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CONFERENCE PAPER

Analyzing Capital Structure across Industries: Evidence from Croatia

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Abstract: Capital structure refers to the delicate balance between equity and debt that a company uses to finance its assets. It is typically expressed as a debt-to-equity or debt-to-capital ratio, with the components usually located on the right side of the company's balance sheet. Capital structure can exert great influence on the company's risk profile and ability to leverage its operations. For this reason, the authors conducted an investigation of the capital structure of 16 joint stock companies listed on the Zagreb Stock Exchange comprising CROBEX, the equity index of Croatia for a three-year period starting in 2015 and ending in 2017. The study demonstrates that many CROBEX-listed companies are very risk averse and choose to remain debt-free. Some are, however, starting to discover the potential offered by financial leverage and have slowly started adjusting their capital structure. In conclusion, capital structure is slowly becoming an issue worthy of discussion on the corporate agendas in Croatia.

Keywords: Capital structure; Debt ratio; Leverage; Financial analysis; Croatia

JEL Classification: G32, N24, O16

Introduction

While nowadays conventional finance cannot be imagined without the wisdom imparted on both academia and praxis by Modigliani and Miller, it stands to reason that their research findings were based on data drawn from US stock markets and conducted more than 60 years ago. Much has changed globally in the meantime,

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with mature European markets offsetting the dominance of their American counterparts, and Eastern Europe emerging as an economic force in its own right after - in some cases – a rather prolonged post-transition period. This re-shuffling of the global economic order has provided fertile soil for the reexamination of validity of capital structure findings to match the new reality and realign it with dominant economic theory.

The primary goal of the paper is to calculate the debt/equity ratio of the main equity index in Croatia and analyze its capital structure and borrowing behavior among the 16 constituting share issuers which come closest to the elusive *blue-chip* designation on the Zagreb Stock Exchange. Working with a set of three-year financial data for a sample of 16 companies, the authors analyze the financing choice of each of the index components.

While modest in its scope, this study contributes to the growing capital structure literature in two important ways. First, it diverges greatly from the popular econometric treatment of capital structure which focuses on examining the various determinants influencing the firm's borrowing behavior. Instead, it provides a distinctly financial and practical flavor to the analysis as it attempts to produce a final figure capturing the debt/equity ratio of the flagship equity index on the Zagreb Stock Exchange that can prove usable to professionals and analysts worldwide. Second, it draws attention to Croatia, an equity market which due to its size, location, and post-transition idiosyncrasies, usually gets either overlooked by academic researchers or bundled in a wider Balkan or Central/Eastern European comparative study. The study's main weakness is the short time series which cover a relatively prosperous and calm period on the equity markets without any notable exogenous shocks.

The article is structured as follows: Section 1 provides the general introduction to the topic. Section 2 discusses the literature pertaining to capital structure research, especially with regards to markets other than the US. Section 3 introduces the methodology, while Section 4 proffers a discussion on the obtained findings. The conclusions of the financial analysis and areas for further research are discussed in Section 5.

Literature review

No topic even distantly associated with capital structure can circumvent the seminal work of Modigliani and Miller, who first proposed that the value of the firm is independent of its capital structure, albeit in frictionless perfect markets (1958). According to one of the authors, this *paradox of indifference* was resolved by Proposition II, which "showed that when Proposition I held, the cost of equity capital was a linear increasing function of the debt/equity ratio" (Miller, 1988, p.100). The most

important takeaway from the authors' *Correction* was that leveraging increased the riskiness of the shares (Modigliani & Miller, 1963).

Despite an influx of research on capital structure following this groundbreaking work, Myers refers to academia as "having inadequate understanding of the corporate financing behavior, and how [it] affects security returns" (1984, p. 575). Furthermore, he grouped research into two opposing ways of thinking: the static tradeoff vs. pecking order framework.

