Corporate capital structure: the case of large Croatian companies

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ABSTRACT

A growing body of research literature deals with the debt policy decisions of companies. Although the subject of corporate capital structure has been intriguing scientists for a number of years, very little research has been conducted on the sample of companies in an emerging market environment such as Croatia. The objective of this article is to identify the main determinants of capital structure in case of large companies in Croatia during the period from 2001–2010. The chosen set of explanatory variables is driven by firm-specific (internal) characteristics and is additionally extended by macroeconomic (external) features. The results obtained by dynamic panel data methodology reveal that neither of the two competing theories exclusively and completely explain the financing behaviour of the analysed companies, and that inflation and development of the banking sector are important factors that affect the corporate leverage level.

1. Introduction

Corporate capital structure theories have emerged to explain corporate financing choices (debt-equity mix) and the consequent effect of these decisions on the corporate value. By the inclusion of the real-world conditions – agency costs, costs of financial distress and information asymmetry, modern capital structure theories developed, such as trade-off theory (static and dynamic), signalling theory (Leland & Pyle, 1977; Ross, 1977) and pecking order theory (Myers, 1984; Myers & Majluf, 1984). In addition to these relevant theories, models that approach the capital structure problem from the aspect of corporate control have developed (Harris & Raviv, 1991; Stulz, 1988; Israel, 1992), as well as models based on the industrial organisation theory (i.e. Titman, 1984; Sarig, 1988). Although the main theories in their fundamental forms are based on the contrary predictions, empirical results are not unambiguous. Different theories identify a number of firm-level features, or internal factors, that affect the firm leverage, such as size, asset structure, profitability,

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liquidity, tax, growth opportunities, age, product uniqueness, dividend pay-out policy, free cash flow and ownership structure (Harris & Raviv, 1991). However, the empirical results are not consistent with respect to the direction and strength of the relationship between the corporate leverage and its determinants meaning that there is no universally applicable capital structure theory.

Additionally, Frank and Goyal (2003) have concluded that roughly 30% of differences in the capital structure inside the country could be explained by internal determinants. This presupposes that there are additional influencing capital structure factors possible not included in the trade-off and pecking order theories (Črnigoj & Mramor, 2009), or other external or country-specific factors that affect supply of financing and hence influence corporate financing decisions (De Haas & Peeters, 2006). Acknowledging the importance of the specifics of the broader environment in which companies operate, new and expanding areas for better understanding of corporate financial decisions is open, which enables a more comprehensive overview of the nature of different impacts on the corporate capital structure. In spite of this argument in favour of the importance of country's environment, the corporate capital structure determinants are in general most often examined in terms of firm-level characteristics. This is especially true for emerging countries such as Croatia, that are rarely examined, most often as a part of broader set of countries with very low number of companies included (i.e. de Jong, Kabir, & Nguyen, 2008). Furthermore, studies that have included Croatia in examining financing decisions (i.e. De Haas & Peeters, 2006; de Jong et al., 2008), are performed over the time span up to 2005, thus, it is necessary to conduct a more recent study (an extended period) in order to reveal the capital structure of Croatian companies incorporating recent changes and developments.

The objective of this article is twofold. The first aim is to explore the main firm-specific (internal) determinants of corporate capital structure in order to evaluate the validity of dominant capital structure theory. The second aim is to expand the set of potential influential variables in order to evaluate the influence of country-specific (external) characteristics, namely macroeconomic factors, on corporate capital structure. Thus, this article contributes to the scarce empirical literature regarding capital structure determinants of Croatian companies taking into consideration both firm-specific and macroeconomic potentially influencing factors. Furthermore, the analysis is performed on panel data encompassing 111 large companies during the 10-year period.

The article is organised as follows: the second section discusses the determinants of corporate capital structure based on the underlying theories and empirical evidence. Section 3 describes data and methodology, and section 4 presents the results of the research. The main conclusions are summarised in section 5.

2. Literature review

Modern capital structure theory encompasses two dominant theories – trade-off theory and pecking order theory. The trade-off theory argues that companies choose their optimal level of debt by trading off the benefits of debt financing against its costs. The benefits of debt financing include the tax deductibility of interests (Miller, 1977; Modigliani & Miller, 1963) and the reduction of free cash flow agency costs of equity (Jensen, 1986; Jensen & Meckling, 1976; Stulz, 1990). The costs of debt relate to the costs of financial distress, and the agency costs of debt. The optimal level is achieved where the marginal benefits equal

the marginal costs of an additional unit of debt. The alternative pecking order theory is based on the information asymmetry between the firm's insiders – either shareholders or managers, and outsiders – mainly investors, regarding the real value of both current operations and future prospects. For that reason, external capital (debt and equity) will always be relatively costly compared to internal capital (retained earnings). The main prediction of this theory is that companies follow the hierarchy of preference with respect to financing resources – they will first use retained earnings as the cheapest source of finance, followed by debt finance, and finally outside equity financing as a last option. Due to the fact that equity entails larger information asymmetry costs due to which is more expensive relative to other financing sources, it is less interesting to firms and serves them as a last resort. However, despite the important contributions of both these theories in understanding the capital structure decisions, neither of them gives definite answers to questions about how companies should be financed.

Most of the empirical studies on capital structure determinants employ models which involve the regression of the observed leverage ratio against a number of microeconomic or firm-level explanatory variables. These firm-specific characteristics assume to proxy for the underlying forces that drive these theories and represent the above mentioned market imperfections such costs of financial distress, information asymmetries and taxation. Table 1 summarises central predictions of the two major capital structure theories – the trade-off theory and the pecking order theory, regarding the relationship between the leverage ratio and the firm-specific factors which are suggested as determinants of capital structure (leverage).

As it can be seen, trade-off theory and pecking order theory have no common predictions for most of the typically used proxy variables. The listed internal factors are included among the Frank and Goyal's (2009) major factors that are driving forces behind capital structure decisions ('the core model of leverage'). Thus, our first aim is to test empirically whether leverage decisions of firms follow the trade-off or the pecking theory predictions.

