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Agricultural Economic Subjects in the Czech Republic: Capital Structure

Jana Stekla and Marta Gryeova
Department of Economics, Faculty of Economics and Management,
Czech University of Life Sciences in Prague, 129 165 21 Kamycka, 6 Prague, Czech Republic

Abstract: The enterprises that deviate too far from the optimum will face greater risk of failure or acquisition. The businesses appear to increase leverage when they face attractive growth opportunities or when poor operating performance reduces equity value or compels borrowing. The enterprises are acquired when rapid growth has reduced financial slack. The economically optimal capital structure decision is very important even more in those days because the profitability of an enterprise and its success is directly affected by such decision. This study is focused on the capital structure and its disparity of companies in the Czech agricultural sector for time series 2008-2013. The data from the database of enterprises Albertina is analyzed by using statistical measures and correlation analysis to find out the association between the calculated selected financial indicators. The financial crisis and the recovery period influenced the most the limited liability companies in the agricultural sector in the Czech Republic in terms of the highest changes in the calculated values for most of the financial ratios. The capital disparity in terms of differences between the values of calculated ratios, especially in the case of tangible assets ratio and market share ratio for the selected types of companies in agricultural sector has narrowed during the recovery period.

Key words: Capital structure, capital disparity, agriculture, farmer's cooperatives, statistics, correlation, Person's correlation coefficient

INTRODUCTION

Capital structure is referred to as the way in which the enterprise finances itself through debts, equity and securities. It is the structure of debt and equity that is required for an enterprise to finance its assets. The capital structure of an enterprise is very important because it is related to the ability of the enterprise to meet the needs of its stakeholders. Management of a company should always endeavor to develop a capital structure. Consequently, a company should plan its capital structure to maximize the use of funds and to be able to adapt more easily to the changing conditions. With unplanned capital structure, enterprises may fail to economize the use of their funds. It follows that an attention has to be paid as far as the optimum capital structure is concerned (Periasamy, 2009). One of the important financial decisions facing firm is the choice between debt and equity capital but in some countries there is a third choice-convertible debt which combines both instrument above (Glen and Pinto, 1994). This decision can effectively and efficiently be taken when managers are aware of how capital structure influences company profitability.

According to study by Brander and Lewis (1986), the enterprise's objective is to maximize the wealth of shareholders and moreover market behavior is affected by financial structure. They also state that enterprise which ignores the strategic effect of financial decision would have lower value. Maksimovic (1988) shows in his research that enterprise's values are affected by the choice of capital structure. The enterprises will follow the strategy of maximizing their output for improving profitability in favorable economic conditions. In unfavorable economic conditions, firms would take a cut in production and reduce their profitability.

There are two main theories which are concerned with corporate capital. It is the optimal trade off theory and the pecking order theory. Under the trade off theory, taxes, distress costs and agency costs combine to yield an optimal capital structure and enterprises are punished for deviating from that optimum through lower risk-adjusted returns and potentially failure or acquisition. The optimal tradeoff theory was mentioned for example by Kraus and Litzenberger (1973), Jensen and Meckling (1976). Under the pecking order theory, capital structure is a result of investment opportunities and capital retention policies in the presence of asymmetric information. Donaldson and Fox (2000), Myers and Majluf (1984) were concerned with the pecking order theory. This study tries to assess the capital structure and capital

Corresponding Author: Jana Stekla, Department of Economics, Faculty of Economics and Management,
Czech University of Life Sciences in Prague, 129 165 21 Kamycka, 6 Prague, Czech Republic

disparity of agricultural companies in the Czech Republic during the period of 2008-2013 using the selected financial indicators. The main focus is on the changes and differences during the monitored period, resp. The time of the crisis and the recovery, across the three main types of agricultural companies, i.e., cooperatives, joint-stock companies and Limited Liability Companies (LLCs). This study also checks the relations between the selected indicators during this period for each type of companies.

