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Determinants of the capital structure of large companies: Evidence from Serbia

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ABSTRACT

The subject of this study is the capital structure of the largest Serbian companies in the period after the global economic crisis in 2008. The research sample comprises the 141 largest non-financial (mostly private) companies in Serbia over the period 2009–2017. In order to identify the key determinants of the capital structure of the sampled companies, three models of financial leverage were tested (total, short-term, and long-term) using panel data fixed effects models. The main result of the analysis indicates that these companies, mostly financed by short-term debt, predominantly belong to the 'pecking order' theory. When the total leverage is split into its short-term and long-term components, the results show that short-term leverage behaviour aligns with the 'pecking order' theory, whereas long-term leverage is fully consistent with the expectations of the trade-off theory. Also, this study shows that the country-specific determinants, such as inflation and development of the banking sector, have a significant impact on the capital structure of the largest companies in Serbia.

1. Introduction

Value-based management implies that company value is maximised through three kinds of strategy: operational (business) strategy, investment strategy, and financial strategy (Rappaport, 1998). Financial strategy, inter alia, is responsible for capital structure, which supports the value maximisation achieved primarily by business strategy and investment strategy. For this reason, capital structure receives a great deal of attention from both academics and practitioners. The most important capital structure theory and the most important empirical research come from countries with the most developed financial markets, particularly the USA. These studies have cleared a path for similar research on countries in the rest of the world.

The capital structure of companies differs between developed and developing countries. Decision-making on capital structure depends on a numerous country-specific factors, such as the characteristics of the financial system (development of the banking sector and stock market) and the legal and tax systems, as well as corporate governance practice (Demirgüç-Kunt & Maksimovic, 1999; Booth et al., 2001; Delcoure, 2007). For example, developing countries usually have a bank-centred financial system, and companies' financing options are usually limited to commercial banks (Berk, 2007; Arsov, 2016). Nevertheless, the role and importance of the stock market cannot be ignored.

The aim of the paper is to gain new insight into the determinants of capital structure in large companies in an emerging economy such as Serbia's. Serbia is an EU candidate country with evident characteristics of a transitional economy.

2. Theoretical background and literature review

There are two dominant theories of capital structure, the trade-off theory (TOT) and the pecking order theory (POT), plus a third, newer, market timing theory (MTT). TOT is based on the 1963 work of Modigliani and Miller, which is an adjustment of their famous seminal work (Modigliani & Miller, 1958). It sees the optimal capital structure as being a compromise between the benefit of debt in terms of corporate tax advantage, and the cost of debt in terms of the financial distress caused by the risk of bankruptcy (Kraus & Litzenberger, 1973) and agency costs (Jensen & Meckling, 1976). Conversely, POT (Myers, 1984; Myers & Majluf, 1984) posits that the aim of companies is not an optimum capital structure: their preferred primary source of funds is retained earnings, with debt as a secondary solution, and they raise external equity capital only as a last resort. The third theory, MTT (Baker & Wurgler, 2002), says that managers are generally indifferent to the attractiveness of any source of funding or any 'order' in using funding sources: rather, their financial choices are determined by the current cost of those sources.

Marsh (1982), Bradley et al. (1984), and Titman and Wessels (1988) were some of the pioneers of a new wave of research into the theory and practice of capital structure. Published shortly afterwards, Mayer's (1990) work aims to show the specificities of companies' financial behaviour in different countries. Frank and Goyal (2009) find that the factors that most reliably impact market leverage are median industry leverage, market-to-book assets ratio, tangibility, profitability, log of assets, and expected inflation (book leverage is determined only by industry leverage, tangibility, and profitability).

Research on the capital structure determinants of companies in different institutional contexts, in countries at various stages of financial market development, and in countries with different levels of national economy development has been prolific, although often leading to opposing conclusions. Demirgüç-Kunt and Maksimovic (1996) find a significant negative correlation between stock market development and financial leverage. In a study of 10 developing countries, Booth et al. (2001) find that capital structure decision-making is affected by the same variables as in developed countries, but country-specific factors give rise to differences across countries. Mitton (2007) concludes that leverage of emerging market companies increases due to firm-

specific factors as well as country-specific factors. Based on a panel data analysis of 34 countries over the 1990–2006 period, Bokpin (2009) finds that the development of the banking sector significantly influences firms' capital structure, with the direction of the impact depending on the capital structure indicators; while the impact of stock market development on firms' capital structure decisions is insignificant. TOT and POT do not fully explain the typical financial behaviour of Chinese companies. Chen (2004) establishes a 'new pecking order' theory with the following preferences for financing new business opportunities: retained earnings, equity, and long-term debt. The 'new pecking order' is a consequence of significant institutional differences and financial constraints in China's banking sector. Additionally, Chinese companies prefer short-term finance debt compared to companies in developed economies.

