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DETERMINANTS OF CAPITAL STRUCTURE OF CROATIAN ENTERPRISES BEFORE AND DURING THE FINANCIAL CRISIS

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Abstract:
This paper analysis capital structure determinants of Croatian enterprises based on a cross-sectional data for pre-recession 2007 and recession 2010 comprising about 10,000 firms. Determinants are selected with reference to the relevant capital structure theories and include asset tangibility, profitability, firm size and business risk. The results indicate highly positive significant impact of tangibility and negative significant impact of profitability on financial leverage in both observed years. Firm size seems to be statistically significant at higher level in crisis period, but at the same time no relationship can be found between business risk and financial leverage that is of economic significance.

Key words: Croatian enterprises, capital structure, determinants of capital structure, financial crisis.

Jel Classification: G32

INTRODUCTION

In finance, one of the most debatable topics is capital structure. Many economists have devoted much effort to understanding firms' financing policies, and the existence of optimal structure capital. Starting with Modigliani and Miller, who claimed that capital structure financing decision does not matter, there are several more theories in this regard, such as trade-off theory, signaling theory and pecking order theory, each with different considerations. However, despite the major development of this literature, little attention has been paid to the capital structure in Croatia as well as its determinants. Lately, financial and economic crisis changed macroeconomic environment which influenced enterprises' behavior and their decisions about capital

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structure. This study is analysing the impact of selected determinants like asset tangibility, profitability, firm size and business risk on financial leverage of about 10,000 Croatian enterprises in pre-recession 2007 and recession 2010.

This paper is organized as follows. Section two provides an overview of capital structure theories; section three defines the main determinants of capital structure choice; section four gives the description of macroeconomic conditions on some of the key capital structure determinants; the data, research methodology and the results are presented in section five; while section six concludes the paper.

REVIEW OF CAPITAL STRUCTURE THEORIES

According to many scientific papers and literature, the capital structure theory seems to be the most controversial area of the financial management. The beginnings of theoretical studies of capital structure were in the fifties of the last century when Proffesor David Durand introduced two approaches, known as the Net Operating Income and the Net Income theories. These approaches were considered extreme and unacceptable in the terms of the real world. The upgrades of these approaches were made by Ezra Solomon in 1963, when he presented the traditional approach that was better accepted due to more realistic assumptions. However, the modern theory of capital structure began with the celebrated paper of Modigliani and Miller (Harris and Raviv 1991, 297). Their theory is based on the assumption that firms operate in a completely free and competitive market without taxes or transaction costs, where information is completely transparent and available without cost. From these assumptions the two MM´s Propositions were derived. The first Proposition says that the market value of the company is equal to the sum of the total value of equity and the total value of debt, meaning it is completely independent of capital structure. Thus, the value of the company with debt is equal to the value of the company that operates without debt. The weighted average cost of capital is according to Modigliani and Miller a constant, depending only on the expected rates of returns demanded by the stockholders and creditors and on the market value ratios of debt and equity to overall firm value (Myers 2001, 84). Since the cost of debt is always less than the cost of equity (due to prior claim of debt on the firm's assets and earnings), any attempt to substitute cheaper debt for more expensive equity will not reduce the WACC, because the remaining equity will become more and more expensive with the increase of the market value of debt to equity ratio. This is shown in MM's Propositon 2.

Since Modigliani and Miller´s theory, there have been other useful theories trying to explain the mix of debt and equity used by corporations to finance their business activities, like the trade-off theory, signaling theory and the pecking order theory. They all differ in their relative emphasis on the key factors affecting the capital structure choice.