Profitability is usually taken as firm-specific attribute that clearly distinguishes between these two theories. The trade-off theory predicts a positive influence of profitability on leverage as a result of bankruptcy costs, taxes and agency costs. First, expected costs of financial distress decline with profitability increase because more profitable firms can support more debt. Second, it pays off to profitable firms to have more leverage since interest payments are tax deductible and firms can realise tax savings through the use of additional debt. Finally, higher leverage helps to control agency problem of free cash flow by forcing managers to pay out more of the excess cash instead of spending it inefficiently (Jensen, 1986; Jensen & Meckling, 1976). The use of higher leverage can serve as a signal of optimistic future of the company (Ross, 1977).

Table 1. Central predictions of two dominant capital structure theories.

Variables	Trade-off theory	Pecking order theory
Profitability	Positive	Negative
Tangibility	Positive	Positive
Size	Positive	Negative
Non-Debt tax shields	Negative	-
Growth (opportunity)	Negative	Positive
Earnings volatility	Negative	Negative
Liquidity	Positive	Negative

Source: Authors' expectations according to theoretical assumptions.

In contrast, the pecking order model (Myers, 1984) predicts negative relationship between profitability and leverage as a consequence of hierarchy of financing due to the adverse selection costs associated with new equity issues in the presence of information asymmetry. Firms that have higher operating profitability have more earnings that they can potentially retain to finance their investments. Thus, profitable firms need less external financing and have lower leverage.

Tangible asset can be used as collateral or can be sold in case a firm has problems meeting its debt obligations. According to the trade-off theory, a higher share of tangible assets means lower bankruptcy costs and lower agency costs as debtholders can more easily secure their claims (Jensen & Meckling, 1976). Thus, a firm holding more tangible assets faces lower agency costs and finds it optimal to hold more debt. The pecking order theory (Myers, 1984) assumes that firms prefer debt over equity due to the fact that debt is considered more secured and has less agency costs. Thus, positive relation between tangibility of assets and leverage is predicted.

The effect on firm size is ambiguous. The trade-off theory predicts that bankruptcy costs decline with firm size. Accordingly, an inverse relationship between size and the probability of bankruptcy is expected and hence a positive relationship between size and leverage. In line with arguments of Titman and Wessels (1988), larger firms tend to be more diversified, which lowers the probability of default implying positive size-leverage relationship. According to the viewpoint of the pecking order theory (Myers, 1984), company size can be regarded as a proxy for information asymmetry between company insiders and capital markets. As a result, larger firms are better able to overcome information asymmetry than smaller firms, thus they can obtain external financing, both debt and equity, more easily.

Depreciation works as a non-debt tax shield and can be considered alternative to debt tax benefits (De Angelo & Masulis, 1980).[1] Firms that have more depreciation expenses as a proportion of total assets have less need to use debt interest payments as a mean of reducing their tax base (Byoun, 2008). In other words, higher non-debt tax shields reduce the potential tax benefits of debt – hence, a negative effect is expected between non-debt tax shields and debt level.

One aspect of agency problem relates to the incentive of management of levered companies to engage in asset substitution activities and underinvestment (i.e. Jensen & Meckling, 1976). The debt-related agency costs are higher for firms with more growth opportunities. Accordingly, the trade-off theory predicts that companies with more investment opportunities have less leverage because they are more motivated to control the managers' opportunistic behaviour and to avoid underinvestment and asset substitution that can arise from shareholder–bondholder agency conflict. This is further supported by free cash flow theory argument (Jensen, 1986) which predicts that firms with more investment opportunities have less need for the disciplining effect of debt payments to prevent managerial funds misuse. The predictions of pecking order theory are ambiguous. On one hand, in its simplest form, it suggests positive relationship between growth opportunities and leverage because debt typically grows when investment exceeds retained earnings suggesting that firms with rapid growth opportunities need more debt due to the lack of internal funds. However, in a more complex version of the theory, managers are interested in future as well as current financing costs. Balancing both costs, companies with large expected growth opportunities can maintain a low-risk debt capacity in order to avoid financing future investments with

new equity (or even forgoing profitable investments). Thus, firms with larger expected investments will have less current leverage.

With respect to earnings volatility (business risk), both theories allow for the same, negative prediction but with different argumentation. Firms with high earnings volatility face a higher risk that earnings drop below the debt service commitment. This may force firms to arrange funds at high costs to pay the debt or to bankrupt in an extreme case. However, if financed with equity, firms can choose not to pay out dividends during the period of financial distress. This indicates that firms with high earnings volatility will borrow less and prefer equity to debt when facing external financing choices. Thus, an inverse relationship between volatility and leverage is expected. According to De Angelo and Masulis (1980), for companies with volatile cash flows investors cannot accurately forecast future earnings based on the publicly available information. For that reason, market demands a premium to provide debt. Moreover, in order to reduce the possibility that it would not be able to realise profitable investments when cash flows are low and to reduce the necessity for issuing new equity, companies with volatile cash flows maintain low leverage. Thus, pecking order theory predicts negative relationship between company's leverage and cash flows volatility.

Liquidity refers to the company's ability to meet its short-term obligations. A highly liquid company has a better ability to meet short-term liabilities which implies a positive relationship between liquidity and debt level. On the other hand, according to the pecking order theory, firms prefer internal to external financing. High liquidity firms can create liquid reserves from retained earnings and consequently have the choice to finance their projects with internal funds instead of debt. Hence, liquidity is expected to be negatively related to leverage. Moreover, in regards to agency theory, liquidity of the company's assets can be used to show the extent to which these assets can be manipulated by shareholders at the expense of bondholders. This implies a negative relationship between liquidity and debt level.

Most theoretical and empirical studies of capital structure have examined the cases of companies in the developed countries such as the US. Rajan and Zingales's (1995) cross-section analysis is one of the first attempts to test for other developed (G7) countries the theoretical and empirical lessons learnt from the studies conducted in the US. The authors find similar levels of leverage across countries and the results of study indicate that the determinants of capital structure that have been reported for the companies in the US – size, growth, profitability, and asset tangibility, are important in other countries as well. In other words, capital structure decisions of the developed countries companies are similar to those of the companies in the US and support the assumptions of several modern theories of capital structure (e.g., the trade-off theory, the pecking order theory). However, recent studies (i.e. Chen, 2004; Delcoure, 2007) performed on the companies in developing – transition and emerging countries (i.e. Central and East European [CEE] and Asian companies), show different results and support the assumptions of so-called 'new pecking order theory', which states that firms use as financing sources, first retained earnings, then equity, and finally, debt. These differences are caused by different firm-specific factors and different macroeconomic and institutional settings in developing and developed countries.

