13. |
| C23 | Manufacture of other non-metallic mineral prod. | 9,38% | 8,92% | 8,19% | 7,31% | 10,80% | 8,92% | 14. |
| C17 | Manufacture of paper and paper products | 10,95% | 3,75% | 9,52% | 7,99% | 11,35% | 8,71% | 15. |
| C15 | Manufacture of wood and wood products | 7,33% | 0,95% | 5,02% | 8,44% | 14,12% | 7,17% | 16. |
| C18 | Printing and reproduction of recorded media | 4,67% | 1,57% | 8,64% | 5,99% | 8,14% | 5,80% | 17. |
| C31 | Furniture production | 5,34% | 5,84% | 3,61% | 5,68% | 7,24% | 5,54% | 18. |
| C24 | Manufacture of basic metals | 1,92% | 3,01% | 2,03% | 4,34% | 12,65% | 4,79% | 19. |
| C19 | Manufacture of coke and refined petrol. products | -6,10% | -1,40% | -1,49% | 0,71% | 0,86% | -1,48% | 20. |
| C26 | Manufacture of computer, electronic and optical.. | -48,34% | - | 1,28% | 6,19% | 13,61% | -8,18% | 21. |
| C | MANUFACTURING INDUSTRY | 11,61% | 11,52% | 12,12% | 10,37% | 14,42% | 12,01% | x |

*Sectoral codes according to NACE

Source: own processing from [5], [6], [7]

Table 2 Debt ratios in sectors in 2010-2014

| CODE | SECTOR | DC/A* 2010 | DC/A 2011 | DC/A 2012 | DC/A 2013 | DC/A 2014 | Ø DC/A | RANK |
|----------|---|---------------|---------------|---------------|---------------|---------------|---------------|----------|
| C21 | Manufacture of basic pharmaceutical products | 23,67% | 20,30% | 20,68% | 25,89% | 28,99% | 23,91% | 1. |
| C31 | Furniture production | 35,50% | 33,35% | 28,43% | 28,68% | 28,86% | 30,97% | 2. |
| C19 | Manufacture of coke and refined petrol. products | 39,14% | 40,38% | 41,73% | 21,73% | 27,53% | 34,10% | 3. |
| C24 | Manufacture of basic metals | 34,00% | 33,75% | 29,72% | 35,95% | 37,53% | 34,19% | 4. |
| C22 | Manufacture of rubber and plastic products | 39,82% | 38,93% | 33,93% | 34,45% | 31,80% | 35,79% | 5. |
| C32 | Other manufacturing | 28,27% | 28,86% | 40,62% | 42,18% | 42,26% | 36,44% | 6. |
| C23 | Manufacture of other non-metallic mineral prod. | 33,91% | 34,03% | 39,37% | 38,78% | 38,50% | 36,92% | 7. |
| C17 | Manufacture of paper and paper products | 39,13% | 37,50% | 42,82% | 44,28% | 43,55% | 41,46% | 8. |
| C13 | Manufacture of textiles | 42,81% | 45,31% | 44,00% | 41,32% | 38,89% | 42,47% | 9. |
| C33 | Repair and install. of machinery and equipment | 47,69% | 47,79% | 37,56% | 41,94% | 40,92% | 43,18% | 10. |
| C15 | Manufacture of wood and wood products | 48,21% | 49,84% | 48,43% | 45,04% | 43,46% | 47,00% | 11. |
| C28 | Manufacture of machinery and equipment | 52,68% | 51,35% | 50,19% | 42,94% | 41,51% | 47,73% | 12. |
| C10 | Manufacture of food products | 52,01% | 50,91% | 49,66% | 45,00% | 43,37% | 48,19% | 13. |
| C18 | Printing and reproduction of recorded media | 57,66% | 56,48% | 50,52% | 47,75% | 46,42% | 51,77% | 14. |
| C27 | Manufacture of electrical equipment | 52,66% | 52,51% | 50,62% | 53,54% | 50,00% | 51,87% | 15. |
| C25 | Manufacture of fabricated metal products | 54,20% | 55,08% | 51,00% | 50,72% | 50,06% | 52,21% | 16. |
| C20 | Manufacture of chemicals | 51,29% | 51,68% | 49,67% | 53,53% | 54,93% | 52,22% | 17. |
| C11 | Manufacture of beverages | 42,92% | 47,29% | 66,13% | 57,25% | 58,26% | 54,37% | 18. |
| C29 | Manufacture of motor vehicles | 55,45% | 58,15% | 55,70% | 53,06% | 55,14% | 55,50% | 19. |
| C30 | Manufacture of other transport | 53,70% | 60,65% | 54,43% | 56,90% | 54,79% | 56,09% | 20. |
| C26 | Manufacture of computer, electronic and optical.. | 93,04% | 98,25% | 59,57% | 68,62% | 65,09% | 76,91% | 21. |
| C | MANUFACTURING INDUSTRY | 48,96% | 50,23% | 47,79% | 47,35% | 47,24% | 48,31% | x |

