DETERMINANTS OF THE COST OF DEBT
IN THE REPUBLIC OF SERBIA

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Abstract

This study explores the determinants of the cost of corporate debt in the Republic of Serbia. It covers 4,701 companies during 2008-2013, representing more than 90% of all medium-sized and large companies actively operating in the country. In this particular market, the cost of corporate debt is influenced by the following factors: Euribor rates, sector membership, size of a company, short-term and total leverage of a company, interest coverage ratio, the presence of the shareholder capital, ownership structure as pertaining to the state or foreign ownership, and the type of audit opinion. After accounting for these factors, the pseudo R^2 yields 77%. At the same time, the type of an audit opinion is shown to be the single most important predictor of the cost of debt in the country, contributing to the pseudo R^2 with approximately 2,900 basis points. Therefore, the companies operating in the Republic of Serbia seeking a more affordable cost of debt should pay special attention to the quality of their financial reports.

Key words: cost of debt, Republic of Serbia, audit opinion, financial leverage, ownership structure.

ДЕТЕРМИНАНТЕ ЦЕНЕ ДУГА У РЕПУБЛИЦИ СРБИЈИ

Апстракт

Ова студија истражује детерминанте цене дуга на примеру Републике Србије. Узорком је обухваћено 4701 средње и велико привредно друштво које је активно пословало у периоду од 2008. до 2013. године, што чини више од 90% одговарајуће популације. Резултати показују да, на посматраном тржишту, утицај на висину цене дуга имају следећи фактори: Еурибор каматна стопа, секторска класификација, величина друштва, степен краткорочне и дугорочне задужености, коефицијент покрића камате, правна форма, власничка структура и врста ревизорског мишљења. Након узимања у обзир свих наведених фактора, псеудо R^2 достиже вредност од 77%. Такође, врста ревизорског мишљења показала се као најзначајнија детерминанта цене дуга, доприносећи вредности псеудо R^2 са приближно 29 процентних поена. Друштва која послују у Републици Србији би, према томе, требало да обрате посебну пажњу на квалитет финансијског извештавања.

Кључне речи: цена дуга, Република Србија, ревизорско мишљење, задуженост, власничка структура.

INTRODUCTION

Similar to their counterparts in developed markets, the companies in the Republic of Serbia are concerned with their cost of debt. To lower their overall cost of capital and thus become more competitive and profitable, they must identify and improve the factors that determine their cost of debt. The most important firm-specific factors relevant to the cost of debt - as identified in the extant literature - include size and financial leverage (Anderson, Mansi, & Reeb, 2003), ownership structure (Sánchez-Ballesta & García-Meca, 2011), and the quality of financial reporting (Francis, LaFond, Olsson, & Schipper, 2005). These factors are directly or indirectly linked to credit risk. For example, Anderson et al., (2003) reported that a firm's size is negatively related to the debt yield spreads due to the stability and scale typically enjoyed by larger firms. This study also shows that financial leverage is an important factor in determining the cost of debt (Anderson et al., 2003), as the increased use of financial leverage increases the credit risk, leading to higher interest rates.

In the literature, the ownership structure is acknowledged to play an important role, as the companies with state (government) ownership have, on average, a lower cost of debt (Sánchez-Ballesta et al., 2011). Furthermore, it is shown that a decrease in state ownership leads to an increase in the cost of debt (Borisova & Megginson, 2011). Arguably, the reason is that state ownership is negatively related to corporate risk-taking (Boubakri, Cosset, & Saffar, 2013). The study also reported that both family control and ultimate ownership (i.e., the voting/cash-flow rights wedge) have a positive effect on the cost of debt (Boubakri & Ghouma, 2010).