The Static Tradeoff Theory (STT) proclaims that a company's optimal debt structure is viewed as determined by a cost-benefit tradeoff of borrowing. Essentially, profitability is negatively correlated with leverage (Rajan & Zingales, 1995). In such case, the company sets a target debt-to-equity value and slowly progresses towards it through gradual adjustments (Myers, 1984).

The Pecking Order Theory (POT) predicts external debt financing driven by internal financial deficit. According to Shyam-Sunder & Myers (1999), this framework has greater time-series explanatory power relative to the STT model. Not only that, but instead of targeting s specific debt-to-equity ratio, the company's management follows a sequence of steps in an attempt to minimize the negative consequences of information asymmetries (Myers & Majluf, 1984).

The Agency Theory (AT) developed in an attempt to explain the behavior of various agents – managers, investors, and creditors – that interfere in the firm's funding decisions, achieving a compromise on the optimal financial structure while keeping their divergent interests in check. First proposed by Jensen & Meckling (1976), this theory gained traction and soon became a major venue for capital structure research based on managerial behavior.

While Harris & Raviv (1991) demonstrate that empirical research has in most cases confirmed the existing theories, it is possible that one single theory cannot explain capital structure decision making. Their publication was instrumental in spurring further exploration of the significance of particular capital structure determinants such as size, profitability, growth and growth opportunities (Jung et al., 1996), tax shields (MacKie-Mason, 1990), risk (Kim & Sorensen, 1986; Titman & Wessels, 1988), ownership structure (Chen et al., 2010).

Perhaps most pertinent to this study, Booth at al. (2001) provided empirical evidence that capital structure theory is not portable across borders due to different institutional structures and other country-specific factors. Črnigoj & Mramor (2009) provide a detailed insight with respect to capital structure of Slovenian firms, as do Arsov & Naumoski (2016) for Macedonian firms, and Hernadi & Ormos (2012) for Central and Eastern European SMEs. Research proves that similar factors influence capital choice in developed and emerging markets (Booth, Aivazian, and Demirguc-Kunt 2001). However, Lin *et al*. (2013) demonstrate that control divergence-ownership may ensure avoiding moral hazard incentives and help improve finical decisions.

Possibly the best explanation about capital structure in transitional economies is provided by Delcoure (2007), who claims that none of the theories in circulation provides a satisfactory explanation of selection of financing choice. She attributes the "modified pecking order" found there to a number of corporate governance-related factors.

Data and methodology

This study uses the market data of companies listed on CROBEX, the main equity index of the Zagreb Stock Exchange, for the period 2015-2017. According to official data available online, CROBEX is a price index which excludes dividends in the calculation of returns. The number of constituents is not fixed and it ranges from 15 to 25 stocks. The main criterion for inclusion in the index is a threshold of 80% of trading days. Free-float market capitalization is used, with a maximum weight of each constituent capped at 10%. Revisions are performed semiannually, on the third Friday in March and September of each year. It was first created in 1997 with a base value of 1000.00 and a divisor of 5,989,305.15. Its symbol in trading system is CBX (ZSE, 2017).

The main sources for data collection were the annual reports issued by Croatian companies listed in CROBEX in conjunction with the reports and data available through the Zagreb Stock Exchange. Given that revisions of the index are made twice a year and not all constituent shares were part of it for the full three-year period under examination, the initial sample was downsized to include only those shares that were a permanent fixture in the index from 2015 to 2017.

Capital structure is calculated by dividing a company's debt with its corresponding equity, both found on the right side of the balance sheet. Seemingly an innocuous exercise, compiling the list of all debt and equity from a company's financial statement should include retained earnings, shares, debt financing, and contributions, in order to be complete. The obtained figure reveals how the company finances its operations and provides insights into how risky it is to investors. When aggregated for all 16 CROBEX constituents, this information can shed light with respect to the overall level of riskiness and financial leverage present among the blue-chip companies in Croatia, as well as CROBEX itself. The authors follow the same methods and procedures as delineated Ghosh (2012).