There is a high level of consistency between the conclusions of research conducted in Poland (Hussain & Nivorozhkin, 1997) and Hungary (Nivorozhkin, 2002). In both countries, firms have extremely low leverage levels and lack long-term financing. Kaźmierska-Jóźwiak et al. (2015) confirm that POT better explains the financial behaviour of Polish companies, while Pirtea et al. (2014) find that POT explains the financial behaviour of Romanian companies. Delcoure (2007) finds that the capital structure choices of companies in transitional economies (the Czech Republic, Poland, the Russian Federation, and Slovakia) differ from those in developed countries. These companies follow the modified 'pecking order': retained earnings, equity, and bank and possibly market debt.

There are several Turkish studies on this topic. Bayrakdaroğlu et al. (2013) find that Turkish companies follow POT in capital structure decision-making. Köksal and Orman (2015) argue that TOT is a way of financing behaviour in large, private non-manufacturing companies doing business in a stable economic environment, while POT is suitable for small manufacturing companies in unstable economic conditions. Also, they find that macroeconomic variables such as GDP growth, inflation, and capital flow have a significant impact on the capital structure of Turkish companies.

In Croatia, Mošnja-Škare and Škare (2002) find that leverage is negatively correlated with firm size, profitability, and tangibility. Šarlija and Harc (2012) conclude that the more liquid assets firms have the less they are leveraged, but increasing inventory levels lead to higher debt. Taking into account macroeconomic variables (GDP, inflation, and banking sector development) as well, Pepur et al. (2016) argue that neither TOT nor POT completely explain the financial behaviour of large Croatian companies in the period 2001–2010. In Slovenia the largest companies follow the pecking order hypothesis rather than TOT (Berk, 2006), while private companies have higher leverage than public companies (Berk, 2007).

In Serbia there have been several studies regarding capital structure and its determinants. The samples differ: big and medium-sized listed companies (Malinić et al., 2013; Denčić-Mihajlov, Malinić, & Grabinski, 2015); companies with the highest turnover on the stock exchange (Arsov, 2016); and the largest companies (Stančić et al., 2016). These studies cover the crisis period. Malinić et al. (2013) and Arsov (2016) find that the analysed Serbian companies follow the modified pecking order theory, but Stančić et al. (2016) conclude that the financial behaviour of Serbian non-financial companies is not in accordance with any relevant capital structure theory.

Relying on survey-based analyses of Serbian companies, Kaličanin and Todorović (2014) and Đulić et al. (2017) arrive at similar conclusions regarding the tendency towards internal financing, confirming POT.

Large Serbian companies have a low share of long-term debt and a very high share of short-term debt. There are several possible reasons for this unfavourable debt maturity structure. Long-term loans in Serbia are usually denominated in euros. This leads to an increase in capital costs in periods of a rising exchange rate against the Serbian dinar, which causes a decline in profitability (Stančić et al., 2016). Such a risk makes companies reluctant to increase long-term debt. Additionally, due to technological obsolescence, Serbian producing companies do not possess the necessary collateral to obtain cheaper long-term loans (Stančić et al., 2016). On the other hand, Malinić et al. (2013) explain the dominance of short-term over long-term liabilities by: the chronic illiquidity present in the Serbian economy; the attitude of banks towards credit risk, leading to preferential approval of short-term loans; and the transfer of the financing burden to suppliers.

In order to eliminate the identified gap between the previously described studies from Serbia and studies from other developing countries, in our study we extend the time horizon of observations to cover the non-crisis period and analyse the impact of both internal and external (macroeconomic) determinants of capital structure.

We postulate three research questions: (1) What is the predominant theory that explains the finance behaviour of the largest companies in Serbia over the 2009–2017 period? (2) Do the prevailing capital structure theories differ depending on debt maturity (short-term versus long-term leverage)? (3) Does the macroeconomic context affect the capital structure of the observed companies, and if so, in what way?

3. Overview of research methodology

3.1. Data description and descriptive statistics

The econometric research sample comprises the largest companies in Serbia, using the criterion of operating revenue. This criterion was selected because the subject of the present analysis is large companies with the highest level of operation, even if some of them were operating at a loss. The sample comprises companies whose operating revenue for 2013 exceeded RSD 5 billion (about EUR 44 million). Financial sector entities and companies incurring losses exceeding equity were excluded from the sample.

The research spans 9 years and includes 141 companies (a balanced panel of 1,269 observations). The data source was the financial statements of the analysed companies, publicly available at the Serbian Business Registers Agency. We used book values to calculate the values of the financing structure indicators and their determinants. The use of market values was not possible, as few companies in the sample are quoted on the stock market, which is underdeveloped, shallow, and in decline.

3.1.1. Dependent variables
As short-term sources of funding constitute a predominant share of the total liabilities of the sampled companies, observing the capital structure in the traditional (narrow) meaning of long-term debt relative to equity would not result in a complete and

Table 1. Descriptive statistics of dependent variables.