MATERIALS AND METHODS

The database used for the analysis was the Albertina, the database of enterprises for time series from 2008-2013. In total there were analyzed 393 cooperatives, 706 limited liability companies and 473 joint-stock companies. The enterprises were selected with pursuant to the methodology CZ-NACE and with focusing their activities on crop and agriculture production.

In this study, there are used the formulas such as Book Leverage ratio (BLr), Market Leverage ratio (MLr), Cash Flow volatility ratio (CFvr), Profitability ratio (Pr), Market Share ratio (MSr), Tangible Assets ratio (TAr), Size ratio (Sr).

Book leverage ratio (Baker and Wurgler, 2002) is a ratio used to calculate the financial leverage of a company to get an idea of the company's methods of financing or to measure its ability to meet financial obligations. This ratio is used to measure a mix of operating costs, giving an idea of how changes in output will affect operating income. Fixed and variable costs are the two types of operating costs.

Market leverage ratio (Welch, 2011) is used to determine about the companie's financing methods or the ability to meet the obligations. This ratio is meant to evaluate a company's debt levels.

Firms with cash flow volatility ratio, approximated by the standard deviation, experience higher expected costs of financial distress and the debt-related agency costs are also more pronounced with increasing volatility. Investors have little ability to accurately forecast future earnings based on publicly available information for firms with high earnings volatility, according to De Angelo and Masulis (1980).

Profitability ratio (Periasamy, 2009) is used to measure the overall profitability of firm to the extent of operating efficiency it enjoys. This ratio establishes the relationship between profitability on sales and the profitability on investment turnover.

Market share ratio (McDonald and Wilson, 2011) is an indicator of the product's ability to generate cash. Market growth is used because it is an indicator of the product's cash requirements. The measure of market share used is the product's share relative to the firm's largest competitor. This indicator reflects the degree of dominance enjoyed by the product in the market. Fixed assets also known as "tangible assets" or property, plant and equipment is a term used in accounting for assets and property that cannot easily be converted into cash. Due to tangible assets ratio, it is compared with current assets such as cash or bank accounts which are described as liquid assets (Dyckman *et al*., 1995).

Size ratio is the log of assets (Nichols, 2008). Size of enterprises is important to potential partner income. Depending on the selected formulas there were constructed the following hypotheses:

- H_1: there is a negative relationship between book leverage ratio and market leverage ratio
- H_2: there is a negative relationship between book leverage ratio and cash flow volatility ratio
- H_3: there is a negative association between book leverage ratio and profitability ratio
- H_4: there is a positive relationship between market leverage ratio and profitability ratio
- H_5: there is a negative relationship between cash flow volatility ratio and profitability ratio
- H_6: there is a positive association between profitability ratio and market share ratio
- H_7: there is a positive relationship between tangible assets ratio and size ratio

In this study is used a Pearson correlation coefficient and statistical indicators. Pearson correlation coefficient (LeBlanc, 2004) is used to evaluate sample data as evidence that a linear association exists between two quantitative variables. The statistic is used to test the null hypothesis that there is no association between the variables X and Y. This coefficient is a summary statistic that represents the strength and nature, positive or negative of linear association between two variables. There are values approaching +1 or -1. A value of +1 corresponds a straight line with a positive slope, i.e., perfect positive association. A value of -1 corresponds a straight line with a negative slope, i.e., perfect negative association. A correlation value of zero indicates there is no association between the two variables. Equation 1 of Person's correlation coefficient is following (Jackson, 2003):

$$r = \frac{\sum XY - \frac{(\sum X)(\sum Y)}{N}}{\sqrt{\left(\sum X^2 \frac{(\sum X^2)}{N}\right)\left(\sum Y^2 \frac{(\sum Y^2)}{N}\right)}} \quad (1)$$

RESULTS AND DISCUSSION

Table 1 shows calculated values for the Book leverage ratio (Blr) of farmer's cooperatives, Limited

Table 1: Book leverage ratio (figures in times)