The issue of capital structure determinants in the context of transition and emerging economies, which have far more different macroeconomic and institutional environment, has received more attention in recent years. The institutional diversity entails for example, large differences in the aspects of a country's financial system, legal system and tradition,

tax system, etc. Well known and cited studies by La Porta, Lopez-De-Silanes, Shleifer and Vishny (1997), La Porta, Lopez-de-Silanes, Shleifer and Vishny (1999), Demirguc-Kunt and Maksimovic (1999), Claessens and Klapper (2005) for example, highlight the presence of systematic differences in the capital structure across countries. These studies show how legal system and financial market development, as the components of the wider environment in which the companies operate, play an important role in the way the firms are financed. Different institutional features in various countries may impact the trade-off between bankruptcy costs and tax benefits as well as the information asymmetry costs for firms. Also, companies operating in countries with higher distress costs need more collateral relative to companies operating in lower distress costs environment. In higher distress costs countries, lenders can repossess collateral or enforce debt contracts to reduce bankruptcy and agency costs of debt. The more developed financial system (banking system and/or financial markets) implies better supply of external financing for companies in financial deficit as well as less information asymmetry between investors and companies due to stronger regulation, higher corporate governance standards and better investor protection rights. Therefore, firm-specific characteristics as well as the characteristics of their environment, such as the general health of the economy, the size and the development of the banking system and/or capital market, legal environment, etc. influence the companies' decision to use more debt or equity.

The focal point of this article is on the influence of firm-specific factors and country's macroeconomic features on the corporate leverage. Studies focusing primarily on the effects at the micro level have documented common determinants of capital structure. However, some of those firm specific determinants – such as investment, sales volume or future growth opportunities, may vary upon the current state of the economy. During an economic trough, there are more future investment and growth opportunities available to firms, compared with an economic peak. This suggests that companies should adjust their capital structure according to the fluctuations in macroeconomic conditions in order to respond to future investment and growth opportunities. Stulz (1990) states that, due to managers, shareholders' agency problem and the resulting overinvestment and underinvestment problems connected with the amount of resources under management control, firms would use more debt when cash flows are high and when the possibility that the company will have free cash flows is high. When cash flows are high, management tends to invest largely in projects with negative net present value (NPV) (overinvestment); on the contrary, when the cash flows are low, there are no sufficient funds to invest in positive NPV projects (underinvestment). Beside the above mentioned, Stulz (1990) states that chosen financing policy can reduce these potential problems – issuing debt that forces management to pay out funds when cash flows are high reduces overinvestment problem, and issuing equity to increase the resources under management control when cash flows are low can reduce underinvestment problem. Therefore, according to the agency theory, the company's leverage will be positively related to the macroeconomic conditions.

The asymmetric information theory has somewhat opposite conclusions about the impact of free cash flows and profitability on capital structure decisions. Asymmetric information between the managers and outside investors assume that the latter are less informed about the value of the company's asset. Consequently, this inequality in available information can lead to under-pricing of equity and then underinvestment occurs. Ross's (1977) signalling theory states that company's decision to use debt investors interpret as a signal

of positive future opportunities and company's prospect. In addition, Myers and Majluf (1984) argue that there is a pecking order in financing with the use of equity as a last resort option. Moreover, it is better for firms to maintain financial surplus for future investment opportunities. Thus, due to information asymmetry problems, companies tend to use debt rather than equity financing during an economic trough. To conclude, according to the asymmetric information theory, the company's leverage will be negatively related to the macroeconomic conditions.

Korajczy and Levy (2000) find that a company's choice on security issuance depends on the macroeconomic conditions and firm-specific variables and conclude that for that reason companies tend to timely adjust the issuance of securities to periods of favourable macroeconomic conditions. An economic intuition behind the above mentioned arguments is that economy's business cycle phase is an important determinant of capital structure decisions. Moreover, the results of some research have implied that the firm's speed of adjustment toward a target level is faster under favourable macroeconomic conditions (Drobetz, 2006; Hackbarth, Miao, & Morellec, 2006).

Korajczyk and Levy (2003) assume the impact of macroeconomic conditions on capital structure taking into consideration a company's financial constraints. Their results confirm that the corporate leverage is counter-cyclical for the financially unconstrained firms, which is not consistent with the agency theory of capital structure.

Hackbarth et al. (2006) propose that balancing the tax benefit of debt and bankruptcy costs in order to reach optimal leverage should depend on macroeconomic conditions. The benefits of debt – interest deductibility and mitigation of agency conflicts between managers and shareholders, depend on the economy's business cycle since economic expansion or recession has important implications for the companies' cash flows. Further, costs of debt – bankruptcy costs and agency conflicts between debtholders and shareholders, depend on the probability of default and loss given default both of which should depend on the current state of the economy.

Levy and Hennessy (2007) develop a general equilibrium model to explain corporate financing over business cycles. They argue that capital structure is counter-cyclical for less-constrained companies. From the above, it can be concluded that there is consensus on the importance of macroeconomic circumstances for corporate financing decisions. However, there is no agreement on the nature of the impact of these conditions on corporate capital structure. Thus, there is a need for further research to provide better understanding on the impact of macroeconomic specifics on the capital structure decisions and this article addresses this gap to provide further evidence in the case of companies in Croatia.

Bopkin (2009) examines the effect of macroeconomic factors on capital structure decisions of emerging markets companies. The results point to significant influence of the banking sector development on the use of long-term debt over equity. Inflation has a negative but statistically insignificant effect on capital structure decisions and GDP per capita has a negative and statistically significant relationship with capital structure variables. Interest rate positively influences the choice of short-term debt over equity.