All of the calculations presented in the following tables belong to the authors.

Results and discussions

Capital is a vital resource for all firms, the supply of which can prove elusive and uncertain. This is the main reason why capital structure choice remains one of the most important financial decisions for the company's management. This section delves

further into the various ways capital structure is computed and the types of ratios (D/E, LTD/TA, LTD/LTA) used to obtain this information.

For the purposes of this study, Table 1 provides detailed information on all stock issuers that act as CROBEX constituents, including name, ticker symbol, price, number of transactions, quantity of shares traded, as well as total turnover on a daily basis, respectively, averaged out for the three-year period under investigation. All prices are quoted in Croatian kuna (HRK).

Table 1 Average daily values for CROBEX constituents, 2015-2017

Ticker symbol	Issuer name	Price	Number of transactions	Quantity of shares traded	Total turnover
ADPL	AD PLASTIK d.d.	124.84	14.13	1378.45	173,576.42
ADRS2	ADRIS GRUPA d.d.	408.90	28.22	3079.82	1,250,846.28
ARNT	Arena Hospitality Group d.d.	399.32	10.70	813.49	295,938.82
ATGR	ATLANTIC GRUPA d.d.	850.26	7.48	785.14	663,256.94
ATPL	ATLANTSKA PLOVIDBA d.d.	275.12	30.80	798.07	230,984.6
DDJH	ĐURO ĐAKOVIĆ GRUPA d.d.	35.01	32.83	4845.39	163,684.7
DLKV	Dalekovod d.d.	16.53	37.54	9940.3	173,787.3
ERNT	ERICSSON NIKOLA TESLA d.d.	1,153.63	16.62	221.90	254,115.3
HT	HT d.d.	159.25	50.04	9,638.49	1,513,000
JDRN	JADRAN d.d.	/	/	/	/
KOEI	KONČAR d.d.	694.85	5.38	1299.88	896,150.53
MAIS	MAISTRA d.d.	242.27	6.56	270.08	63,909.33
OPTE	OT-OPTIMA TELEKOM d.d.	2.47	22.11	33,084.76	84,001.12
PODR	PODRAVKA d.d.	332.96	12.96	2,079.04	714,303.4
RIVP	Valamar Riviera d.d.	30.67	56.14	35,969.7	1,082,680.33
ZABA	Zagrebačka banka d.d.	45.12	13.78	5,609.79	261,512.4

It is worth noting that no criteria regarding listing on CROBEX concern any type of diversification across industries hence equal representation may not always be present. Quite the contrary, the index is heavily skewed in favor of tourism and hospitality companies, given that this market segment has been the impetus behind the growth of Croatia's economy in recent years. Based on average price, the most expensive share is that of Ericsson Nikola Tesla at 1,153.63 HRK, while the cheapest one is that of OT-Optima Telekom at 2.47 HRK. The most traded shares were those of Valamar Riviera, with 56.14 daily transactions on average, while Končar shares were least traded, with 5.48 transactions per day on average. The biggest quantity of traded shares was that of Valamar Riviera averaging 35,969.7 a day, while the lowest was that of Ericsson Nikola Tesla at 221.90 on average a day, which is to be expected given the relatively high price per share of this company. Finally, the highest total turnover was recorded for HT at 1,513.000 HRK on average daily, while the lowest total turnover was that of 63,909.33 HRK a day, on average. The shares of Jadran

were excluded from this part of the analysis as no share quotes could be retrieved for the period under observation.

The most common method for calculating capital structure is through the debt/equity (D/E) ratio. As the name itself suggests, debt/equity ratio is obtained by dividing total liabilities with total equity. It provides information on leverage, i.e. how much of the company's debt is financed by shareholder's equity. In essence, it provides the numerical equivalent to the notion of capital structure as most often understood by financial practitioners. Table 2 presents the D/E ratio for 2015-2017 as well as the average value for the period under observation.