Parameters	2008	2009	2010	2011	2012	2013	Mean	SD
Farmer's cooperatives	0.461	0.452	0.451	0.441	0.416	0.411	0.439	0.020
Limited companies	0.679	0.626	0.600	0.571	0.537	0.505	0.586	0.063
Joint-stock companies	0.332	0.331	0.351	0.322	0.323	0.324	0.330	0.011

Table 2: Market leverage ratio (figures in times)

Parameters	2008	2009	2010	2011	2012	2013	Mean	SD
Farmer's cooperatives	0.986	1.001	0.998	0.997	0.996	1.000	0.996	0.005
Limited companies	1.000	0.997	1.000	1.000	1.000	1.009	1.001	0.004
Joint-stock companies	1.001	0.999	1.000	0.999	1.000	1.010	1.002	0.004

Table 3: Cash flow volatility ratio (figures in times)

Parameters	2008	2009	2010	2011	2012	2013	Mean	SD
Farmer's cooperatives	0.685	0.091	0.140	0.109	0.153	0.098	0.213	0.2330
Limited companies	9.956	0.361	0.198	0.613	9.984	0.464	3.596	4.9390
Joint-stock companies	0.618	0.528	0.167	0.093	0.511	0.083	0.333	0.0244

Table 4: Profitability ratio (figures in times)

Parameters	2008	2009	2010	2011	2012	2013	Mean	SD
Farmer's cooperatives	0.093	0.127	0.109	0.070	0.100	0.128	0.104	0.022
Limited companies	0.119	0.160	0.133	0.114	0.121	0.137	0.131	0.017
Joint-stock companies	0.086	0.104	0.083	0.074	0.088	0.115	0.092	0.015

Table 5: Market share ratio (figures in times)

Parameters	2008	2009	2010	2011	2012	2013	Mean	SD
Farmer's cooperatives	0.154	0.178	0.182	0.144	0.156	0.186	0.167	0.017
Limited companies	0.150	0.170	0.180	0.155	0.161	0.186	0.167	0.014
Joint-stock companies	0.157	0.174	0.179	0.150	0.156	0.184	0.167	0.014

Liability Companies (LLC) and Joint-Stock Companies (JSC) during the period of 2008-2013. The capital disparity in the sense of the differences in the book leverage ratio was quite high before the crisis. After wards, the gap mainly between LLC and cooperatives is narrowing. The limited liability companies has the highest values of this ratio and the standard deviation during this period, esp. >3x higher than the one for the cooperatives and nearly 6x higher than for the joint-stock companies that means that LLC was hit by the crisis the most.

Table 2 contains calculated values for the Market Leverage ratio (MLr) of farmer's cooperatives, Limited Liability Companies (LLC) and Joint-Stock Companies (JSC) during the period of 2008-2013. The differences in the Market leverage ratio were a bit higher between the cooperatives and LLCs before the crisis and a bit lower between the LLCs and joint-stock companies. However, the value is quite similar for all three types of agricultural companies and it is around one. Even the standard deviations are quite alike.

Table 3 shows the values for the Cash Flow volatility ratio (CFvr) of farmer's cooperatives, Limited Liability Companies (LLC) and Joint-Stock Companies (JSC) during the period of 2008-2013. The disparity in the Cash Flow volatility ratio was quite high during the monitored period, mainly LLCs stood apart from the others. The cash flow volatility was very extreme for LLCs as well as a high standard deviation during the financial crisis year 2008 and the year 2012 and so the LLCs were hit the most by the crisis.

Table 4 lists calculated values for the Profitability ratio (Pr) of farmer's cooperatives, Limited Liability Companies (LLC) and Joint-Stock Companies (JSC) during the period of 2008-2013. The capital disparity in the sense of the differences in the profitability ratio was not so high before the crisis. Mainly the values for cooperatives and LLCs are quite close. The most profitable companies during the period are LLCs. The cooperatives had the highest standard deviation so they were hit by the crisis the most.