As it has already been pointed out, the greater interest for the empirical examination of theoretical predictions and capital structure determinants in case of companies in transition and/or CEE countries has arisen in the last decade (Klapper, Sarria-Allende, & Sulla, 2002; Nivorozhkin, 2004; 2006; Berk, 2007; Delcoure, 2007; Črnigoj & Mramor, 2009). The empirical literature on the capital structure issue in the context of Croatian companies

is still scarce. A study of De Jong, Kabir and Nguyen (2006) is one of the multi-country studies where Croatia is included among 42 countries with, however, only 13 companies, which is the smallest number of observations of all sample countries. Similar is evident in the representation of other CEE countries which raises the need for deeper investigation of these indicative results. There are only a few studies on capital structure issues conducted in the Republic of Croatia. Baran and Zorić (2005) investigate firm-specific determinants of leverage of small and medium enterprises, but on the aggregated data for Croatian Counties in the year 2004. Učkar (2007) explores the functional relationship between financial structure elements and stock price movements of selected listed companies in Croatia during the period 2000–2006. The results confirm the explicative power of trade-off theory. The same model does not find evidence for confirmation of the traditional approach, the Modigliani-Miller theory and signal theory of financial structure management. Penavin and Šarlija (2010) investigate the occurrences in capital structure flow of Croatian companies in the pre-recession period from 2002 to 2007. The results show that there are two common ways of changes in the capital structure in the observed period. The first is one in which own funds grow through retained earnings, while funds from borrowed sources grow faster which in the end indicates a change in the capital structure through debt increase. The second one, present in a smaller number of companies, is represented with a combination of the capital structure change in which own funds grow through increased retained earnings faster than comparing to borrowing. Furthermore, analysis for the period 2002–2007 shows that borrowing from banks is the dominant form of financing. The explanation for the observed situation can be found in the excessive costs of capital in the market, insufficient effects of the tax shield, as well as in the relative underdevelopment of the capital market in Croatia. Thus, as the suggestions for future deeper investigation of this issue, the authors underline the need for exploration of internal capital structure determinants in Croatian companies as well as macroeconomic conditions in which companies operate.

From the above, it can be concluded that the gap exists in the empirical literature relating to the capital structure issue of Croatian companies. Furthermore, previous research has not been adjusted for the panel nature of the data and thus full potential on information utilisation about the same unit of observation could not be achieved which ultimately might result in misleading conclusions. Our article contributes to the limited empirical literature by bridging the detected gaps.

3. Data and methodology

The sample of 111 large companies (LSE) in Croatia has been extracted from the population of all companies in Croatia available in the AMADEUS database in November 2011[2]. The observed period is between 2001 and 2010. According to the AMADEUS database criteria, large companies are defined as those with equal or more than 10 million EUR of operating revenue or 20 million of total assets or 150 employees. Enterprises with ratios operating revenue per employee or total assets per employee below 100 EUR are not included in the category of large companies. From the population of all large companies available for Croatia, these selected 111 had to satisfy the criteria that observation has a known value in the AMADEUS excel spreadsheet in at least eight out of 10 observed years for the firm specific variables used in the analysis, and that there are known values for the mentioned variables in the period 2008–2010. This criterion is necessary due to the model requirements

and is in accordance with suggestions of previously conducted (and already mentioned) studies that use a similar sample of CEE countries' companies. The final sample is strongly balanced. The data on economic development, inflation and banking sector development are obtained from World Development Indicators.[3]

Table 2 shows descriptive statistics for all variables included in the model.

With respect to leverage, as the main variable of interest, the data show that the companies have the leverage level of 65.5% on average. Minimum value of the leverage is 0 while the highest value of leverage is 221.3%. Standard deviation of the variable has value 25.4%.

The correlations for the data used in the analysis are presented in the Table 3. The magnitude of the correlation coefficients (Table 3) indicates that multicollinearity is not a potential problem in the regression models.

The panel character of the data allows us to use panel data methodology for this empirical research. This type of the analysis can control for firm heterogeneity and reduce collinearity among the observed variables (Arellano & Bond, 1991; Arellano & Bover, 1995). To estimate the dynamic regression models, a two-step General Method of Moments (GMM) estimator is used which enables us to eliminate unobservable individual effects and the explanatory variables used in the research. Several tests will be performed to test the validity of the model – consistent results of an estimator are achieved under the assumption that there is no second order correlation in the first-differenced residuals and that instrumental variables are uncorrelated with the residuals. Thus, we use tests for first order (m_1) and second order (m_2) serial correlation in the first-differenced residuals as well as Sargan test for checking the validity of instruments.

The used panel data model can be represented with the following expression[4]:

$$LEV_{it} = \alpha + \gamma LEV_{i,t-1} + \beta'_{FS}X^{FS}_{it} + \beta'_{MF}X^{MF}_t + e_{it} \tag{1}$$

The subscripts i and t represent company and year respectively. $LEV_{i,t-1}$ is the one-period lagged leverage variable. β'_{FS} and β'_{MF} are the vectors of coefficients to be estimated. X^{FS}_{it} and X^{MF}_t are sets of firm-specific and macroeconomic variables, respectively. Finally, e_{it} are unobserved firm-specific effects and the error term.

The dependent variable is leverage calculated as total liabilities to total asset. This is the broadest version of this ratio and its use is determined by the availability of the financial statement data. Explanatory variables are approximated and measured as presented in the following Table 4.

Table 2. Descriptive statistics.

Variable	Mean	Standard Deviation	Minimum	Maximum
Leverage	0.655	0.254	0.000	2.213
Tangibility	0.444	0.247	0.000	1.000
Return on assets	0.100	0.127	-1.141	0.950
Sales growth	2.008	31.153	-1.000	921.668
Liquidity	3.712	43.029	0.004	1360.000
Size	1.66e+07	2.19e+07	48840	1.40e+08
Non-debt tax shield	0.054	0.061	0.000	0.698
GDP	6017.42	6017.42	6017.42	6017.42
Inflation	3.74	1.17	1.02	6.09
Domestic credit provided by banking sector	65.03	11.09	45.57	82.20

Source: Authors' calculations.