*DC/A means ratio of debt capital and assets

The table 2 shows average values of total indebtedness in sectors for years 2010-2014 as well as the average indebtedness of these five monitored years ØDC/A. The individual industries were subsequently ranged from the lowest to the highest indebtedness. The lowest indebtedness is achieved in sector Production of basic pharmaceutical products being at the amount of 23.91%. The manufacturing industry, as the whole, has the average indebtedness of 48.31% and the highest indebtedness is achieved in the Production of computers, electronic and optic devices at the amount of 76.91%.

The relation of indebtedness and prosperity in industries was tested using the Spearman's correlation coefficient. First, the prosperity was quantified using the return on assets (ROA). The testing of relation between ROA and the total indebtedness did not show any connection among values in sectors based on all available data in years 2010-2014. This means that hypothesis 2 was not confirmed. On the contrary, ROE as the prosperity representative has a strong connection to the total indebtedness pursuant to the Spearman's correlation coefficient. The value R of this test is 0.21502 and the bilateral value P is 0.02475. Thus the dependency between ROE and the total indebtedness in industries can be considered as important from the statistic point of view. This means that hypothesis 1 was confirmed.

The industry C22 Production of rubber and plastic products with five-year average of ROE at 23.94% and the total indebtedness of 35.79% achieved the best relation of profitability and indebtedness (coefficient 0.67). On the contrary the worst relation of profitability and indebtedness was found in the industry C26 Production of computers,

Source: own processing from [5], [6], [7]
electronic and optic devices and equipment (coefficient - 0,11) with total lowest value of five-years average of ROE - 8.18% and the highest five-years average indebtedness in total among all sectors, i.e. at the level of 76.91% (coefficient -0.11).

4. CONCLUSION

The performed prosperity analysis in sectors of the manufacturing industry has shown considerable differences in prosperity based on ROE as well as in the total indebtedness among sectors. The analysis's authors have considered two versions of opposed effects of the profitability level on the total indebtedness. One version states that the low value of equity profitability leads to the higher indebtedness and vice versa. The other version states that the higher equity profitability, as the result of economic success, leads to further investments in production enlargement, thus it leads to higher indebtedness of companies.

The Spearman's correlation test has shown the dependency between the ROE growth and the decrease of indebtedness. The ranking of ROE made within this analysis in the Czech industry has also shown large differences in profitability and growth of owners' capital. The sector of Production of computers, electronic and optic devices and equipment unexpectedly shows fluctuating values of ROE, including the negative ones, and the ROE average of several years of -8.18% is the worst one within the manufacturing industry. On the contrary the stable and high values of ROE of nearly 24% are shown in the sector of Production of rubber and plastic products and in the Production of other

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transport means and devices and thus they are at two first places within the profitability of manufacturing industry.

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