Indicator	Mean	Std. Dev.	Min	Median	Max	Skewness	Kurtosis
TL	0.5580	0.2469	0.0322	0.5765	0.9998	−0.2220	2.0545
STL	0.4371	0.2458	0.0025	0.4130	0.9876	0.3140	2.1426
LTL	0.1209	0.1373	0	0.0789	0.8852	1.7633	6.8574

Source: Authors' calculations based on financial statements of the analysed companies; Serbian Business Registers Agency.

realistic view of the firms' financial position and security, or of the risk to which financiers and other stakeholder groups are exposed. For this reason, the present paper has a broader focus, encompassing overall sources of financing. Following the example of other studies conducted in transitional economy countries (Nivorozhkin, 2002; Chen, 2004; Delcoure, 2007; Köksal & Orman, 2015), the present research uses the following three indicators of capital structure as the panel model dependent variables: total, short-term, and long-term leverage.

The first dependent variable is the most commonly used and most comprehensive financial leverage indicator, representing total liabilities relative to total assets, and is therefore also known as total leverage (TL). TL is the fundamental dependent variable in this paper.

In order to identify the key determinants that explain the variability of the most dynamic and predominant source of financing, we assessed the capital structure model where the dependent variable is short-term leverage (STL). Short-term leverage is expressed as the ratio of short-term liabilities to total assets. In the third model, long-term leverage (LTL) is the dependent variable, expressed as the ratio of long-term liabilities to total assets. Although the share of long-term liabilities in the total sources of financing of domestic companies is rather small, this indicator was used to complement the first two indicators in order to ensure greater comparability with other studies (e.g., Chen, 2004; Delcoure, 2007).

The average total leverage ratio of the sampled companies equalled 0.56, while the median value was 0.58. The average (median) value of the short-term leverage ratio was 0.44 (0.41). The average long-term leverage ratio equalled 0.12, while its median value was 0.08. Descriptive statistics of the dependent variables in the capital structure models are presented in Table 1.

3.1.2. Explanatory variables – capital structure determinants

Using as our starting point the results of relevant research conducted in transition economy countries (Chen, 2004; Delcoure, 2007; Malinić et al., 2013; Pepur et al., 2016) and the 'basic leverage model' (Frank & Goyal, 2009), we defined the set of explanatory variables explicitly included in econometric capital structure models. A number of determinants and their 'formulae' are given in Table 2.

Descriptive statistical indicators of the set of potential capital structure determinants for the largest Serbian companies are presented in Table 3 and the correlation matrix is presented in the Appendix (Table A1).

3.2. Empirical model and results

The research was conducted using panel data models. As the number of observed individual units N (number of companies) was significantly higher than the number

Table 2. Description of the analysed capital structure determinants.

Determinant	Designation	Formula
Internal (firm-specific) determinants:		
Profitability	ROA	(Net income + finance expenses × (1−tax rate))/ Average total assets
Size	lnTA	Natural logarithm of total assets
Tangibility	tang	Non-current assets /Total assets
Growth	gS	(Sales $_t$ − Sales $_{t-1}$)/Sales $_{t-1}$
Volatility	vol	St. dev. (EBIT/Total assets)
Liquidity	cLiq	Current assets/Current liabilities
Cash gap	cgap	Days inventory outstanding + Days sales outstanding − Days payable outstanding
Tax shields	tax	Tax expense for the period/Profit before taxes
External (country-specific) determinants:		
GDP growth	GDP	Annual percentage change in Gross Domestic Product
Inflation	Inf	Annual percentage change in consumer price index
Banking sector development	Cred	Domestic credit provided by banking sector to GDP

Source: Authors' description based on the literature review.

Table 3. Descriptive statistics of the analysed capital structure determinants.

Indicator	Mean	Std. Dev.	Min	Median	Max	Skewness	Kurtosis
ROA	0.0970	0.0904	−0.3444	0.0891	0.6555	0.7219	7.8422
lnTA	22.8011	1.2951	18.5433	22.7879	27.6362	0.4667	4.2545
tang	0.4649	0.2564	0.0000	0.4737	0.9973	0.0149	2.0980
cLiq	1.5826	1.3143	0.0212	1.2237	10.4623	3.2297	17.0700
vol	0.0222	0.0257	0.0000	0.0135	0.2232	2.6867	13.9032
gS	0.1460	0.4779	−0.9999	0.0752	4.9352	4.8644	14.1689
cgap	12.5764	131.1510	−1097.36	12.5778	1186.75	−0.7964	29.0837
tax	0.0883	0.1374	−0.7933	0.0664	1.3514	2.2571	22.2786
GDP	0.8556	1.9667	−2.7000	1.8000	3.3000	−0.5343	1.9230
Inf	5.1222	3.8442	1.5000	3.0000	12.2000	0.6607	1.9374
Cred	50.0079	3.3059	42.6500	50.9100	53.8900	−1.0415	3.1774

Source: Authors' calculations based on financial statements of the analysed companies (Serbian Business Registers Agency); National Bank of Serbia (2020) and the World Bank (2020) database for the external determinants.

of observation years *T*, the analysis made use of the econometric models and methods characteristic of standard panels. The initial step was the estimation of the total leverage panel data model in the form of pooled, fixed effects (FE) and random effects (RE) specifications.

Selection of the model specification depends on the results of testing for the existence of individual and time effects. All the tests confirmed the existence of individual effects at the 1% significance level, while the time effects were insignificant, as presented in Table 4 below.