In the trade-off theory, the emphasis is on taxes. The benefits of increased leverage are weighted against the costs of increased leverage in order to determine the optimal capital structure. Namely, the firm will borrow up to the point where the marginal vaule of tax shields on additional debt is just offset by the increase in the present value of possible costs of financial distress. The other two theories, signaling and the pecking order theory are based on the informational asymmetries between firm's insiders (typically the managers) and market participants on the value of their firm's assets and

investment opportunities (Schmid Klein, O'Brien, and Peters 2002, 318). Signaling theory[2] uses debt as a signal of the firm's quality[3]. By using debt in financing, firms are making commitment to pay interests on the due date. If they fail to meet their obligations, they will end up in a financial distress, or worse, bankruptcy. Firms with low expected cash flows find it more costly to incur higher levels of debt (because bankruptcy is more likely) than do firm with higher expected cash flows. Thus, high-valued firms can signal this information about the firms' good quality to the market by issuing a sufficiently high amount of debt. The pecking order theory[4] describes the order in which firms prefer to finance firms' future activities and growth. According to this theory, a firm will rather borrow than issue equity[5], when internal cash flow is not sufficient to fund capital expenditures. Namely, leverage increases when investment exceeds retained earnings.

THE DETERMINANTS OF CAPITAL STRUCTURE

As earlier mentioned, different theories suggest there are determinants that may affect the firm´s debt-equity choice, such as asset structure, profitability, earnings volatility, firm size, growth rates, industry classification, control, taxes, managerial conservatism, financial flexibility, market conditions, etc. In this section only determinants that will take place in econometric analysis will be described in more detail. These variables present the key capital structure determinants which are commonly used in other empirical analysis.

Most capital structure theories argue that the type of assets owned by a firm in great proportion affects its capital structure choice. Firms with assets that can be used as collateral may be expected to use more debt than the ones with less collateralizable assets. Firms that issue secured debt are signaling creditors that funds will be used for a specified project (Titman and Wessels 1988, 3). In the case of financial distress, the creditors may require sellout of the collateral. In that way the risk of moral hazard is reduced and costs of monitoring are diminished. As a result, firms with greater tangible assets, potentially collaterized, are likely to have relatively lower bankruptcy costs, and thus, higher debt capacity (Cook and Tang 2010, 77).

However, different theories are not consistent about the effect of profitability on the capital structure choice. Profitability can affect leverage in at least two directions. According to the trade-off theory, highly profitable firms would use more debt in

[2] The signaling theory was first mentioned by the Akerlof, using it to describe uncertanty about price-quality relationship between new and old cars in the market. See Akerlof, G.A. 1970. The Market for ″Lemons″: Quality Uncertainty and the Market Mechanism. *The Quarterly Journal of Economics* 84 (3): 488–500. The first use of signaling theory in corporate finance was in the work of Ross S.A. (1977. The Determination of Financial Structure: The Incentive-Signaling Approach. *The Bell Journal of Economics* 8 (1): 23–40), Leland H.E., and Pyle D.H. (1977.vInformation Asymmetries, Financial Structure, and Financial Intermediation. *The Journal of Finance* 32 (2): 371–387) and Bhattacharya, S. (1979. Imperfect Information, Dividend policy, and ″The Bird in the Hand″ Fallacy. *The Bell Journal of Economics* 10 (1): 259–270).

[3] In the case of mispriced equity, managers have incentive to signal the market their private information through capital structure decisions.

[4] The authors of this theory, Myers and Majluf, assumed perfect financial markets, except that investors do not know the true value of the firm's assets or the future oportunities (meaning they can not precisley value the securities issued to finance the new investment).

[5] Outsiders find the issue of equity as a negative signal; that the shares are undervalued.

financing in order to exploit debt tax benefits. Also, signaling theory finds debt as positive signal to the market about the firms'quality. Since debt is considered to be a great tool to control managers' behavior and to reduce agency problems, highly profitable firms would use more debt in their capital structure. On the other hand, according to the pecking order theory, firms with higher earnings tend to operate with lower leverage ratios because their retained earnings should be sufficient to finance their operations. They will use more debt only when the value of investment exceeds the value of retained earnings. In either case, the profitability, and accordingly earnings, should be an important factor of firms' capital structure.