Another factor that influences the cost of debt is the quality of financial reporting (Francis, et al., 2005). Evidence suggests that debtholders want to receive the same information as shareholders, who are incentivized to transfer wealth to themselves as they have an information advantage (Aslan & Kumar, 2012). By reducing the information asymmetry, high quality financial reporting reduces the debtholders' risk and consequently lowers the lending rates. Francis et al., (2005) and Bharath, Sunder, & Sunder (2011) further confirmed that the companies with a superior quality of accounting achieve lower interest rates; studies also found accounting conservatism to be a favorable characteristic of financial reporting, which leads to reduced interest rates (Ahmed, Billings, Morton, & Stanford-Harris, 2002). Studies also showed that though a presence of independent auditors increases the reliability of financial statements in general (Anderson et al., 2004), the reliability is considerably increased by hiring high quality auditor firms (i.e., Big 6 or more recently Big 4), commending a lower cost of debt (Lai, 2011; Karjalainen, 2011; Pittman & Fortin, 2004).

Despite the variety of factors examined in the existing literature, individual studies usually focus on one, or a handful of, relevant factor(s) (Kabir, Li, & Veld-Merkoulova, 2013; Rahaman & Zaman, 2013). Using

incomplete sets of variables, these studies failed to account for the effects of other potentially relevant factors and their complex interdependencies. Considering this fallacy, the primary aim of this study is to simultaneously consider a comprehensive set of publicly available financial information and determine the extent to which they influence the cost of debt. Furthermore, as most empirical studies are focused on developed markets, apart from Bliss & Gul (2012), Shailer & Wang (2014), and Chan & Hsu (2013), the secondary aim of this study is to examine and interpret the peculiarities of the Republic of Serbia regarding the determinants of the cost of debt.

DATA SET AND METHODOLOGY

The audited financial statements and corresponding audit opinions for 4,701 companies were collected, representing more than 90% of all medium-sized and large[1] non-financial companies in the Republic of Serbia, for 2008-2013. In most cases, more than one financial statement was available per company, yielding an unbalanced panel data set comprising 22,394 observations.

The criteria for the inclusion of an observation in the analysis were as follows:

(1) The company had debt on its books, but the amount did not exceed the value of total assets (i.e., 0 <debt ratio < 1) and

(2) The calculated interest rate was within the following range: 3% <interest rate < 25%.

The dependent variable was the pre-tax cost of debt. To estimate a company's cost of debt, its total interest expense was divided by its average (at the beginning and at the end of the year) interest-bearing liabilities as described by Francis et al. (2005):

Cost of debt = Interest expenses / Average balance of interest-bearing liabilities

After calculating the values of the dependent variable (the earliest observation for each company was discarded due to the averaging of liabilities and applying the criteria for inclusion, the number of companies observed was reduced to 2,468, and the number of observations was reduced to 7,120. The histograms displaying the calculated values for each year during the study period are presented in Figure 1; it displays the interest rates (from 3% to 25%) and their respective frequencies from 2009 to 2013.

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[1]For 2013, the mean value of total assets of the companies in the sample was 20.75 million Euros.
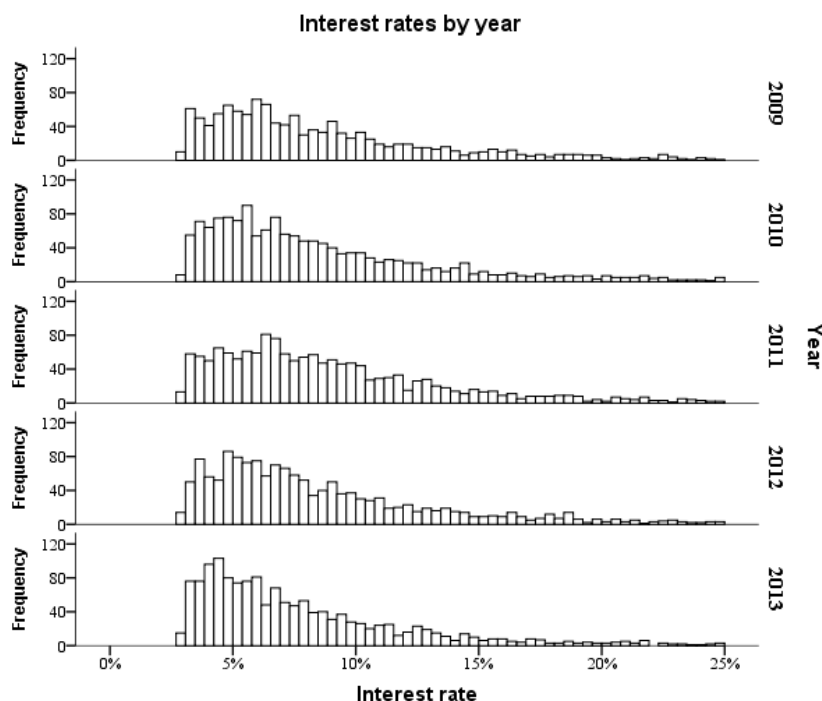
Figure 1. Histograms of the calculated values of interest rates by year