Based on the tests listed above, we concluded that the pooled regression model was inadequate and confirmed the relevance of the individual effects model:

$$CS_{it} = \beta_1 + \sum_{k=2}^{K} \beta_k X_{kit} + \mu_i + u_{it}$$

i = 1,2,… N, t = 1,2, … T where CS_{it} is the capital structure indicator (TL, STL, LTL) of company *i* over year *t*; β_1 is a y-axis intercept; β_k designates regression parameters with explanatory variables X_k; u_i stands for individual effects; and u_{it} stands for a random model error.

Table 4. Tests of individual and time effects.

Test	Value of the test statistic	p-value
F-test (individual effects)	78.69	0.0000
Breusch Pagan LM test	1,922.56	0.0000
Honda test	33.51	0.0000
F-test (time effects)	0.85	0.5140

Source: Authors' calculations in Stata 13.

We selected the relevant model specification for the purpose of this research in accordance with the econometric procedure that entails application of specification tests. Following the testing of the panel data model assumptions (Table 5), we used the Hausman specification test, which is robust to heteroscedasticity and autocorrelation (Wooldridge, 2010). Based on the obtained value of the Hausman test statistic of 45.32, at the 1% significance level, we dismissed the random effects specification and selected the fixed effects model with consistent estimates.

Due to the econometric problems identified in the initial panel specification, we estimated fixed effects specifications that take into account heteroscedasticity and autocorrelation. Namely, after the initial estimation of the fixed individual effects model (FE), we estimated the same model with cluster robust standard errors (FE robust), as they are robust to heteroscedasticity and serial correlation of unknown form. In this specification we clustered standard errors at the unit level; that is, we used individuals (firms) as the cluster variable, since in this case standard errors are heteroscedasticity- and autocorrelation-consistent (Hoechle, 2007, p. 283). Moreover, this specification should also be appropriate bearing in mind the difference between cross-sectional dimension N and time dimension T in our panel sample. In order to check the robustness of the obtained results, an FE model was additionally estimated by the feasible generalised least squares method (FGLS), enabling us to explicitly model the autocorrelation process (AR(1) process within panels) and heteroscedasticity, as well as Prais-Winsten regression with heteroscedastic panel-corrected standard errors (FE-PW). A comparative overview of the estimated total leverage fixed effects model specifications is presented in Table 6.

The results indicate the robustness of our results based on the FE estimator with cluster robust standard errors, since they are not significantly altered by changing the estimation method; i.e., they coincide with the results of the last two estimated model specifications (FE-GLS and FE-PW). Additionally, since FGLS produces downward-biased (understated) standard error estimates when $T < N$, which is typical in micro-economic panels such as ours (Beck & Katz, 1995; Hoechle, 2007) our research conclusions are based on the fixed individual effects specification with cluster-robust standard errors.

The total leverage model does not provide insight into any differences in behaviour between short-term and long-term debt. Therefore, total leverage was divided into two components, short-term leverage (STL) and long-term leverage (LTL), which were further used in this research as dependent variables in the capital structure regression models. To ensure full comparability and consistency of these models we used fixed model specifications, as in the case of the total leverage. Nevertheless, the complete econometric analysis used for the total leverage was performed again. The results revealed the existence of individual effects and the presence of

Table 5. Tests for heteroscedasticity, autocorrelation, and cross-sectional dependence.

Test	Value of the test statistic	p-value
Modified Wald test (heteroscedasticity)	36,514.83	0.0000
Wooldridge test (autocorrelation)	225.57	0.0000
Pesaran test (cross-sectional dependence)	−0.16	0.8723
Friedman test (cross-sectional dependence)	9.83	1.0000

Source: Authors' calculations in Stata 13.

Table 6. Estimated TL fixed individual effects model specifications for the largest companies in Serbia.

TL determinants	FE	FE-robust	FE-GLS	FE-PW
Profitability	−0.28270***	−0.28270***	−0.22098***	−0.24835***
	(0.04656)	(0.06427)	(0.02486)	(0.04265)
Size	0.03209***	0.03209**	0.02542***	0.03739***
	(0.00816)	(0.01305)	(0.00429)	(0.00832)
Tangibility	−0.29042***	−0.29042***	−0.32137***	−0.32275***
	(0.03259)	(0.06453)	(0.01839)	(0.03955)
Growth	0.00786	0.00786	−0.00147	0.00163
	(0.00673)	(0.01223)	(0.00336)	(0.00614)
Volatility	−0.00562	−0.00562	−0.06457	−0.08144
	(0.12808)	(0.17125)	(0.05861)	(0.09722)
Liquidity	−0.06928***	−0.06928***	−0.06713***	−0.06386***
	(0.00339)	(0.00950)	(0.00216)	(0.00403)
Cash gap	−0.00010***	−0.00010*	−0.00006***	−0.00010***
	(0.00003)	(0.00005)	(0.00002)	(0.00004)
Tax shields	−0.01402	−0.01402	−0.01210	−0.01422
	(0.02359)	(0.01897)	(0.00747)	(0.01791)
GDP	−0.00101	−0.00101	−0.00051	−0.00025
	(0.00182)	(0.00113)	(0.00060)	(0.00114)
Inf	0.00516***	0.00516***	0.00352***	0.00511***
	(0.00103)	(0.00167)	(0.00047)	(0.00089)
Credit	−0.00308***	−0.00308**	−0.00144***	−0.00288***
	(0.00111)	(0.00128)	(0.00043)	(0.00081)
Const.	0.22810	0.22810	0.28062	0.02785
	(0.17831)	(0.28578)	(0.12973)	(0.22140)
NT	1269	1269	1269	1269
F statistic	56.47	14.36		
p-value	0.0000	0.0000		
R^2	0.3574	0.3574		