Table 3. Pairwise correlations.

Variable	Leverage	Tangibility	Return on assets	Sales growth	Liquidity	Size	Non-debt tax shield	GDP	Inflation	Domestic credit provided by banking sector
Leverage	1.000									
Tangibility	0.081	1.000								
Return on assets	-0.065	0.026	1.000							
Sales growth	-0.035	0.008	-0.045	1.000						
Liquidity	0.383	0.092	-0.016	-0.003	1.000					
Size	0.059	0.155	-0.008	0.041	0.032	1.000				
Non-debt tax shield	0.041	0.094	0.055	-0.017	0.004	0.014	1.000			
GDP	-0.045	0.066	-0.005	-0.062	0.030	0.236	0.087	1.000		
Inflation	0.018	-0.024	-0.100	0.102	-0.040	0.007	-0.024	0.175	1.000	
Domestic credit provided by banking sector	-0.038	0.074	-0.016	-0.102	-0.051	0.244	0.110	0.509	-0.181	1.000

Source: Authors' calculations.

Table 4. Dependent and explanatory variables and their measures.

Variables	Measures
Leverage	Ratio of total liabilities to total asset
Tangibility	Ratio of fixed asset to total asset
Growth[a] (in sales)	$(Sales_t - Sales_{t-1})/Sales_{t-1}$
Profitability	Ratio of EBITDA to total asset
Liquidity (Current ratio)	Ratio of current asset to current liabilities
Size	Total asset
Non-debt tax shield	Ratio of depreciation to total asset
Gross domestic product per capita	GDP per capita
Inflation	Inflation, GDP deflator (annual %)
Domestic credit provided by banking sector	Domestic credit provided by banking sector as a percentage of GDP

[a]Calculation of possibly better proxies for growth opportunities - such as Tobin's Q, was not feasible due to the lack of necessary capital market data.
Source: Authors' definitions according to existing empirical studies.

Table 5. Determinants of capital structure (GMM system estimator).

	Model 1	Model 2
	Dependent variable: Leverage	Dependent variable: Leverage
Explanatory variables	Coefficients (Standard errors)[a]	Coefficients (Standard errors)[a]
Constant	0.148 (0.157)	0.002 (0.1797)
Leverage$_{(t-1)}$	0.170*** (0.071)	0.2142*** (0.067)
Tangibility	-0.122 (0.354)	-0.327 (0.427)
Profitability (ROA)	-0.0035* (0.002)	-0.0035* (0.002)
Growth	-0.022*** (0.008)	-0.017* (0.010)
Liquidity	0.027*** (0.004)	0.029*** (0.005)
Size	-0.001* (0.005)	-0.001** (0.005)
Non-debt tax shield	-0.002 (0.003)	-0.001 (0.003)
GDP		-0.000 (0.000)
Inflation		0.0162* (0.009)
Domestic credit provided by banking sector		0.0039** (0.002)
Number of instruments	15	18
Sargan test (p-value)	0.2355	0.4048
First-order correlation (m$_1$) (p-value)	0.0599	0.0488
Second-order correlation (m$_2$) (p-value)	0.1623	0.1279

[a]***, ** and * indicate significance at the 1%, 5% and 10% levels respectively. Standard errors are in parentheses.
Source: Authors' calculations.

With regard to macroeconomic variables, we employ GDP per capita, inflation and domestic credit provided by banking sector as a percentage of GDP which is a proxy for the level of banking development.

The results of GMM estimators are presented in Table 5 in the next section.

4. Empirical results

The regression results on the effect of firm-specific and selected macroeconomic factors on capital structure are presented in Table 5. Performed tests prove the validity of the model – there is no first-order (m$_1$) or second-order (m$_2$) serial correlation and instrumental variables used in the model estimation are valid since there is no correlation between the instruments and residuals (Sargan test).

The regression results on the effect of firm-specific factors on capital structure (Table 5, Model 1) suggest highly significant influence of all internal factors except for the asset tangibility and non-debt tax shield. The estimated parameters for the lagged dependent

variable and liquidity are statistically significant and positive, while parameters for other statistically significant variables are negative. In order to find an answer on which theory best reflects the capital structure of the companies in Croatia, the direction of the influence of the significant variables will be compared to the suggested predictions according to the trade off and pecking order theories (see Table 1).

Negative but statistically insignificant coefficient of tangibility suggests an inverse relationship between the proportion of tangible assets as a firm-specific characteristic and the leverage meaning that tangible asset as collateral does not pose an effective guarantee against bankruptcy. This result is in contrast to the results of the studies conducted in developed countries, which obtain a positive relationship, but is consistent with the results of the studies performed on the sample of developing countries (i.e. Booth, Aivazian, Demirguc-Kunt, & Maksimovic, 2001; Črnigoj & Mramor, 2009; Nivorozhkin, 2004). According to Nivorozhkin (2004), two factors suggest weak or no relationship between tangibility and leverage in CEE countries: underdeveloped and inefficient legal systems that may hinder the creation of enforceable debt contracts, and thin and illiquid secondary markets for firms' assets that create uncertainty about their 'recoverable' market value. The negative tangibility–leverage relationship can be explained by the maturity structure of debt liabilities – the companies match the maturities of their assets and liabilities and the higher proportion of tangible assets corresponds to the higher level of long-term debt financing but not necessarily to total debt financing. This phenomenon may be expected to be more profound in the emerging markets of CEE countries where the lack of long-term debt financing (but the presence of the short-term one) may result in the negative relationship between tangibility and leverage. In line with the predictions and results of the De Haas and Peters' study (2006), conducted on the sample of transition countries, our results confirm negative relationship between the proportion of tangible assets and the leverage measured by the proportion of total liabilities in total asset. However, this effect is not statistically significant.