Independent Variables

Regarding the explanatory variables, starting with the proxy for the general level of market interest rates, the variables affecting the cost of debt were sequentially added as identified in the literature. Consequently, the following variables were included in the analysis: Euribor 6_t[2], Euribor 6 lag$_t$, Sector$_{it}$[3], Total assets Ln$_{it}$, Total revenue Ln$_{it}$, Total number of employees Ln$_{it}$, Interest coverage ratio$_{it}$, Debt ratio$_{it}$, Portion of short-term debt$_{it}$, State ownership$_{it}$, Shareholder company$_{it}$, Foreign ownership$_{it}$, Audit opinion lag$_{it}$, and Big 4 lag$_{it}$ (for the Details on the Calculation of the Variables, see Appendix 2).

As previously stated, the first two variables were used as the proxy for the general level of market interest rates. As the majority of corporate loans in the Republic of Serbia are denominated in Euros and the interest

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[2] Data on the first-day-of-the-month Euribor 6M rates were obtained from http://www.euribor-rates.eu/. The calculated mean values were 2009:1.44%, 2010: 1.08%, 2011: 1.64%, 2012:0.83%, and 2013:0.34%.
[3] The value is presented according to the International Standard Industrial Classification (United Nations, 2008).

rate being linked to the Euribor rates, the mean Euribor 6M rates for the observed year as well as those for the preceding year were included. The other 12 variables were used to indicate, directly or indirectly, the level of the companies' credit risk.

Model Specification: The Model with No Explanatory Variables

To decompose the total variance of the interest rate into within (-companies) and between (-companies) components and, consequently, test whether the use of the random intercept model was appropriate for further analysis, a model with no explanatory variables was estimated. The model was specified as follows:

$$IR_{it} = \alpha + u_i + \varepsilon_{it}$$

The components were estimated using the "variance components" covariance structure and the restricted maximum likelihood (REML) estimation method. The results are presented in Table 1:

Table 1. Model with no explanatory variables:
estimates of covariance parameters [a]

Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		8.570	.277	30.916	.000	8.044	9.131
Intercept [subject = Id]	Variance	11.951	.575	20.769	.000	10.875	13.133

a. Dependent Variable: Interest rate.

Source: Authors' database

The results of the analysis suggested[4] that a significant portion (i.e., 58.24%) of the total variability in the interest rates lies between the companies. Therefore, it was appropriate to proceed with the specification of the mixed linear model with the random intercept.

Models with Explanatory Variables

Seven mixed linear models (and two sub models) with explanatory variables were specified and tested during the statistical modeling process[5]

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[4] Interclass correlation: $ICC = \frac{s^2(b)}{s^2(b)+s^2(w)}$.

[5] The statistical methodology used in this research is primarily based on the study by Heck, Thomas, & Tabata (2013), which should be referred to for additional details. IBM SPSS is used for the analysis.