Notes: Standard errors are given in parentheses.
***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.
Source: Authors' calculations in Stata 13.

heteroscedasticity and autocorrelation, as was the case with the total leverage model, and the specification test led to the selection of the FE model. A comparative overview of the estimated FE models with cluster-robust standard errors (FE-robust) for the TL, STL, and LTL of the largest Serbian companies is presented in Table 7.

The total leverage model explains 36% of variation in the total leverage of the largest Serbian companies ($R^2 = 0.36$). This model's explanatory power is comparable to the results of other relevant studies, where R^2 most commonly ranges between 20% and 40% (e.g., Booth et al., 2001; Chen, 2004; Frank & Goyal, 2009). The short-term leverage model has the highest coefficient of determination ($R^2 = 0.51$) – as was expected, since short-term liabilities are prevalent within the total debt. At the other end of the spectrum, the low explanatory power of the long-term leverage model ($R^2 = 0.09$) was the result of the low share of long-term liabilities in the total sources of financing (in line with the results arrived at by Chen (2004)). The average share of long-

Table 7. Comparative overview of the estimation results for fixed individual effects models for TL, STL, and LTL (FE-robust).

Determinants	TL	STL	LTL
Profitability	−0.28270***	−0.34703***	0.06415
	(0.06427)	(0.07587)	(0.05551)
Size	0.03209**	0.01125	0.02082*
	(0.01305)	(0.01211)	(0.01310)
Tangibility	−0.29042***	−0.50552***	0.21505***
	(0.06453)	(0.05638)	(0.05856)
Growth	0.00786	−0.00312	0.00482
	(0.01223)	(0.00727)	(0.00804)
Volatility	−0.00562	−0.10995	0.10494
	(0.17125)	(0.12659)	(0.11926)
Liquidity	−0.06928***	−0.08447***	0.01518***
	(0.00950)	(0.01057)	(0.00473)
Cash gap	−0.00010*	−0.00009**	−0.00001
	(0.00005)	(0.00005)	(0.00004)
Tax shields	−0.01402	−0.01993	−0.00580
	(0.01897)	(0.02227)	(0.01934)
GDP	−0.00101	−0.00127	0.00025
	(0.00113)	(0.00114)	(0.00109)
Inf	0.00516***	0.00227*	0.00289*
	(0.00167)	(0.00131)	(0.00150)
Credit	−0.00308**	−0.00090	−0.00218**
	(0.00128)	(0.00090)	(0.00109)
Const.	0.22810	0.62254**	−0.39387
	(0.28578)	(0.28441)	(0.28392)
NT	1269	1269	1269
R^2	0.3574	0.5127	0.0836

Notes: Standard errors are given in parentheses.
***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.
Source: Authors' calculations in Stata 13.

term liabilities in the observed companies' total sources of financing over the period 2009–2017 was 12%, while the median equalled only 8%. Moreover, for about 30% of the observed companies the share of long-term liabilities was 0%. This is why studies conducted in countries in the region usually do not address long-term leverage analysis, making the inferences drawn from the present research all the more significant.

4. Interpretation of results

As a rule, interpretation of the results of empirical research on capital structure entails two types of comparison. The conclusions are first compared to the postulates of the prevailing financial theories and then to the results of other empirical studies, at the same time taking into consideration specificities.

4.1. Profitability

How profitability affects capital structure is much contested and the cause of heated debate between leading financial theorists. TOT argues that increased profitability results in increased leverage, its basic arguments being: 1) more-profitable companies are exposed to a lower level of bankruptcy risk; and 2) more-profitable companies realise higher tax shields on interest. Conversely, POT claims that a rise in profitability entails an increase in internally generated assets that substitutes the need for external sources of financing. As a result, an increase in profitability has negative effects on leverage.

ROA was selected as a profitability indicator in our econometric models because it eliminates the impact of capital structure and tax shield effects. The average ROA of the observed companies in Serbia was 9.7%.

We found that profitability has a statistically significant negative influence on the leverage of the largest Serbian companies (POT). An increase in internally generated funds leads to a decrease in short-term leverage, and thus to a decrease in total leverage. Conversely, we identified no statistically significant influence of profitability on the movement of long-term leverage.

The result of the present research concerning the significant negative impact of profitability on leverage is consistent with the results of other studies conducted in developing countries, such as Booth et al. (2001), Mošnja-Škare and Škare (2002), Chen (2004), Huang and Song (2006), Bauer (2004), Delcoure (2007), Mitton (2007), Malinić et al. (2013), Pirtea et al. (2014), Köksal and Orman (2015), Kaźmierska-Jóźwiak et al. (2015), Pepur et al. (2016), and Stančić et al. (2016).