A number of authors (Korajczyk and Levy 2003, 85; Cook and Tang 2010, 85; Titman and Wessels 1988, 6) have suggested that leverage ratios may be related to firm size. Larger firms tend to be more diversified, to have lower cash flow volatility and better acces to financial markets, so they are less likely to become financially distressed. This suggests that there may be a positive relationship between firm size and debt financing. However, since large firms communicate more with investors, the asymmetrical information problem should be decreased, and consequently they should rather issue shares than debt. Again the exact impact of firms'size on capital structure is unclear.

Higher variability in earnings indicates that probability and the expected costs of financial distress increases. Thus, the firms with higher income variability are expected to have lower leverage. Also, it can be assumed that these firms will try to accumulate funds during the expansion so they could avoid insufficient investment financing in the future. As a result, as business risk increases, the debt level in capital structure should decrease.

CAPITAL STRUCTURE AND ITS DETERMINANTS IN THE CONTEXT OF FINANCIAL AND ECONOMIC CRISIS

Macroeconomic conditions should have an impact on firms' capital structure choice. During the recession, which is traditionally defined as a decline in real gross domestic product for two or more successive quarters of a year (Cook and Tang 2010, 77), a slowdown in economic activities is recognized. It generates some variations in the value and dynamic of future cash flows that can easily lead to major financial problems. Volatility of earnings increases, so the debt tax advantages are diminished, if even exist. The downturn in profitability is also inevitable, which increases the business risk. When operating cash flows and business risk depend on current economic conditions, firms should adjust their capital structure decisions to economies' business cycle phase.

Since firms' earnings are dependent on macroeconomic conditions, the tax benefits and bancruptcy costs[6] should also be dependent on the state of economy. According to the trade-off theory, which finds the optimal capital structure as a balance between debt tax benefits and bankruptcy costs, variations in macroeconomic conditions should determine variations in firms' target debt-equity ratio. Because default risk is lower in an expansion than in a contraction, the debt capacity of the firm is greater during economic prosperity (Hackbarth, Miao, and Morellec 2006, 536). Also, in different

[6] The tax benefits of debt depend on the level of cash flows, while bancruptcy costs are affected by the probability of default and losses that are both related to economic conditions.

states of economy, the distribution of wealth between managers and outside shareholders changes. Managers' compensation is tied to a corporate profits and equity performance, so in recession, levered managers' wealth is reduced relative to outside shareholders. This worsenes the agency problem and increases the optimal amount of leverage in order to realign managers' incentives with those of the shareholders (Korajczyk and Levy 2003, 78).

In the times of a financial crisis the supply of funds conditions worsen. There is some empirical evidence (Mörec and Rasković 2011; Cook and Tang 2010; Faulkender and Peterson 2006) that small, medium and large companies are disproportionately affected by such economic cycles. Thanks to their considerable higher market power over small and medium sized firms, and through their better acces to financial markets, large firms are able to considerably increase the share of liabilities in their capital structure when needed.

ANALYSIS AND RESULTS

Data

Data for the empirical analysis of this study were taken from the Register of Annual Financial Reports (RGFI), which according to the Accounting Act (OG, 109/2007) and the Law on the Register of financial statements (OG, 47/2003), is conducted by the Financial Agency (FINA). Entrepreneurs, taxpayers who are required to submit report named GFI-POD, are mostly joint-stock enterprises and private limited liability enterprises, but also institutions, cooperatives, associations and individuals - entrepreneurs who are liable to corporate income tax. The data do not include the financial statements of other companies and individuals such as financial institutions, nonprofit organizations, and government and public administration.