(see Appendix 3). In models 1-6, one group of variables was added at a time, excluding the variables which showed no statistical association with the dependent variable, at each stage. Then, random slopes were introduced in models 6a, 6b, and 7. The purpose of introducing random slopes was to allow for the logical proposition that as described by Prevost, Rao, & Skousen (2008), the type of audit opinion should have caused a greater absolute percent-point increase in the interest rates for the companies that were riskier (i.e., had higher interest rates) than for those that were safer (i.e., had lower interest rates). To measure the fit of the models, the squared correlation between the predicted and actual values of the dependent variable was used (see the values for the pseudo R^2 in Appendix 3).

The greatest improvement in the model fit was achieved after adding the variable indicating the audit opinion, bringing the pseudo R^2 from 48% for model 5 to the pseudo R^2 of 77% for model 6. Therefore, in the study, model 6 was the focus of the analysis. Model 6 was specified as follows:

$$
\begin{aligned}
IR_{it} = \alpha + u_i &+ \beta_1 \times (Euribor6)_{it} + \beta_2 \times (Euribor6Lag)_{it} \\
&+ \sum_{i=3}^{19} \beta_i \times (Sector)_{it} + \beta_{20} \times (LnAssets)_{it} \\
&+ \sum_{i=21}^{26} \beta_i \times (InterestCoverage)_{it} + \beta_{27} \\
&\times (DebtRatio)_{it} + \beta_{28} \times (Short-termDebt)_{it} + \beta_{29} \\
&\times (State/socially-owned)_{it} + \beta_{30} \times (ShareCap)_{it} \\
&+ \beta_{31} \times (Foreign)_{it} + \sum_{i=32}^{34} \beta_i \times (AuditOpinion)_{it} + \varepsilon_{it}
\end{aligned}
$$

The explanatory variables that were examined in this study but did not appear to have a statistically significant association with the cost of debt were revenues (i.e., Total Revenue Ln_{it}), number of employees (i.e., Number of Employees Ln_{it}), and a dummy coded variable indicating whether the audit opinion of the prior year (i.e., Audit opinion lag $_{it}$) was issued by one of the Big 4 audit firms (i.e., Big 4lag $_{it}$).

RESULTS

Model 6: Independent (Explanatory) Variables

Model 6, which exhibited the best fit as measured by the correlation between the predicted and actual values (pseudo R^2=77%), indicated that the following explanatory variables had a significant association with the cost of debt:

1) The Euribor 6M ($t= 8.109$, $p=0.000$) and one-period lag Euribor 6M ($t=5.016$, $p=0.000$) had the expected significance, whereas further (i.e., two- and three-period) lags were not statistically significant. The fixed effects of Euribor 6_t and Euribor 6 lag$_t$ on the cost of debt were estimated at 0.743% and 0.705%, respectively.

2) Though none of the individual coefficients for the sector membership variable were statistically significant, the type III tests of the fixed effects indicated that the sector classification was significant at the 0.05 level and, hence, was an important predictor of the cost of debt. The fixed effects of sector membership on interest rate ranged between −1.90% to 3.384%.

3) The value of the companies' assets exhibited a significant negative relationship ($t= -4.254$, $p=0.000$) with the cost of debt, whereas the fixed effect on the interest rate was estimated at 0.264%.

4) The interest coverage ratios had a negative association with the cost of debt, whereas the fixed effects on the interest rate were 3.987%, 3.541%, 3.252%, 2.532%, 2.143%, and 0.964%, respectively.

5) Surprisingly, the results indicated that the debt ratio had a significant ($t=14.184$, $p=0.000$) negative association with the cost of debt. The effect of Debt ratio$_{it}$ on the interest rate was −5.552%.

6) The results imply a negative relationship between the size of the short-term debt and the cost of debt, whereas the fixed effect was −2.074%.

7) State ownership$_{it}$ ($t=-4.756$, $p=0.000$) had unexpected significance and exhibited a positive correlation with the cost of debt; the fixed effect of State ownership$_{it}$ on the interest rate was 1.486%.