Table 2 Debt/Equity ratio for CROBEX constituents, 2015-2017 (in %)

Ticker symbol	Issuer name	2015	2016	2017	Average
ADPL	AD PLASTIK d.d.	38.73	29.34	32.52	33.53
ADRS2	ADRIS GRUPA d.d.	0.01	0.00	0.00	0.00
ARNT	Arena Hospitality Group d.d.	92.00	92.00	82.00	88.67
ATGR	ATLANTIC GRUPA d.d.	0.00	59.94	59.96	39.97
ATPL	ATLANTSKA PLOVIDBA d.d.	14.29	8.04	6.90	9.74
DDJH	ĐURO ĐAKOVIĆ GRUPA d.d.	47.86	45.92	36.73	43.50
DLKV	Dalekovod d.d.	72.40	63.42	60.91	65.58
ERNT	ERICSSON NIKOLA TESLA d.d.	6.14	12.43	10.26	9.61
HT	HT d.d.	1.23	4.92	6.34	4.16
JDRN	JADRAN d.d.	/	9.66	15.99	12.82
KOEI	KONČAR d.d.	0.00	0.00	0.00	0.00
MAIS	MAISTRA d.d.	0.00	14.85	13.63	9.49
OPTE	OT-OPTIMA TELEKOM d.d.	31.37	29.59	32.78	31.25
PODR	PODRAVKA d.d.	28.84	20.28	17.73	22.28
RIVP	Valamar Riviera d.d.	41.05	44.70	50.99	45.58
ZABA	Zagrebačka banka d.d.	82.47	34.96	37.42	51.61
CBX	Total	30.43	29.38	29.01	29.24

It is evident from the above table that debt/equity ratios differ across companies and years. The highest D/E ratio among all of CROBEX constituents is that of Arena Hospitality Group at 92.00% for the first two years under observation, with a significant reduction of 10% in 2017, showing a very high degree of leverage employed by this company. Adris Grupa, Končar, Atlantic Grupa (for 2015 only) and MAISTRA sit at the other end of the spectrum with nonexistent debt on their books – coincidentally, these companies are considered the true 'blue chips' of Croatia. The biggest change in capital structure from one year to another was experienced by Zagrebačka banka which drastically reduced its debt/equity ratio, from 82.47% in 2015 to 34.96% in 2016. Overall, the D/E ratio for CROBEX indicates that its share constituents financed 30.43% of their operations with equity in 2015, with a slow, but visible downward trend.

Another way of calculating firm's capital structure is by employing the long term debt-to-total assets (LTD/TA) ratio, which provides a general measure of the long-term financial position of the company and its ability to service its financial obligations for outstanding debt. Table 2 presents the LTD/TA ratio for 2015-2017 as well as the average value for the period under observation.

Table 3 LTD/TA ratio for CROBEX constituents, 2015-2017 (in %)

Ticker symbol	Issuer name	2015	2016	2017	Average
ADPL	AD PLASTIK d.d.	21.47	14.83	16.91	17.74
ADRS2	ADRIS GRUPA d.d.	0.00	0.00	0.00	0.00
ARNT	Arena Hospitality Group d.d.	37.06	29.38	18.37	28.27
ATGR	ATLANTIC GRUPA d.d.	0.00	11.88	12.21	8.03
ATPL	ATLANTSKA PLOVIDBA d.d.	7.99	4.90	4.16	5.68
DDJH	ĐURO ĐAKOVIĆ GRUPA d.d.	36.09	24.02	20.73	26.95
DLKV	Dalekovod d.d.	37.92	31.73	30.27	33.31
ERNT	ERICSSON NIKOLA TESLA d.d.	1.26	2.46	1.93	1.88
HT	HT d.d.	0.93	3.58	4.29	2.93
JDRN	JADRAN d.d.	/	8.76	14.60	11.68
KOEI	KONČAR d.d.	0.00	0.00	0.00	0.00
MAIS	MAISTRA d.d.	0.00	7.88	7.05	4.98
OPTE	OT-OPTIMA TELEKOM d.d.	63.65	62.69	52.39	59.58
PODR	PODRAVKA d.d.	19.72	12.04	10.95	14.24
RIVP	Valamar Riviera d.d.	32.94	32.76	37.71	34.47
ZABA	Zagrebačka banka d.d.	5.78	3.27	2.72	3.93
CBX	Total	17.65	15.64	14.64	15.85