As predicted by the pecking order theory, firm size is found to negatively correlate with leverage suggesting that larger firms are less leveraged. Previous studies in the transitional countries usually report a positive relationship (i.e. Byoun, 2008; Črnigoj & Mramor, 2009) which can be attributed to lower bankruptcy costs for larger firms (trade-off theory), their better transparency towards investors and consequently less severe problems of information asymmetry (pecking order theory), or possible to existence of soft budget constraints. Klapper et al. (2002) find a negative relationship between size and actual leverage for all the countries they study; however, the authors only use 1999 data. Delcoure, (2007) observes anegative relationship for the estimation of long-term leverage and ascribes it to the existence of information asymmetry and still developing laws, due to which companies acquire more funds through short-term loans, and to underdeveloped bond markets. The negative size-leverage relationship in our study may be explained by more internal funds available for financing and less need for borrowing.

Profitability is negatively related to leverage which is in accordance with the hierarchy of financing, namely the pecking order theory. More profitable firms have more internally generated funds available and thus less need for debt. This negative relationship between profitability and leverage is confirmed in various studies (i.e. Booth et al., 2001; Črnigoj & Mramor, 2009; De Haas & Peeters, 2006; Delcoure, 2007; Nivorozhkin, 2004). Another explanation for this result could be related to the assumptions of the 'new pecking order theory' (Chen, 2004; Delcoure, 2007). According to this theory, banks from the developing

countries provide short-term loans rather than long-term loans, thus firms have to finance their investments with equity. However, in these countries shareholders' protection laws are weak and managers prefer retained earnings as financing resource. This can be linked to the above elaborated results on the tangibility–leverage relationship. Moreover, these results are in line with the observations of Penavin and Šarlija (2010) on the occurrences in the capital structure flows in case of Croatian companies during period 2002–2007.

Growth possibility shows negative impact on the companies' leverage meaning that as the companies grow more, less debt they use. Companies that have a greater opportunity to grow have a wider range of potential projects in which they can invest. As a result, their shareholders have greater flexibility in selecting these projects and expropriating wealth to the detriment of creditors – banks and bondholders. In other words, because of the higher agency costs of debt, companies prefer equity financing because potential lenders are unwilling to lend funds for fear of exploitation of shareholders who are prone to choosing risky projects (trade-off theory). The agency problem of free cash flow is present in the mature and less growing businesses, and it can be reduced by additional debt (Jensen & Meckling, 1976). This explains the negative relationship between the growth of the company and its debt. These results are consistent with the majority of research conducted in CEE countries and developing economies (i.e. Huang & Song, 2006; De Haas & Peters, 2004).

Liquidity positively affects leverage and this relationship is statistically significant. Higher liquidity, on the one hand, reduces the possibility of economic failure and lowers the potential costs of bankruptcy if it eventually occurs due to a sufficient amount of short-term asset to cover outstanding liabilities. On the other hand, better liquidity increases the liquidation value of the company, thus increasing its borrowing capacity in the future.

Depreciation as a non-debt tax shield is negatively related to the leverage level. However, we do not find evidence of an incentive to increase leverage because of corporate taxes, as the non-debt tax shield variable enters none of the regressions significantly.

On the basis of the observed results it can be concluded that neither trade-off or pecking order theory completely and undoubtedly explains corporate capital structure in Croatia. Taking into account the assumptions behind these two capital structure theories on the one hand, and the specific economic environment and resulting behaviour of firms on the other hand, this is actually not so surprising. The results of our analysis coincide with the results and conclusions of the mentioned researches conducted in other CEE countries (i.e. Črnigoj & Mramor, 2009; Delcoure, 2007; Nivorozhkin, 2004). Furthermore, the results point to the importance of understanding and deeper analysis of the country-specific characteristics of the environment.

With respect to the added macroeconomic variables (Table 5, Model 2) – gross domestic product per capita, inflation and domestic credit provided by banking sector, the results suggest positive and highly significant influence of inflation and domestic credit provided by banking sector, whereas the influence of gross domestic product is negative but statistically insignificant.

Variables of GDP never enter the model significantly, probably reflecting the fact that we have already taken into account investment opportunities at the firm level through the firm growth. The negative coefficient of GDP shows that increase in economic activity reduces the companies' leverage. Such an unexpected result is contradictory to the majority of previous studies that positive correlation between GDP and level of debt arguments with the 'healthier' environment in which the risk of financial distress/bankruptcy is reduced which

motivates companies to increase debt financing (i.e. Booth et al., 2001; Bartholdy & Mateus, 2006). However, if we look at the GDP in a way that it reflects the growth of the company and an increase in retained earnings, then the logical consequence of a negative relation is in accordance with the confirmed positive connection between growth (as measured by sales growth) and indebtedness.

The impact of inflation on debt is positive and statistically significant. The increase in inflation reduces the costs of debt financing and within the financial structure of the companies it is expected to increase the proportion of borrowed funds. Moreover, the value of tax deductions is higher when (expected) inflation is higher (Frank & Goyal, 2007).

The domestic credit provided by banking sector as a share of GDP, which is used as a measure of the development of the banking sector, influences companies' leverage positively and statistically significantly. Since this indicator measures the banking sector depth and financial sector development in terms of size (WDI, 2011, p. 285), the positive relationship is expected and it points to the higher degree of companies' dependence on banking sector financing. In other words, more developed banking system facilitates access to external financing and consequently increases the companies' leverage.

5. Conclusion

The purpose of this article has been twofold: first, to disclose specific internal company characteristics that are most influential determinants of corporate capital structure in case of large companies in Croatia, and second, to expand the set of internal determinants with the macroeconomic factors and to investigate their influence on corporate financing decisions. The results obtained applying dynamic panel methodology show that modern capital structure theories are to a certain extent relevant in Croatian context, namely partially explaining capital structure choices. With respect to macroeconomic factors, higher inflation and more developed banking sector increase corporate leverage.

The results of the research can serve financial managers and macroeconomic policy decision-makers. Financial managers should become aware of the impact of these factors, to understand their significance and their implications on the financial structure of the company. Good financial decisions should take into consideration all of the relevant factors, not only internal or firm-specific. Only in this way it is possible to achieve a significant competitive advantage, which is extremely important in today's dynamic environment of increasing competition and crisis prone times. Decision-makers on a macroeconomic level should be aware of the effect of the macroeconomic environment features on corporate capital structure policy and ultimately corporate performance.