4.2. Company size

The size of a company is a reflection of its strength, stability, security, and negotiating power. Large (and usually diversified) companies with stable cash flows are exposed to lower bankruptcy risk levels, i.e., lower costs of financial distress, which makes them regard debt as the most attractive and preferred external source of funds. Based on this, TOT claims that there is a positive correlation between company size and leverage, while POT claims the opposite.

We measured company size as logarithmized total assets in accordance with the methodology applied by Chen (2004), Delcoure (2007), and Frank and Goyal (2009), among others. In our sample of the largest Serbian companies we identified a significant impact of company size in the total leverage models (at the 5% significance level). We found that company size has a positive impact on leverage, which is consistent with TOT theses.

Other authors have arrived at varying results. Bauer (2004), Huang and Song (2006), Delcoure (2007), Mitton (2007), Frank and Goyal (2009), and Arsov (2016) identify a positive influence, whereas Booth et al. (2001) identify a negative impact in the majority (6 out of 10) of developing countries observed. A negative impact of company size on leverage is found by Kaźmierska-Jóźwiak et al. (2015) for Polish companies, by Pirtea et al. (2014) in their analysis of the capital structure of Romanian companies, and by Mošnja-Škare and Škare (2002) and Pepur et al. (2016) in the case of Croatian companies.

4.3. Tangibility

Tangibility of assets is generally expressed as the share of non-current assets in the total assets of a company (e.g., Booth et al., 2001; Huang & Song, 2006). We used the same approach in this research. The average share of non-current assets in the total assets of the observed Serbian companies was stable and equalled around 46.5% over

the entire period of observation. The share of intangible assets in the total assets of the Serbian companies was exceptionally small (2.02% on average).

Tangibility of assets has a negative impact on the leverage of the largest companies in Serbia. We found that tangibility has a significant negative influence on both short-term and total leverage. The growth of non-current assets is financed from long-term sources of funding, the key argument for this being the maturity matching principle, i.e., balancing the maturities of assets and their financing sources. This is confirmed by the identified significant positive impact of tangibility of assets on long-term leverage. The predominant share of short-term sources in total sources of financing causes the prevailing negative effect of tangibility of assets on total leverage, so that increases in long-term assets lead to decreased total leverage of the largest Serbian companies.

The results we obtained are consistent with those arrived at by research from other countries in the same region, such as Croatia (Mošnja-Škare & Škare, 2002), Slovenia (Črnigoj & Mramor, 2009), and Hungary (Nivorozhkin, 2002), as well as with the results of previous studies conducted in Serbia (Malinić et al., 2013; Arsov, 2016; Stančić et al., 2016). These results support Harris and Raviv (1991) interpretation of the pecking order theory.

4.4. Growth

In the present research we used the annual sales revenue growth rate as an indicator of growth (e.g., Delcoure, 2007; Malinić et al., 2013). The average annual sales revenue growth rate of the observed companies was 14.6% over the period 2009–2017.

Our econometric analysis showed that company growth has no statistically significant impact on leverage in any of the three capital structure models. Such a result was unexpected, given that borrowed funds are the predominant source of financing in countries with undeveloped capital markets, such as Serbia. However, it should be borne in mind that the time horizon of the analysis is atypical, and is characterised by huge fluctuations in the growth rate of the entire Serbian economy as well as the observed businesses. Due to the low level of activity in the initial (crisis) period, the annual sales growth rates of the observed businesses were relatively high until 2012 (around 27% on average), after which they significantly decreased, reaching a minimum of 1% in 2017.

In their research, Chen (2004) and Malinić et al. (2013), among others, identify a positive impact of sales growth rate on leverage, while Delcoure (2007), Mitton (2007), Köksal and Orman (2015), Kaźmierska-Jóźwiak et al. (2015), and Pepur et al. (2016) arrive at the opposite conclusion.

4.5. Earnings volatility

Volatility of operating activities and consequently volatility of earnings is a measure of risk. Exposure to additional financial risk from new debt results in increased bankruptcy risk. In the present research we used standard deviation of the EBIT/total assets ratio to measure earnings volatility (e.g., Booth et al., 2001). In our sample the

average value of this indicator was only 2%. The results of our econometric analysis revealed that volatility of earnings has no significant impact on the financial leverage of the largest companies in Serbia.

Regarding the results of others' research, there is no uniform view on the impact of earnings volatility on leverage. Titman and Wessels (1988), Chen (2004), and Huang and Song (2006) all emphasise that increased volatility has negative effects on leverage, whereas Malinić et al. (2013) and Arsov (2016) reach the opposite conclusion.

4.6. Liquidity

The average value of the current liquidity ratio of the companies observed in the period 2009–2017 was 1.58. The current liquidity ratio rose from 1.48 in 2009 to 1.8 in 2017. Taking into consideration the overall context and the negative trends present in the movement of the other parameters of the companies' financial and business health, the liquidity indicators in fact imply that the focus of the observed companies is principally the preservation and maintenance of short-term financial security.