In order to obtain a representative sample of enterprises it was necessary to make some adjustments on data. First, leasing enterprises and entrepreneurs individuals were removed from the sample. This was followed by deletion of enterprises with fewer than five employees. From the analysis were also excluded enterprises that in their financial statements reported lack of equity or their shareholders' equity is negative. Finally, from a sample of enterprises were excluded firms that have not achieved sales revenues. Table below (Table 1. authors'calculations based on FINA data) shows the impact of the above described changes in the size of the initial sample of firms. Changes are shown at the aggregate level. The last step in adjusting representative sample was to find the same enterprises which appear in both observing years. There are 10,258 enterprises included in final sample.

Table 1. The number of enterprises before and after correction

Year	No. of enterprises before correction	No. of enterprises after correction	Difference (excluded from sample)	SAMPLE (adjusted)
2007	83,532	18,830	64,702	10,258
2010	96,662	17,140	79,522	

Dependent and independent variables

In this analysis the dependent variable is financial leverage which is defined as the ratio of debt to capital of the observed enterprises. This measure is probably the best representation of past financing decisions (Rajan and Zingales 1995). Corporate debt includes short-term and long-term corporate debt, and represents only a part of the liabilities of enterprises. Capital, which is in the denominator of the calculation of financial leverage, is equal to the sum of total debt and shareholders' equity. Since the market value was not available, in calculation of the leverage, book value took place.

The paper uses four independent numerical variables, which are asset tangibility, profitability, firm size and business risk. The selection of these variables was based on capital structure theories previously explained. Tangibility or the structure of firm assets is one of the fundamental factors of the firms' capital structure. As a measure of asset tangibility most commonly is used proportion of tangible assets in the total assets of the firm. Except tangibility, the other key factor of capital structure is the profitability of enterprises. The largest number of studies on this subject, as a variable that measures the profitability of enterprises, uses return on assets (ROA). Therefore, in this paper is also used ROA, i.e. ratio of earnings before income and taxes (EBIT) to total assets. Firm size is a determinant, which is also taken into account in the empirical analysis of the capital structure of Croatian enterprises. It is expressed by natural logarithm of sales. The last used independent variable is business risk expressed as standard deviation of percentage changes in earnings before interest and income or loss before interest and taxes. Selected indicator shows the volatility of firms' earnings.

Comparing data for pre-recession 2007 and recession 2010, previously selected Croatian enterprises experienced drop in sales by 13.6 per cent but also significant decrease in profitability by high 51.5 per cent. Earnings before income and taxes fell by 32.5 per cent, and at the same time losses before income and taxes increased by more than 250 per cent. Accordingly to the above observed data, financial and economic crisis has significantly marked business activities of Croatian enterprises.

In such unfavorable macroeconomic environment with uncertain future enterprises are not prone to long-term investments and therefore no long-term borrowing. Those who can, are trying to deleverage while others (in Croatian case, most of them) are trying to get short-term loans to pay back their liabilities. Therefore, most of the loans which banks have approved to enterprises during financial crisis were short-term loans for working capital. In 2010, Croatian enterprises used by 72.9 per cent more short-term debt compared to 2007. This led to a significant change in debt structure. Share of long-term debt decreased by almost 11 percentage points from 2007 to 2010 but it is still above 50 per cent. Observed enterprises increased total debt by high 31.4 per cent and equity by 8.5 per cent. As a result average financial leverage amounted to 34.5 per cent in pre-recession 2007. Crisis conditions in 2010 increased this ratio by 1.1 percentage point or 3.4 per cent, i.e. to 35.6 per cent.

After defining, brief overview and description of all the variables, it is useful and necessary (for econometric analysis) to show the correlation matrix between all thevariables used in the regression equation. The correlation matrix does not imply the existence of any significant positive or negative relationship between the variables in both years (Table 2a and Table 2b — authors' calculations).