This study helps to reveal the nature of corporate financing in Croatia and by producing a number of insights could form a basis for both further research in Croatia and comparative research in other developing countries. In Croatian context, suggestions for future research would relate to inclusion of other macroeconomic variables, such as exchange rate volatility and the level of openness of the economy, as well as deeper investigation of the effect of other financial system segments' characteristics – capital markets, insurance sector, etc. on corporate leverage. Furthermore, the model should be expanded by other factors that characterise institutional environment in which companies operate, such as tax, legal and political systems. Having in mind the differences between large, small and medium companies and depending on data availability, the comparative analysis with respect to different

firm sizes can be performed. Additionally, the capital structure dynamics, target leverage and adjustment speed can be relevant topics for future empirical works.

Notes

1. Apart from depreciation, other non-tax shields could be allowances for research and development and investment tax credit (De Angelo & Masulis, 1980).
2. The financial sector is excluded, as in similar research, due to its specificities and particular requirements of the supervisors.
3. This comprehensive World Bank database, available on World Bank's Open Data site, among various the most current and accurate data series (1300 time series indicators) encompasses numerous economic and financial data at national level (214 economies) (World Bank, 2015).
4. We run the regression for two different model specifications: in the first (basic model), we use only firm-specific variables and in the second model we expand this set with inclusion of macroeconomic variables. Table 5 summarises results for both models.

References

Arellano, M., & Bond, S. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *The Review of Economic Studies, 58*, 277–297. doi:http://dx.doi.org/10.2307/2297968.

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics, 68*, 29–51. doi:http://dx.doi.org/10.1016/0304-4076(94)01642-D.

Baran, D., & Zorić, M. (2005). Determinante zaduženosti malih i srednjih poduzeća u Republici Hrvatskoj - regionalni pristup [Leverage determinants of small and medium enterprises in the Republic of Croatia - regional approach]. In Lj., Vidučić(Ed.), *Mala i srednja poduzeća: financijski, računovodstveni i pravni aspekti osnivanja i poslovanja* [Small and medium enterprises: financial, accounting and legal aspects of their establishing and business] (pp. 75–94) Split: Ekonomski fakultet Split.

Berk, A. (2007). The role of capital market in determining capital structure: Evidence from Slovenian public and private corporations. *Acta Oeconomica, 57*, 123–155. doi:http://dx.doi.org/10.1556/AOecon.57.2007.2.1.

Bessler, W., Drobetz, W., & Kazemieh, R. (2011). Factors affecting capital structure decisions. In H. Kent Baker, & G. S. Martin (eds.), *Capital structure and corporate financing decisions – Theory, Evidence, and Practice*, John Wiley and Sons.

Booth, L., Aivazian, V., Demirguc-Kunt, A., & Maksimovic, V. (2001). Capital structures in developing countries. *The Journal of Finance, 56*, 87–130. doi:http://dx.doi.org/10.1111/0022-1082.00320.

Bopkin, G. A. (2009). Macroeconomic developments and capital structure decisions of firms – Evidence from emerging market economies. *Studies in Economics and Finance, 26*, 129–142. doi:http://dx.doi.org/10.1108/10867370910963055.

Byoun, S. (2008). How and when do firms adjust their capital structures toward targets? *Journal of Finance, 56*, 87–130. doi:http://dx.doi.org/10.1111/j.1540-6261.2008.01421.x.

Chen, J. J. (2004). Determinants of capital structure of Chinese-listed companies. *Journal of Business Research, 57*, 1341–1351. doi:http://dx.doi.org/10.1016/S0148-2963(03)00070-5.

Claessens, S., & Klapper, L. F. (2005). Bankruptcy around the World: Explanations of Its Relative Use. *American Law and Economics Review, 7*, 253–283. doi:http://dx.doi.org/10.1093/aler/ahi004.

Cornelli, F., Portes, R., & Shaffer, M. E. (1996). *The capital structure of firms in Central and Eastern Europe*. Unpublished manuscript.

Črnigoj, M., & Mramor, D. (2009). Determinants of capital structure in emerging european economies: evidence from slovenian firms. *Emerging Markets Finance and Trade, 45*, 72–89. doi:http://dx.doi.org/10.2753/REE1540-496X450105.

De Haas, R., & Peeters, M. (2006). The dynamic adjustment towards target capital structures of firms in transition economies. *The Economics of Transition, 14*, 133–169. doi:http://dx.doi.org/10.1111/j.1468-0351.2006.00237.x.

de Jong, A., Kabir, R., & Nguyen, T. T. (2008). Capital structure around the world: The roles of firm - and country specific determinants. *Journal of Banking and Finance, 32*, 1954–1969. doi:http://dx.doi.org/10.1016/j.jbankfin.2007.12.034.

De Angelo, H., & Masulis, R. W. (1980). Optimal capital structure under corporate and personal taxation. *Journal of Financial Economics, 8*, 3–29. http://www.elsevier.com/wps/find/journaldescription.cws_home/505576/description#description

Delcoure, N. (2007). The determinants of capital structure in transitional economies. *International Review of Economics and Finance, 16*, 400–415. doi:http://dx.doi.org/10.1016/j.iref.2005.03.005.

Demirguc-Kunt, A., & Maksimovic, V. (1999). Institutions, financial markets and firm debt maturity. *Journal of Financial Economics, 54*, 295–336. doi:http://dx.doi.org/10.1016/S0304-405X(99)00039-2.

Drobetz, W., & Wanzenried, G. (2006). What determines the speed of adjustment to the target capital structure? *Applied Financial Economics, 16*, 941–958. doi:http://dx.doi.org/10.1080/09603100500426358.

Frank, M. Z., & Goyal, V. K. (2003). Testing the pecking order theory of capital structure. *Journal of Financial Economics, 67*, 217–248. doi:http://dx.doi.org/10.1016/S0304-405X(02)00252-0.

Frank, M. Z., & Goyal, V. K. (2009). Capital structure decisions: Which factors are reliably important? *Financial Management, 38*(1), 1–37. doi:http://dx.doi.org/10.1111/j.1755-053X.2009.01026.x.

