

# The Puzzle of Zero Debt Capital Structure in Emerging Capital Markets<sup>1</sup>

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## Abstract

This study investigates the puzzle of zero-debt in developing markets using a sample of firms from Eastern Europe during 2000–2013. The results of this paper are in line with the previous research of firms from developed markets. Firms that are financially constrained do not use debt as a result of credit rationing while financially unconstrained firms intentionally eschew debt to maintain financial flexibility and avoid underinvestment incentives. Furthermore, this study provides new insights into unconstrained firms' performance during different economic situations. Firms that strategically avoid debt show better financial results than levered firms.

**Keywords:** capital structure; leverage; financial constraints; underinvestment incentives

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## Introduction

One of the most important puzzles in the theory of capital structure is that companies prefer to have a considerably lower amount of debt than the major trade-off theory predicts. Latest studies of zero-levered firms found an unexpected fact that the number of unlevered companies has been increasing during the last 15 years; however, the existing theories (those of trade-off and pecking order) are not capable to explain this trend.

The current research of unlevered firms has studied different factors that have an influence on the firm's choice of capital structure (for example: [Bessler et al., 2013; Strebulaev, Yang, 2013]). Even though they draw a conclusion that some firms eschew debt for strategic decisions, they do not study the effect of economic conditions on the firm's performance. Also, most research is devoted only to developed markets (the US – [Devos et al., 2012]; the UK – [Dang, 2013]) and does not fully cover developing markets.

**The goal** of this paper is to explain the firm's choice of zero-levered policy in developing markets.

**The following issues** have to be solved in order to achieve the goal of this paper:

- finding determinants that have influence the firm's propensity to become unlevered in developing markets;
- revealing the difference in determinants of the firm's choice in developing markets in comparison with developed markets;
- determining the influence of macroeconomic conditions on the firm's probability to eschew debt in developing markets;
- identifying the difference in performance of zero-levered and levered firms in different economic cycles.

**The object** of this research is a sample of listed non-financial firms from developing markets of Eastern Europe.

**The subject** of this research is the decision-making process on the zero-leverage.

**Theoretical and methodological basis** is presented by current works that are devoted to the zero-debt phenomenon and extreme debt conservatism. The empirical part of this work is based on the analysis of the panel data.

**Informational basis** for this research includes Compustat datastream, which was used to gather information about financials of the firms included in the sample. Macroeconomic indicators were collected from The World Bank.

**The major results** that correspond to the **scientific novelty** of the study:

- the major motives for firms in developing markets to become zero-leverage are determined, which are financial constraints and financial flexibility with underinvestment incentives;

- the firm's choice to become unlevered in developing markets is explained by the same hypotheses as in developed markets;
- dividend status is an important indicator for financial constraints in developing markets;
- zero-levered firms perform better in recession as well as in the periods of growth;
- the probability to follow unlevered policy in recession increases for unconstrained firms and decreases for the constrained group of companies.

This study consists of three parts. The first part covers the existing theories as well as the latest studies on the zero-levered phenomenon and provides the hypotheses of this work. The second part presents econometric methodology for testing the hypotheses, while the third part discusses the results.

## Literature review

The existence of unlevered firms could not be fully explained by basic theories of capital structure: the trade-off [Kraus, Litzenberger, 1973] and pecking-order [Myers, Majluf, 1984] theories. According to the first theory, there is an optimal level of debt that balances marginal costs of financial distress and marginal tax shield savings. The pecking-order theory claims that transactional costs for external financing are lower for debt than for equity issue. This theory states that firms firstly prefer internal financing than debt and at the last stage equity as external financing. It means that firms should be more likely to use debt than equity. At the same time there is a significant amount of firms that have low levels of debt or even do not have debt at all. The first researchers who address the debt conservatism do not focus on zero-leverage firms. For example, Graham (2000) while studying debt conservatism shows that many firms use a lower amount of debt than it is predicted by the trade-off theory. He concludes that an average firm can double its tax benefit. Graham (2000) defines the key determinants for the conservative firm's policy, which are growth perspectives and low asset collateral. Iona et al. (2007) also investigate factors of financial conservatism using the sample of non-financial UK firms. They suggest that such determinants as managerial ownership and board composition are likely to influence the decision to have low leverage.