8) Shareholder company$_{it}$ ($t=-5.403$, $p=0.000$), or the presence of shareholder capital, had the expected significance and exhibited a positive relationship with the cost of debt; the fixed effect of Shareholder company$_{it}$ on the interest rate was 1.032%.

9) Foreign ownership$_{it}$ ($t=-2.570$, $p=0.000$) had the expected significance and showed a negative relationship with the cost of debt; the fixed effect of Foreign ownership$_{it}$ on the interest rate was 0.622%.

10) All three types of modified audit opinions had significant adverse effects on the cost of debt, whereas the fixed effects were 3.014%, 1.494%, and 0.559%, respectively. Furthermore, the greatest improvement in the model fit was achieved after adding this variable, bringing the pseudo R^2 from 48% for model 5 to 77% for model 6 (see Appendix 3).

Results of the Introduction of Random Slopes (Models 6a, 6b, and 7)

Model 6b (pseudo R^2=82%) - in which the most realistic "unstructured" covariance matrix[6] was used - failed to converge. Consequently, in terms of the calculation power, a less demanding but also less flexible "variance components" covariance structure[7] was used in models 6a (pseudo R^2=79%) and 7 (pseudo R^2=79%). Random effects (intercepts and slopes) were, in fact, correlated (the covariance is estimated at 1.184), indicating a positive correlation between the companies' average cost of debt and magnitude of its increase caused by the modified audit opinions. After accounting for the correlation between the random effects, the adverse effect of modified opinions seems to be even greater (3.13, 1.56, and 0.58, respectively).

The purpose of model 7 was to isolate the portion of the increase in interest rates that was attributable solely to the low quality of financial reporting (to control for the going concern part of the opinion). Similar to Bharath et al. (2004), the Altman Z-score for private companies was used to ensure that the audit opinion did not merely capture the effect of the default risk. To quantify the increase in the interest rates associated with the maximal change in the expected default risk (from 0% to 100%), the original values transformed using the inverse logit function are used instead of the original values of the Z-score for private companies. The increase in the cost of debt caused solely by inaccurate financial reporting was estimated to be 2.64%, 1.03%, and 0.40% for adverse opinion, disclaimer, and qualified audit opinion, respectively. Similar to Bharath et al. (2004), the impact of the accounting quality on the debt contract terms was found to be robust and incremental to the firm's default risk.

DISCUSSION

From a theoretical perspective, this study yielded both expected and unexpected findings. The study also shows that audit opinion is the most important determinant of the cost of corporate debt in the Republic of Serbia.

Determinants of the Cost of Debt: Expected Effects

Higher Euribor rates yield a higher cost of debt, as the Euribor rate is typically the base rate used for determining interest rates. Furthermore, as reported by previous studies, larger companies are perceived to be

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[6] The unstructured covariance matrix is the most flexible, as it imposes no pattern on the covariance values. Each covariance is estimated separately from the data.

[7] "Variance components" covariance structure allows for different variances, but all covariance values are set to be 0.

stable (Anderson et al., 2003) and safer and, therefore, positioned to attract lower interest rates. This study shows that the size as determined by the total assets has a statistically significant association with the cost of debt, whereas the size as determined by the revenues or total employees does not. This result could be explained by the fact that in the Republic of Serbia, lenders are more interested in the size as it relates to collateralization than in the size as a perception of safety. In this study, the sector is one of the determinants of the cost of debt, whereas certain sectors command higher rates than the average rates. Previous studies suggested that: a) companies, operating in competitive markets attract a higher cost of debt (Valta, 2012) and b) companies in rural areas attract less prestigious bank syndicates and a higher cost of debt (Arena & Dewally, 2012). However, no study focuses on sector analysis, although lenders may perceive certain industrial sectors as being safer due to their business models, financial stability, or the ability to collateralize debt. As the interest coverage ratio has the expected negative effect, it shows that a greater ability to pay the interest leads to a lower cost of debt.