Table 5 contains values for the Market Share ratio (MSr) of farmer's cooperatives, Limited Liability Companies (LLC) and Joint-Stock Companies (JSC) during the period of 2008-2013. The value of market share ratio in 2013 is the same for the cooperatives and LLCs and it is the highest one but in 2008 it was the value for joint-stock companies. So, it can be said that the market structure has changed and the market share gap narrowed after the crisis. The standard deviation was biggest for the cooperatives during this period.

Table 6 shows calculated values for the Tangible Assets ratio (TAr) of farmer's cooperatives, Limited Liability Companies (LLC) and Joint-Stock Companies (JSC) during the period of 2008-2013. The disparity in capital structure in the sense of the differences in

Table 6: Tangible assets ratio (figures in times)

Parameters	2008	2009	2010	2011	2012	2013	Mean	SD
Farmer's cooperatives	0.524	0.524	0.540	0.560	0.566	0.558	0.545	0.019
Limited companies	0.449	0.448	0.487	0.505	0.517	0.525	0.489	0.034
Joint-stock companies	0.541	0.535	0.534	0.555	0.564	0.562	0.549	0.013

Table 7: Size ratio (figures in times)

Parameters	2008	2009	2010	2011	2012	2013	Mean	SD
Farmer's cooperatives	7.562	7.590	7.611	7.594	7.597	7.626	7.597	0.022
Limited companies	7.280	7.330	7.354	7.354	7.375	7.412	7.351	0.044
Joint-stock companies	7.785	7.806	7.828	7.809	7.820	7.846	7.816	0.021

Table 8: Correlation matrices for capital structure and profitability (Pearson correlation)

Variables	BLr	MLr	CFv	Pr	MSr	TAr	Sr
Farmer's cooperatives							
BLr	1.0000	-0.4337	0.5149	-0.2343	-0.1608	-0.8400	-0.6828
MLr		1.0000	-0.9630	0.4990	0.5706	0.3207	0.7866
CFv			1.0000	-0.2870	-0.3793	-0.5205	-0.7868
Pr				1.0000	0.9127	-0.2727	0.4612
MSr					1.0000	-0.2217	0.6419
TAr						1.0000	0.5696
Sr							1.0000
Limited liability companies							
BLr	1.0000	-0.6627	0.2584	0.0630	-0.5269	-0.9440	-0.9780
MLr		1.0000	-0.1826	-0.0900	0.5567	0.6550	0.6757
CFv			1.0000	-0.5031	-0.6389	-0.1167	-0.4030
Pr				1.0000	0.5823	-0.3726	0.0870
MSr					1.0000	0.3592	0.6880
TAr						1.0000	0.8909
Sr							1.0000
Joint-stock companies							
BLr	1.0000	-0.2408	-0.0412	-0.1881	0.4576	-0.7802	0.0256
MLr		1.0000	-0.4204	0.7329	0.5808	0.4704	0.6559
CFv			1.0000	-0.0009	-0.3257	-0.2748	-0.7027
Pr				1.0000	0.7337	0.1428	0.4839
MSr					1.0000	-0.2575	0.6603
TAr						1.0000	0.4369
Sr							1.0000

5% critical value (two-tailed) = 0.8114, own processing

the tangible assets ratio was not quite high during the monitored period and the values had an increasing trend. The gap mainly between LLC and the other types of companies narrowed. The joint-stock companies had the highest values of this ratio and LLCs the highest standard deviation during this period.

Table 7 shows calculated values for the Size ratio (Sr) of farmer's cooperatives, Limited Liability Companies (LLC) and Joint-Stock Companies (JSC) during the period of 2008-2013. The size ratio disparity was also not quite high during this period. The highest value is in 2013 for the joint-stock companies. However, the LLCs had the highest standard deviation that means that changes during the period and crisis effects had more impacts on the LLCs.