Strebulaev and Yang (2013) are the first researchers who have focused on zero-debt phenomenon. They study the data sample of US companies from 1962 to 2009 and show that 10% of large public non-financial US firms maintain zero-debt capital structure. The authors point out that the percentage of unlevered firms has been increasing since 1980. After Strebulaev and Yang's publication in 2013, other researchers have presented their studies and major explanations of this puzzle.

## Main explanations of zero-leverage phenomenon

### Financial constraints

The credit rationing exists due to asymmetry of the information in the market. That is why creditors may not lend money in situations where they have an excess supply of money and firms want to raise debt to invest in projects that are likely to generate positive cash flows and cover initial investments. The main reason is that creditors cannot properly estimate the firm's solvency [Stiglitz, Weiss, 1981]. This is especially true for new, small firms which do not have financial credibility in the eyes of banks [Diamond, 1991; Hadlock, Pierce, 2010]. Immature firms do not usually have enough assets that can be used as collateral [Benmelech, Bergman, 2009]. This is an important point for banks because they try to minimize risks, and collateral is one of the solutions because in case of default banks receive these assets. According to the publication of Eisfeldt and Rampini (2009), constrained firms prefer to lease assets instead of purchasing them. Financial constraints lead to the situation where firms which face credit rationing have on average a lower amount of debt than their peers [Faulkender, Petersen, 2006]. In the context of the puzzle of unlevered firms, financial constraints are one of the reasons that can explain why firms have zero debt in their capital structure. Researchers in their publications use size (the amount of assets), age of the firm and tangibility ratio (tangible assets divided by total assets) as proxy for financial constraints [Bessler et al., 2013; Dang, 2013].

### Financial flexibility

Firms can not only be forced to eschew debt but also deliberately decide to follow zero-leverage policy. This decision is explained in existing literature by financial flexibility.

Financial flexibility refers to firms' ability to raise funding when needed. Therefore, at bad times when firms' revenues fall or when firms unexpectedly have some investment opportunities, those that are financially flexible can smoothly issue debt in comparison with less flexible firms [DeAngelo, DeAngelo, 2007]. Firms can also increase the amount of cash to preserve flexibility [Gamba, Triantis, 2008]. As a result, firms from the first group perform better in periods of recession [Arslan et al., 2014].

### Underinvestment incentives

The underinvestment concept relates to the situation when the firm has a risky financing and at the same time projects under consideration that will generate high returns. The firm tends to reject these projects because not a whole amount of gains goes directly to shareholders some of the money may go to creditors [Myers, 1977]. To tackle this issue, companies may decide to avoid debt financing in the periods of high growth opportunities [Johnson, 2003; Hennessy, Whited, 2005]. In comparison with financial constraints, firms on their own decide what amount of debt to carry.

To evaluate these reasons, researchers use the firm's growth opportunities which are calculated as market value of equity plus book value of debt divided by total assets and the amount of cash reserves which is defined as cash and short term investment divided by total assets [Dang, 2013].

### External factors

In his recent research Dang (2013) has included macroeconomic variables (such as real GDP growth rate, equity premium and structure of interest rates) to investigate the influence of economic cycles on the firm's capital structure. According to his work, in periods of recession firms try to eschew debt and this increases the amount of firms that become unlevered. These findings are supported by Bernanke and Gertler (1995); Kiyotaki and Moore (1997); Korajczyk and Levy (2003) who conclude that the firm's leverage is positively correlated with economic conditions. That is because economic decline has a negative influence on the firm's capitalization and also on its assets, so it decreases the company's ability to raise funding. Dang (2013) concludes that the impact of macroeconomic conditions is greater for unconstrained firms.

## The latest studies on zero-debt phenomenon

Strebulaev and Yang (2013) in their research show that unlevered firms have a larger amount of cash, their profits are higher and they pay more dividends comparing to the control group of firms. However, the numbers of years the firms operate do not differ in these groups.

Similarly, Dang (2013) studies the zero-leverage phenomenon using the sample of non-financial UK firms. As in the previously mentioned work, Dang defines characteristics of unlevered firms. According to his study, zero-debt firms have higher cash reserves and they are smaller. In contrast to Strebulaev and Yang, unlevered firms from the UK are younger and less profitable.