Table 2a. The correlation matrix of the dependent and independent variables in 2007

	LEVERAGE	TANG	PROF	SIZE	RISK
LEVERAGE	**1.000**				
TANG	0.267	**1.000**			
PROF	-0.364	-0.274	**1.000**		
SIZE	0.033	-0.028	-0.045	**1.000**	
RISK	0.002	-0.009	0.051	-0.012	**1.000**

Table 2b. The correlation matrix of the dependent and independent variables in 2010

	LEVERAGE	TANG	PROF	SIZE	RISK
LEVERAGE	**1.000**				
TANG	0.226	**1.000**			
PROF	-0.279	-0.186	**1.000**		
SIZE	0.078	0.012	0.048	**1.000**	
RISK	-0.016	-0.018	0.030	0.007	**1.000**

The biggest negative correlation exists between profitability and leverage (-0.364 in 2007 and -0.279 in 2010), while the largest positive correlation can be noticed between asset structure and financial leverage (0.267 in 2007 and 0.226 in 2010). The connection between the tangibility and profitability is negative (-0.274 in 2007 and -0.186 in 2010), but it still does not indicate a potential correlation problem between variables.

Econometric analysis and results

This paper employs multiple linear regression using cross-sectional data and the least squares method.

The regression model adopted is, as follows (equation 1):

$$Y_i = \alpha_i + \beta_{1n} X_n + \varepsilon_i \qquad \text{Eq.(1)}$$

where,

Y_i denotes financial leverage;
α is an intercept;
X_n denotes the explanatory variables as following (n=1, 2, 3 and 4):
n=1 ... tangibility,
n=2 ... profitability,
n=3 ... firm size,
n=4 ... business risk;
ε_i is the random error term.

Before conducting regression for both years (2007 and 2010), it is necessary to make appropriate tests to confirm that a particular technique is appropriate choice for this type of analysis as well as to be sure that the results of this analysis can lead to reliable conclusions. Since this is a cross-sectional analysis, there is no problem of stationary series, but multicollinearity problem is tested with correlation matrix and for mitigating autocorrelation and heteroskedasticity is used Newey-West heteroskedasticity and autocorrelation consistent (HAC) covariance matrix. In this analysis there is a large number of observations, and such large samples experience the degradation of

normality measured by Jarque-Bera test. However, in large samples Student's distribution is approaching a normal distribution, so this assumption can be accepted as satisfied. The existence and effect size of the impact of each independent variable in the model conclusions were made on the basis of their significance, i.e. p-values.

Table 3. Regression results

Variable	2007			2010		
	Coeff	t-stat	Prob	Coeff	t-stat	Prob
C	0.2583	7.1949	0.0000	0.0148	0.4227	0.6725
TANG	0.2145	15.3219	0.0000	0.2063	15.2808	0.0000
PROF	-0.5799	-28.7638	0.0000	-0.4937	-16.8216	0.0000
SIZE	0.0052	2.3524	0.0187	0.0193	8.7500	0.0000
RISK	0.0056	3.8210	0.0001	-0.0018	-1.3475	0.1779

Asset structure or tangibility has a highly statistically significant (at 1 per cent level) positive impact on the firms' financial leverage in 2007 as well as in 2010. This means that enterprises with a higher proportion of tangible assets are more inclined to use debt. The conclusion of a positive relation between assets and financial leverage of the company is a confirmation of the trade-off theory and the pecking order theory. This result is in line with the results of most empirical studies (Rajan and Zingales 1995; Frank and Goyal 2003).

Return on assets is a variable that measures the profitability of enterprises in the regression model. Regression coefficients in both observed years are highly statistically significant at 1 per cent level and inclusion of this variable in the analysis contributes to explaining of financial leverage. The sign of profitability coefficient is negative which suggests that more profitable firms have a lower level of leverage, i.e. less profitable firms are more likely to borrow. This conclusion is not consistent with neither agency, signaling or the trade-off theory. However, the negative relationship between profitability and capital structure suggests a pecking order theory, which in the case of Croatian enterprises, can be taken as relevant in explaining the established connection. In the case of the analyzed Croatian companies, highly profitable enterprises have the ability to retain earnings and finance internally. If that would not be enough, they would rather use debt than equity (which would be their last choice). It is important to note that most of the empirical studies suggest a negative relationship between profitability and leverage of enterprises (Rajan and Zingales 1995; Booth et al. 2001; Gaud et al. 2003; Abor 2008).