As in the previous case, LTD/TA ratio differs across companies and years. OT-Optima Telekom has the highest long term debt-to-total assets ratio of 63.65%, while Adris Grupa and Končar again have the lowest, 0.00%. The most volatile movements of this ratio are observable with Arena Hospitality Group's stock, starting at 37.06% in 2015 and falling in large increments to 29.38% and 18.37% in 2016 and 2017, respectively. Overall, the LTD/TA ratio for CROBEX indicates that 15.85% of the index components' assets are financed with long term debt. Again, although small, a decreasing trend of this ratio is visible, suggesting that the companies listed on CROBEX are becoming progressively less dependent on debt to grow their business.

The last metric under consideration is the long term debt-to-long-term assets (LTD/LTA) ratio, a measurement of the firm's solvency. It shows the percentage of a firm's long term assets financed by long term debt. Whether the golden rule of financing – namely, that long term assets should be financed by long term debt, and vice versa – is respected can be best examined with the LTD/LTA values for CROBEX components for 2015-2016, represented in Table 4.

Table 4 LTD/LTA ratio for CROBEX constituents, 2015-2017 (in%)

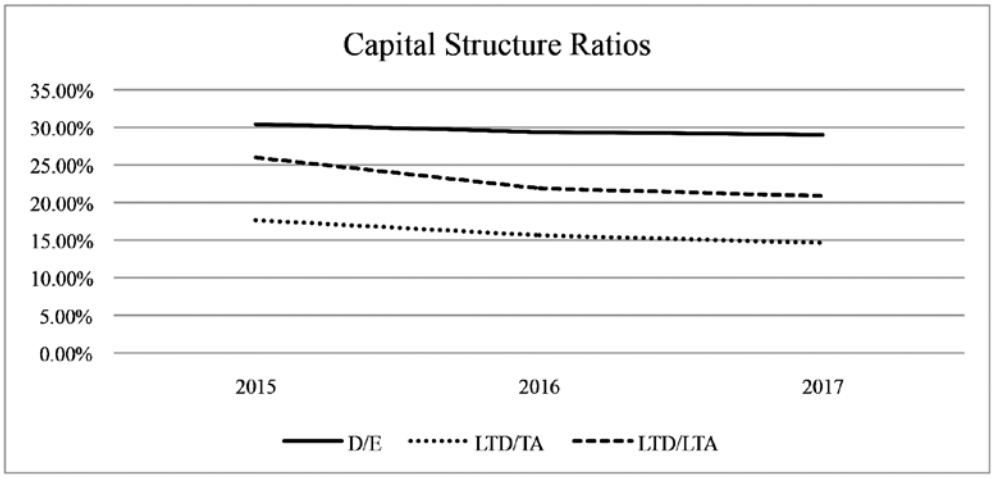
Ticker symbol	Issuer name	2015	2016	2017	Average
ADPL	AD PLASTIK d.d.	25.96	19.71	23.81	23.16
ADRS2	ADRIS GRUPA d.d.	0.00	0.00	0.00	0.00
ARNT	Arena Hospitality Group d.d.	40.97	31.34	26.01	32.77
ATGR	ATLANTIC GRUPA d.d.	0.00	12.32	12.84	8.39
ATPL	ATLANTSKA PLOVIDBA d.d.	9.28	5.67	4.50	6.48
DDJH	ĐURO ĐAKOVIĆ GRUPA d.d.	82.86	49.18	47.42	59.82
DLKV	Dalekovod d.d.	63.95	58.74	55.01	59.23
ERNT	ERICSSON NIKOLA TESLA d.d.	5.95	9.24	7.70	7.63
HT	HT d.d.	1.51	5.71	6.40	4.54
JDRN	JADRAN d.d.	/	8.89	14.74	11,81
KOEI	KONČAR d.d.	0.00	0.00	0.00	0.00
MAIS	MAISTRA d.d.	0.00	8.13	7.13	5.09
OPTE	OT-OPTIMA TELEKOM d.d.	83.34	80.89	67.59	77.27
PODR	PODRAVKA d.d.	33.51	21.52	17.66	24.23
RIVP	Valamar Riviera d.d.	36.71	35.50	40.25	37.49
ZABA	Zagrebačka banka d.d.	5.78	3.27	2.72	3.93
CBX	Total	25.99	21.88	20.86	22.62