The expected negative relationship between foreign ownership and the cost of debt could be explained by better management and disclosure practices. The companies with foreign ownership could have better management practices, which leads to a lower cost of debt (Rahaman et al., 2013), or they could provide debtholders with better protection of rights, thus attracting a lower cost of debt (Boubakri et al., 2010). On the other hand, audit opinion does have the expected effect on the cost of debt (Francis et al., 2005). To that end, modified audit opinions have a significant negative relationship with the cost of corporate debt, in line with the studies showing that the companies with modified audit reports (Karjalainen, 2011) and earnings management practices (Prevost et al., 2008; Shen & Huang, 2013) command higher interest rates. Moreover, the Big 4 companies do not seem to affect the cost of debt; as reported by Lai (2012), firms can reduce the cost of debt by employing the Big 4 auditors. Possibly, in Serbia, which opened for the market economy in 2001, lenders do not perceive the Big 4 auditors as different from other auditors.

Determinants of the Cost of Debt: Unexpected Effects

The negative association between the portion of the short-term debt and the cost of debt is unexpected, potentially suggesting an inverted yield curve. An explanation could be that this factor was, at the time, an indicator of the economic recession that affected Serbia in 2014 (World Bank, 2015). The positive relationship between leverage, as characterized by the debt ratio, and the cost of debt is unexpected - similar to the positive relationship between leverage and the cost of debt as reported by Anderson et al. (2003) and the relationship between the cost of excessive leverage and the cost of financial distress established by Binsbergen & Jules (2010).

The reason for the unexpected result could lie in the specifics of Serbia itself. Until 2014, the companies had access to subsidized loans provided by the government (National Bank of Serbia, 2015), which could have encouraged them to use more leverage to finance their operations.

Further, this study reveals the positive relationship between state ownership and the cost of debt, showing that the companies with state ownership have a higher cost of debt. This finding is in contrast with the research conducted in the emerging market of China, showing that the companies under government control have a lower cost of corporate debt compared with the private firms (Shailer et al., 2014). The market differences between China and Serbia could be a plausible explanation for such a discrepancy. On the other hand, the positive relationship between state ownership and the cost of debt is in line with Cerović, Stanisić, Radojević, & Radović (2015), showing that after controlling for the size effect, the companies characterized by state ownership have a significantly lower profitability compared with their counterparts, leading, potentially, in this case, to a higher cost of debt. In addition, the findings of this study are in line with the research conducted in Malaysia, reporting that the politically connected companies are perceived as having a higher risk, higher leverage, higher likelihood of reporting loss, and higher cost of corporate debt (Bliss et al., 2012).

Unexpectedly, shareholder capital exhibits a positive relationship with the cost of corporate debt in contrast with the findings of Piot and Missonier-Piera (2007), which indicated a negative correlation between the cost of debt and institutional shareholding capital. A possible explanation for this finding could be that the companies with shareholder capital are multi-layered and therefore exhibit a positive relationship with the cost of debt as reported in Taiwan (Chan et al., 2013).

Determinant with the Strongest Effect: Audit Opinion

Based on the results, a modified audit opinion (adverse, disclaimer or qualified) is the most important predictor of the cost of debt in Serbia, accounting for more than 2,900 basis points of the total 77% pseudo R^2. Although previous studies document the importance of the quality of financial reporting for the cost of debt (Francis et al., 2005; Karjalainen, 2011; Prevost et al., 2008; Shen et al., 2013), this is the first documented evidence from the Republic of Serbia.

CONCLUSION

To improve financial performance, companies need to identify the factors that determine their cost of debt. By examining ten potential determinants of the cost of debt, which is - to the extent of the authors' knowledge - the most exhaustive set of determinants examined in a single

study in the context of any emerging market including Serbia, the findings make an important contribution to the existing literature.