Among the determinants of capital structure, firm size has an important role in explaining enterprises' decisions about their capital structure. Firm size in the model showed positive impact on the firms' financial leverage but is only significant at the 10 per cent level in 2007. The sign of the coefficient in the regression analysis indicates a positive relation between firm size and financial leverage, which is consistent with the trade-off theory, and also with the majority of empirical studies (Gaud et al. 2003; Janbaz 2010). The explanation of such results for Croatian enterprises, as well as other observed in various analyses, can be found in the fact that large firms are more diversified and have a lower risk of bankruptcy, which lowers their cost of debt. In 2010 regression coefficient is positive, too, but this time is significant at the 1 per cent level. Firm size appears to be very important determinant of capital structure not only

in observed pre-crisis year but also during the crisis. Most Croatian enterprises in financing their activities still use bank loans and it is usual practice that large enterprises have more opportunities to meet all criteria for easier and cheaper getting loans. That is even more pronounced in crisis period compared to pre-crisis.

The relationship between business risk and financial leverage in 2007 is positive and statistically significant at the 1 per cent level. Business risk is measured by the change in earnings or loss before interest and taxes, which would mean that greater earnings volatility indicates greater exposure to business risk. In 2007 Croatian enterprises that are more exposed to business risk suffer from asymmetric information and are expected to have a correspondingly greater degree of use of financial leverage. The obtained results are neigher in accordance with the trade-off theory nor the pecking order theory. Similarly is concluded in empirical studies (Booth et al. 2003; Deesomsak et al. 2004). But in 2010 during the financial crisis, business risk is shown as statistically insignificant variable, i.e. there is no relationship between business risk and financial leverage that is of economic significance. One possibly explanation may be that during the crisis the effects of the two different theories neutralize each other or maybe measure used as a proxy for business risk is not the best measure which reflects earnings volatility during crisis.

CONCLUSION

During financial and economic crisis Croatian enterprises experienced increase in average financial leverage, from 34.5 per cent in 2007 to 35.6 per cent in 2010. The main contribution to such development came from short-term debt which was in observed period higher by 72.9 per cent. New macroeconomic environment, which was very unfavorable, caused significant drop in profitability, sales as well as in earnings before income and taxes. Consequently enterprises were forced to adjust their capital structures to the new circumstances in the economy.

The focus of this paper was on the determinants of capital structure of a selected sample of Croatian enterprises (about 10,000) using cross-sectional data for 2007 as pre-recession year and 2010 as recession year. Determinants are selected with reference to the relevant capital structure theories and include asset tangibility, profitability, firm size and business risk. The results indicate highly positive significant impact of tangibility on financial leverage in both observed years what is in line with trade-off theory as well as with pecking order theory. A large share of tangible assets in total assets allows enterprises to use tangible assets as collateral. Thus firms reduce moral hazard risks because this constitutes a positive signal to the creditors who can require the selling of these assets in the case of default. Highly profitable enterprises in Croatia in the period before financial crisis and during recession have the ability to retain earnings and finance internally. This conclusion is a result of negative sign of statistically significant coefficient based on the pecking order theory. Firm size is also an important determinant which contributes in explaining firms' decisions about capital structure. Large firms use more debt in financing because they have lower cost of debt due to the fact that they are more diversified and have a lower risk of bankruptcy. This is in line with trade-off theory. In the bank-centred financial systems firm size has even more important role during the recession than in the pre-crisis time. So it seems

expected for firm size to be statistically significant at higher level in crisis period. Compared to highly statistically significant impact of business risk on financial leverage in pre-recession 2007, during crisis period there is no relationship between these two variables that is of economic significance.

This study, like many others, has certain limitations which can be corrected and that give a great scope for further research in this area.

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