Again, LTD/LTA shows different values from one company to another and from one year to the next. The company most closely complying with the golden rule of financing is OT-Optima Telekom, with 83.34% in 2015 and gradually falling to 67.59 in 2017. In this case, 0.00% values are not truly meaningful as they refer to companies with no long term debt on their books, so a more indicative values would be the truly low LTD/LTA ratios, such as those of HT, Maistra, and Zagrebačka banka with average values of 4.54%, 5.09%, and 3.93%, respectively. The biggest single-year decrease was documented for Đuro Đaković Grupa, with LTD/LTA plummeting to 47.42% in 2017 from a high of 82.86% in 2015, indicating a severe violation of the golden financing rule within a very short time period.

Finally, Figure 1 depicts a comparison between the three capital structure metrics (D/E, LTD/TA, LTD/LTA) examined for CROBEX and its components for the period 2015-2017. On average and relative to the other two, the debt-to-equity ratio shows the highest values, ranging around 30%. It is only natural that on average, LTD/LTA ratio is higher than LTD/TA, as total assets are comprised of current and long term assets and the main differences between the two ratios arises from the exclusion of current assets from the calculation. Nevertheless, the most important observation in this case is that all three trend lines are downward sloping, indicating, in the first case, that CROBEX-listed companies are financing their total operations with decreasing amounts of equity, i.e., by increasing their leverage. In the second case, total assets and long term assets are decreasingly financed with long-term debt, indicating

that companies are slowly moving away from the golden rule of financing, and potentially moving into high-leverage territory.

Figure 1 Comparison of D/E, LTD/TA, and LTD/LTA ratios for CROBEX constituents, 2015-2017 (in %)



Concluding Remarks

The purpose of this paper was to analyze the capital structure of the main equity index in Croatia. A sample of 16 companies comprising CROBEX was examined from 2015 to 2017. The data was obtained through the official channels of the Zagreb Stock Exchange. Three different measures of capital structure (debt-to-equity, long term debt-to-total assets, and long term debt-to-long-term assets ratios) were presented in order to capture the various aspects of solvency and leverage.

The authors find that the average CROBEX-listed company in the 2015-2017 period has financed almost one-third of its operations through debt as opposed to wholly-owned funds. Still, 18.75% of CROBEX constituents used no financial leverage to their advantage in said period, showing a rather conservative outlook and missing out on an opportunity to amplify their incomes. Moreover, the average LTD/TA ratio for CROBEX indicates that 15.85% of the index components' assets are financed with long term debt, meaning that Croatian companies have a rather conservative outlook towards gearing. Finally, two separate analyses signal that CROBEX companies are slowly discovering the potential offered by financial leverage and have been gradually readjusted their capital structure.

Despite its small data sample and short time series, this study provides the methodological blueprint for a larger and more inclusive study, spanning over various industries and even different countries. A suggested future line of research should

focus on changing risk-tolerance levels among companies and the subsequent adjustment of the capital structure to account for the newly-found appetite for leverage.

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