Table 8 contains the calculated correlation coefficients between all mentioned ratios for each type of companies for the monitored period of 2008-2013. As expected there exists a negative relationship between the book leverage ratio and market leverage ratio. Also, book leverage ratio has a negative correlation to other ratios except for the cash flow volatility ratio as supposed by the theory. However, this is only partly true in case of the joint-stock companies. The market leverage ratio performs the opposite behavior, i.e., positive correlation to the rest of ratios except for the cash flow volatility ratio. The cash flow volatility ratio has negative correlation coefficients with the other ratios (Pr, MSr, TAr, Sr and MLr) except for MLr in case of cooperatives and LLCs. The size ratio is positively correlated with most of the ratios except for BLr and CFv ratio. The profitability ratio has mostly a negative correlation with the BLr, CFv ratio and TAr and a positive correlation with the MLr, MSr and Sr. The market share ratio is positively correlated with MLr, Pr and Sr and it is negatively mostly correlated with TAr, CFv ratio and BLr (the negative correlation of the last combination is not true in case of joint-stock companies as mentioned above). Lastly, the tangible assets ratio is mostly negatively correlated with BLr, CFv ratio, Pr (except for joint-stock companies), MSr (except for LLCs) and positively correlated with MLr and Sr. Statistically significant correlation coefficients were those between

TAr and BLr both for cooperatives and LLCs between Cfv ratio and MLr for cooperatives between MSr and Pr also only for cooperatives between BLr and Sr only for LLCs and between Sr and TAr also only for LLCs.

CONCLUSION

The financial crisis and the recovery period influenced the most the limited liability companies in the agricultural sector in the Czech Republic in terms of the highest changes in the calculated values for most of the ratios, resp. In case of book leverage ratio, cash flow volatility ratio, tangible assets ratio and size ratio. The cooperatives were affected the most by the crisis if the profitability ratio market leverage ratio and market share ratio are taken into consideration. During the recovery the book leverage ratio has decreased on the contrary the profitability ratio, market share ratio, tangible assets ratio and size ratio have increased, the market leverage ratio has rested quite the same and finally, the cash flow volatility ratio has had a quite W-shaped trend. The reasons behind these results are closed new investments and a lowered liquidity during the crisis.

The capital disparity in terms of differences between the values of calculated ratios, especially in case of tangible assets ratio and market share ratio for the selected types of companies in agricultural sector has narrowed during recovery period mainly thanks to the crisis, lower investment possibilities for LLCs during that period and a slow and cautious initiation of investments of the companies.

The results of the correlation analysis approve the hypotheses of this study about negative correlation between book leverage ratio and market leverage ratio between book leverage ratio and cash flow volatility ratio between book leverage ratio and profitability ratio between cash flow volatility ratio and profitability ratio and about positive correlation between market leverage ratio and profitability ratio between market share ratio and profitability ratio and between tangible assets ratio and size ratio. Statistically, significant correlation coefficients were the negative ones between tangible assets ratio and book leverage ratio both for cooperatives and LLCs, between cash flow volatility ratio and market leverage ratio for cooperatives between book leverage ratio and size ratio only for LLCs and the positive ones between size ratio and tangible assets ratio also only for LLCs and between market share ratio and profitability ratio also only for cooperatives.

Our study is consistent with other researchers. For example Chung *et al.* (2013) found out that ratios of capital structure are not significant determinants of the enterprise's profitability. They state that is a positive relationship between market leverage ratio and profitability ratio. It is the same conclusion as our, it is true for farmer's cooperatives and joint-stock companies but it does not true for limited liability companies.

Titman and Wessels (1988) state that tangible assets and size ratio has a positive relationship. But on the other hand, Titman and Wessels (1988) found out that there is a negative relationship between book leverage ratio and cash flow volatility ratio. In our research, it is true only for joint-stock companies.

The study tries to contribute to the evaluation of the development of the capital structure and the capital disparity across the selected three types of companies in the agricultural sector during and after the economic and financial crisis using the selected financial indicators and their correlation analysis. However, more complex analysis should be modeled to completely define and see the capital condition, structure, disparity and financial health of the selected types of Czech agricultural firms.

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