The results indicate that in the Republic of Serbia, the cost of debt exhibits significant associations with the following factors: a) the general level of the market interest rates as determined by the Euribor rates; b) credit risk as determined by the sector in which a company operates, size of a company, ability to pay interest, total leverage, and short-term leverage; c) ownership structure as pertaining to state ownership, shareholder capital, and foreign ownership structure; and d) quality of financial reporting as determined by audit opinions. Although certain variables, such as the Euribor rates, are beyond their control, most factors can be monitored and effectively managed by companies. One of those variables is the audit opinion, which is the most important predictor of the cost of debt. If they expect cheaper debt financing in the country, companies should work on improving the quality of their financial reporting.

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ДЕТЕРМИНАНТЕ ЦЕНЕ ДУГА У РЕПУБЛИЦИ СРБИЈИ

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Резиме

Домаћа привредна друштва, налик онима у развијеним државама, посвећују посебну пажњу цени дуга. Како би снизила просечну пондерисану цену капитала и тиме постала конкурентнија и профитабилнија, друштва морају идентификовати и унапредити чиниоце који утичу на цену дуга. У бројној литератури су као чиниоци од пресудног значаја за утврђивање цене дуга препознати: величина привредног друштва, задуженост, власничка структура и квалитет финансијског истраживања. Упркос бројним чиниоцима који су обухваћени у постојећој литератури, појединачна истраживања се углавном усредсређују на свега један или на неколико њих. Услед непотпуности скупова чинилаца које су поменута истраживања проучавала, поједини значајни ефекти, као и њихова комплексна међузависност, често су остајали необухваћени. Имајући то у виду, примарни циљ овог истраживања је да истовремено обухвати велики број јавно доступних финансијских променљивих и утврди колики утицај свака од њих има на цену дуга. Пошто се већина емпиријских истраживања усредсредила на развијена тржишта, секундарни циљ овог истраживања је да утврди и протумачи специфичности тржишта Републике Србије по питању чинилаца који утичу на утврђивање цене дуга.

За потребе овог истраживања, прикупљени су редовни годишњи финансијски извештаји са припадајућим ревизорским мишљењима за 4701 средње и велико привредно друштво за посматрани период од 2008. до 2013. године, што чини више од 90% одговарајуће популације у Републици Србији. Зависна променљива је цена дуга пре ефекта опорезивања. Објашњавајуће променљиве идентификоване у претходним истраживањима су, почевши са преовлађујућим нивоом тржишних каматних стопа, итеративно укључиване у статистички модел. Спецификовано је и тестирано седам модела (и два подмодела) линеарних мешовитих ефеката (енгл. mixed linear models) са укљученим објашњавајућим променљивим. У моделима од 1 до 6, итеративно су укључиване групе сродних објашњавајућих променљивих, при чему су у свакој итерацији искључене оне променљиве које нису имале статистички значајан утицај на зависну променљиву. Потом су у моделима 6а, 6б и 7 уведени тзв. случајни нагиби (енгл. random slopes). За потребе оцене статистичког модела, коришћен је квадрат коефицијента корелације између стварних и моделом предвиђених вредности зависне променљиве.

Резултати указују на то да следећи чиниоци у значајној мери утичу на цену дуга у Републици Србији: а) преовлађујући ниво тржишних каматних стопа ме-

рено Еурибором; б) кредитни ризик мерен сектором у оквиру којег друштво послује, величином друштва, способношћу покрића камате, укупном и краткорочном задуженошћу; в) власничка структура (државно власништво, акционарски капитал, страно власништво); г) квалитет финансијског извештавања мерен типом ревизорског мишљења. Иако су одређени чиниоци, као што је Еурибор, изван њихове контроле, већину чинилаца привредна друштва могу надгледати и њима управљати. Један од њих је врста ревизорског мишљења, која је најзначајнија детерминанта цене дуга (доприноси са више од 29 процентних поена укупном псеудокоефицијенту детерминације који износи 77 процената). Стога, уколико очекују повољне услове кредитирања, привредна друштва морају радити на унапређењу квалитета финансијског извештавања.