Our econometric analysis confirmed this conclusion. Liquidity has a statistically significant impact in all the capital structure models and model specifications, with a statistically significant negative influence on the short-term and total leverage of the largest Serbian companies, which is consistent with POT. Contrary to its impact on short-term and total leverage, the observed companies' liquidity has a statistically significant positive influence on long-term leverage (in line with TOT). Increased liquidity increases a company's ability to attract and service long-term debt. Given the predominant share of short-term liabilities in total debt structure in Serbia, the impact of liquidity on total leverage is negative, as is the case with short-term leverage. An inverse movement of liquidity and leverage has been confirmed by the empirical studies of Lipson and Mortal (2009), Šarlija and Harc (2012), Malinić et al. (2013), and Denčić-Mihajlov et al. (2015), among others.

4.7. Cash gap

The cash gap is the period in which a company needs to ensure additional sources of working capital. This measure can be used as an indicator of the use of spontaneous sources of financing. The average length of the cash gap of the sampled companies was 12.58 days.

The cash gap may be improved, i.e., reduced, in two ways. The (more adequate) way is to increase working capital management efficiency while servicing own trade payables in a regular and timely fashion. The other (more convenient) way is to extend deadlines for settlement of payables to suppliers, i.e., extending the periods of interest-free company credit provided by suppliers. The vast majority of the observed companies used the latter. The companies offset inefficiency in collection of receivables with delays in settlement of trade payables, maintaining their own liquidity at the expense of counterparty (non-)liquidity.

Based on the econometric analysis, we found that cash gap has a significant negative impact on short-term and total leverage. Increased negative cash gap (the generally applied transfer of the financing burden to suppliers) reduces the need for interest-bearing sources of funding, thus decreasing leverage. Our results are consistent with those obtained by Malinić et al. (2013), Denčić-Mihajlov et al. (2015), and other researchers, showing that the significance of spontaneous sources of financing during crisis periods is on the rise.

4.8. Tax shields

In this paper we express tax shields using the effective tax rates (Booth et al., 2001). The estimated econometric models show that the effective tax rate has no significant impact on the capital structure of the largest companies in Serbia. Its non-significance is confirmed in all estimated panel model specifications. Serbia belongs to the group of countries with low tax rates. Until 2013 the income tax rate was 10%, after which it was raised to 15%. As a rule, the effective tax rates of Serbian companies are lower than the nominal tax rate (8.2% on average). Such low tax rates combined with marginal profitability lead to minimal tax shields.

Contrary to our results, Pirtea et al. (2014) find a significant negative influence of tax shields, while Bauer (2004) arrives at the opposite conclusion for a sample of Czech companies.

4.9. GDP

The growth of the level of economic activity of an entire economy, measured by Gross Domestic Product (GDP) growth rate, should lead to greater opportunities for growth, investment optimism, and profitable business entities. Significant expectations regarding future investments may be a reason to maintain creditworthiness (low financial leverage). If GDP growth leads to profitable growth, then profitability growth reduces the need for borrowing. On the other hand, low leverage combined with significant investment opportunities can lead to the so-called overinvestment problem.

The average GDP growth rate in Serbia in the period was 0.86%. Our results show that GDP growth rate has a negative but statistically insignificant impact on the financial leverage of the largest companies in Serbia in the 2009–2017 period. Pepur et al. (2016) come to the same conclusion in their study conducted in Croatia. Other studies such as Bokpin (2009) and Köksal and Orman (2015) find a significant negative impact in the analysed emerging market economies, while Booth et al. (2001) identify a significant positive impact on book–debt ratios.

4.10. Inflation

Frank and Goyal (2009) find inflation (expectation) to be one of the five core leverage determinants. There are different opinions regarding the impact of inflation on capital structure. According to Booth et al. (2001), an increase in interest rates and monetary risk due to rising inflation leads to a decrease in debt levels. By contrast, inflation

increases the real value of tax savings, which reduces the cost of debt and makes borrowed funds the preferred source of financing over equity (Frank & Goyal, 2009).

The average inflation rate in Serbia in the observed period was 5.12%. The inflation rate peaked in 2012, when it reached 12.2%. Thereafter the inflation rate rapidly fell to about 2% as a consequence of economic policy (inflation targeting). The results of this study show that inflation produces a significant positive effect on the level of financial leverage of the largest Serbian companies. These results are consistent with the findings of studies conducted by Frank and Goyal (2009), Pepur et al. (2016), and Köksal and Orman (2015).

4.11. Banking sector development

Bearing in mind that Serbia is characterized by a bank-centred financial system, the influence of banking sector development on the companies' financial behaviour was tested. A higher level of banking sector development should lead to more favourable borrowing conditions and easier access to financial resources, which would result in higher leverage. Capital market development has the opposite effect on financial leverage (Demirgüç-Kunt & Maksimovic, 1996).