Frydenberg, S. (2011). Capital structure theories and empirical tests: An overview. In H. Kent Baker & G.S. Martin (Eds.) *Capital structure and corporate financing decisions – Theory, Evidence, and Practice*. John Wiley and Sons.

Hackbarth, D., Miao, J., & Morellec, E. (2006). Capital structure, credit risk, and macroeconomic conditions. *Journal of Financial Economics, 82*, 519–550. doi:http://dx.doi.org/10.1016/j.jfineco.2005.10.003.

Harris, M., & Raviv, A. (1991). The theory of capital structure. *The Journal of Finance, 46*, 297–355. doi:http://dx.doi.org/10.1111/j.1540-6261.1991.tb03753.x.

Huang, G., & Song, F. M. (2006). The determinants of capital structure: Evidence from China. *China Economic Review, 17*, 14–36. doi:http://dx.doi.org/10.1016/j.chieco.2005.02.007.

Israel, R. (1992). Capital and ownership structure and the market for corporate control. *The Review of Financial Studies, 5*, 191–198. doi:http://dx.doi.org/10.1093/rfs/5.2.181.

Jensen, M. C. (1986). Agency cost of free cash flow, corporate finance, and takeovers. *The American Economic Review, 76*, 323–329. doi:http://dx.doi.org/10.2139/ssrn.99580.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*, 305–360. doi:http://dx.doi.org/10.1016/0304-405X(76)90026-X.

Klapper, L. F., Sarria-Allende, V., & Sulla, V. (2002). *Small and medium-size enterprise financing in Eastern Europe*. Unpublished manuscript.

Klapper, L., & Tzioumis, K. (2008). *Taxation and Capital Structure - Evidence from a Transition Economy*. Unpublished manuscript.

Korajczyk, R. A., & Levy, A. (2003). Capital structure choice: Macroeconomic conditions and financial constraints. *Journal of Financial Economics, 68*, 75–109. doi:http://dx.doi.org/10.1016/S0304-405X(02)00249-0.

La Porta, R., Lopez-De-Silanes, F., Shleifer, A., & Vishny, R. W. (1997). Legal determinants of external finance. *The Journal Of Finance, 52*, 1131–1150. doi:http://dx.doi.org/10.1111/j.1540-6261.1997.tb02727.x.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1999). Law and finance. *Journal of Political Economy, 106*, 1113–1155. doi:http://dx.doi.org/10.1086/250042.

Leland, H. E., & Pyle, D. H. (1977). Informational asymmetries, financial structure, and financial intermediation. *The Journal of Finance, 32*, 371–387. doi:http://dx.doi.org/10.2307/2326770.

Levy, A., & Hennessy, C. (2007). Why does capital structure vary with economic conditions? *Journal of Monetary Economics, 54*, 1545–1564. doi:http://dx.doi.org/10.1016/j.jmoneco.2006.04.005.

Lopez-Garcia, J., & Sogorb-Mira, F. (2008). Testing trade-off and pecking order theories financing SMEs. *Small Business Economics, 31*, 117–136. doi:http://dx.doi.org/10.1007/s11187-007-9088-4.

Miller, M. H. (1977). Debt and taxes. *The Journal of Finance, 32*, 261–275. doi:http://dx.doi.org/10.1111/j.1540-6261.1977.tb03267.x.

Modigliani, F., & Miller, M. H. (1963). Corporate income taxes and the cost of capital: A correction. *The American Economic Review, 53*, 433–443. http://www.jstor.org/stable/1809167

Myers, S. C. (1984). The capital structure puzzle. *The Journal of Finance, 39*, 575–592. doi:http://dx.doi.org/10.1111/j.1540-6261.1984.tb03646.x.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics, 13*, 187–221. doi:http://dx.doi.org/10.1016/0304-405X(84)90023-0.

Nivorozhkin, E. (2004). *Firm's financing choices in EU accession countries*. Unpublished manuscript.

Penavin, S., & Šarlija, N. (2010). Pojave u kretanju strukture kapitala hrvatskih poduzeća u predrecesijskom razdoblju (2002. - 2007.)[Occurrences in Capital Structure Flow of Croatian Companies in the Pre-Recession Period (2002–2007)]. *Ekonomski vjesnik, 2*, 317–332.

Rajan, R. G., & Zingales, L. (1995). What do we know about capital structure? some evidence from international data. *The Journal of Finance, 50*, 1421–1460. doi:http://dx.doi.org/10.1111/j.1540-6261.1995.tb05184.x.

Ross, S. A. (1977). The determination of financial structure: The incentive-signalling approach. *The Bell Journal of Economics, 8*, 23–40. doi:http://dx.doi.org/10.2307/3003485.

Sarig, O. H. (1988). *Bargaining with a corporation and the capital structure of the bargaining firm*. Unpublished manuscript.

Stulz, R. (1988). Managerial control of voting rights: Financing policies and the market for corporate control. *Journal of Financial Economics, 20*, 25–54. doi:http://dx.doi.org/10.1016/0304-405X(88)90039-6.

Stulz, R. (1990). Managerial discretion and optimal financing policies. *Journal of Financial Economics, 26*, 3–27. doi:http://dx.doi.org/10.1016/0304-405X(88)90039-6.

Titman, S. (1984). The effect of capital structure on the firm's liquidation decision. *Journal of Financial Economics, 13*, 137–151. doi:http://dx.doi.org/10.1016/0304-405X(84)90035-7.

Titman, S., & Wessels, R. (1988). The determinants of financial structure choice. *The Journal of Finance, 43*(1), 1–19. doi:http://dx.doi.org/10.2307/2328319.

Učkar, D. (2007). Mogućnost optimizacije financijske strukture poduzeća u Republici Hrvatskoj [Possibilities to optimize the financial structure of companies in the Republic of Croatia]. *Ekonomska istraživanja, 20*, 24–34.

Wanzenried, G. (2002). *Capital structure dynamics in UK and continental Europe*. Unpublished manuscript.

World Bank. (2015). *World Development Indicators*, [Data set]. Retrieved July 26, 2015, from http://data.worldbank.org/products/wdi