Development of the Serbian banking sector (or credit market) is measured by domestic credit provided by the banking sector as a share of GDP (World Bank, 2020). Our results show that the banking sector development indicator has a significant negative impact on the level of the financial leverage of the largest companies in Serbia, which is unexpected. The value of this indicator increased from 42.65% in 2009 to 50.91% in 2017, while the TL level of the observed companies decreased from 0.58 to 0.52. At the same time, Serbia's market capitalisation (% GDP) more than halved (decreased from 25.19% to 11.5%). In such circumstances the decrease in the financial leverage of the observed companies indicates that the largest Serbian companies were financed primarily from internally generated sources. Profitable companies were predominantly financed from retained earnings, while highly indebted companies were focussed on repaying accumulated debts from the crisis period, with significant reliance on spontaneous (non-banking) financing.

Regarding the results of other studies, Pepur et al. (2016) find a significant positive impact of this variable on Croatian companies' leverage, while Mitton (2007) finds it insignificant. Bokpin (2009) concludes that bank credits do not affect the total leverage, but only its short-term component.

5. Conclusion

The aim of our study was to research the capital structure of the largest real sector companies in Serbia and identify the typical capital structure, its key determinants, and the prevailing model of financial behaviour. To achieve this goal, we tested three financial leverage models (total, short-term, and long-term) using fixed individual effect models. The obtained results are summarised in Table 8.

The behaviour of the total leverage of the largest Serbian companies is predominantly consistent with POT. This conclusion is based on the negative sign obtained for 4

Table 8. The intensity and direction of the impact of internal determinants on TL, STL, and LTL, and consistency with leading capital structure theories.

Determinant	Expected impact as per TOT	Confirmed TOT in model	Expected impact as per POT	Confirmed POT in model
Profitability	+		−	TL***; STL***
Tangibility	+	LTL***	+/−	LTL***/ TL***; STL***
Size	+	TL**	−	
Growth	−		+	
Volatility	−		−	
Liquidity	+	LTL***	−	TL***; STL***
Tax shields	+		−	

Notes: Although it is a significant determinant, the cash gap is not shown in the table given that its expected impact as per TOT/POT is unknown.
***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.
Source: Authors' findings compared with TOT and POT hypotheses (based on the literature review).

(profitability, tangibility, liquidity, cash gap) out of 5 statistically significant determinants. Company size is the single significant variable with a positive influence on total leverage (in line with TOT). When the total leverage is split into its short-term and long-term components, the results show that short-term leverage behaviour is mostly aligned with POT, whereas long-term leverage is fully consistent with the expectations of TOT. Since short-term borrowing is the prevalent source of financing, POT almost completely explains the movements of the largest Serbian companies' total leverage over the period 2009–2017. Separate analyses of the short-term and long-term leverage models revealed that certain determinants of capital structure have opposite effects on short-term and long-term leverage. Such effects offset each other, which then reduces the intensity and significance of their impact on the total leverage and the predictive power of the total leverage model. This also accounts for the total leverage model's lower explanatory power in comparison to that of the short-term leverage model.

When determining the capital structure, it is necessary to take into account the macroeconomic context. Capital structure is one of the basic determinants of a company's flexibility. Whether and to what extent a company will be able to respond to external threats or seize the opportunity for profitable growth largely depends on the current capital structure. We find that the inflation rate positively affects the financial leverage of the largest Serbian companies. Finally, this study finds a significant negative correlation between banking sector development and financial leverage, indicating a predominant reliance on internally generated resources (POT).

Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendix

Table A1. Correlation matrix.

	TL	STL	LTL	ROA	lnTA	tang	gS	vol	cLiq	cgap	tax	GDP	Inf	Cred
TL	1													
STL	0.8446	1												
LTL	0.2864	-0.2709	1											
ROA	-0.0538	-0.0394	-0.0261	1										
lnTA	-0.3387	-0.4159	0.1354	-0.1681	1									
tang	-0.4499	-0.5991	0.2633	-0.2382	0.5465	1								
gS	0.0556	0.0523	0.0065	0.1606	-0.0109	-0.0313	1							
vol1	0.0685	0.0816	-0.0227	0.2485	-0.1743	-0.1364	0.0785	1						
cLiq	-0.5033	-0.5043	-0.0024	0.1585	-0.0960	-0.1219	-0.0949	0.0043	1					
cgap	-0.0816	-0.0759	-0.0110	0.1115	-0.0246	-0.2155	0.0393	0.0263	0.1905	1				
tax	0.0206	0.0370	-0.0293	0.0128	0.0059	-0.0832	-0.0298	-0.0657	-0.0025	0.0118	1			
GDP	-0.0452	-0.0288	-0.0298	-0.1282	0.0910	0.0074	-0.0597	-0.0705	0.0397	-0.0068	0.0504	1		
Inf	0.0569	0.0286	0.0511	0.2322	-0.0941	-0.0138	0.2326	0.1561	-0.0433	0.0007	-0.1055	-0.3964	1	
Cred	-0.0313	-0.0051	-0.0149	-0.0170	0.0735	-0.0040	0.0489	-0.0709	0.0185	0.0032	-0.0100	0.3905	0.2714	1

Source: Authors' calculations in Stata 13.