Moreover, Dang (2013) shows that macroeconomic factors have a significant effect on firms' capital structure. During recessions firms try to avoid debt financing, so the percentage of unlevered firms increases. Furthermore, Dang divides companies into two groups: those who pay dividends and those who do not pay. It is suggested that the latter usually have zero-debt because of financial constraints while the former intentionally avoid debt financing due to underinvestment incentives.

Devos et al. (2012) in their work support the hypothesis of the influence of financial constraints. They test the hypothesis about corporate governance structures and CEO characteristics using the sample of non-financial, non-regulated US firms from 1990 to 2008. In their work, this hypothesis is rejected. Furthermore, the authors try to find out why unlevered firms decide to use debt financing. The answer is in line with the main idea of the work-financial constraints. Debt lenders weaken firms when they grow and show a good and stable performance. Consequently, companies usually use this new opportunity for debt financing.

Bessler et al. (2013) decide to expand the sample size and do not use only UK and US firms but study firms from all countries of G7 to support the idea that the phenomenon of zero-leverage firms exists in other markets. Analyzing firms over the period from 1989 to 2010, the authors documented that the percentage of unlevered firms has a tendency to rise not only in the US as it is shown by Strebulaev and Yang (2013) but also in G7 countries. Furthermore, splitting the sample into two groups: those of financially constrained and unconstrained firms, Bessler et al. (2013) show that firms from the second group rarely follow the unlevered policy. Zero-debt firms usually belong to the first group which has financial constraints. In addition, it is shown that the country-specific determinants have a great impact on firms' capital structure. Relatively more firms follow zero-debt policy in countries where debt lenders have stronger protection and the tax system is classical.

There are limited studies of zero-leverage puzzle in developing countries. The most recent research on conservative debt policy is done by Nivorozhkin (2015), who finds evidence that Russian companies from particular industries such as heavy manufactured products are more likely to have zero-debt. Using the data starting from 2008, he also shows that in contrast to the results of Dang (2013) firms in Russia increase debt during recessions. Nivorozhkin (2015) explains these results by the influence of a growing number of government preferential loans, which were introduced to stimulate the economy.

Also some works that are devoted to developing markets focus on capital structure in general; they usually investigate the determinants that have an influence on the company's choice and also the impact of capital structure on the firm's performance [Ivashkovskaya, Solntseva, 2009; Kokoreva, Stepanova, 2012].

## Gaps in the existing literature

There are limited studies of the zero-debt puzzle in developing countries, especially in Russia and Eastern Europe. That is why it is important to investigate if there is a difference between the major determinants for developed and developing countries and to examine if the findings of the recent research on developed markets can be applied to developing countries. Furthermore, the existing literature concentrates only on the determinants of unlevered firms. Even though the works provide information that macro-economic factors influence firms' decision about capital structure, they do not investigate the difference in performance between levered and unlevered firms. It is especially important in terms of the findings that some firms strategically eschew debt. They usually maintain the zero-leverage to retain flexibility and avoid underinvestment incentives. As a result, firms have better financial conditions and more funds available for investments even during economic slowdown. This analysis will give a new understanding of the firm's decision to follow unlevered policy.

## The hypotheses of this study

Taking into account the existing literature, this study attempts to fulfill two gaps in it. Firstly, the current research lacks studies that determine factors explaining the zero-leverage phenomenon in developing markets. The second gap refers to the performance of zero-levered firms that strategically avoid debt in the recession periods. The main hypotheses of this study could be formulated as following:

*H1: Financially constrained firms in developing markets are more likely to follow zero-leverage policy.*

Firms that do not have a solid reputation in the market may face difficulties in raising funds. These firms are usually small and operate for a short period of time. Also, as stated by Benmelech and Bergman (2009), firms which face debt rationing do not have a sufficient amount of assets that can be used as collateral.

*H2: Firms with high growth opportunities in developing markets try to maintain zero-leverage capital structure.*

The following hypothesis summarizes the financial flexibility and underinvestment concepts. Firms with high growth opportunities would try to avoid debt in order to have more scope for future loans. The financial flexibility hypothesis emphasizes that companies retain cash and do not borrow to be able to invest in future.

*H3: Unlevered unconstrained firms perform better than unconstrained levered firms in recession periods in developing markets.*

Dang (2013) in his research divides unlevered firms by dividend status into two groups. He finds that dividend status is a good indicator if a company faces financial constraints. The non-paying group, which is likely to face more financial constraints, has to follow zero-leverage policy for this reason. However, the group which pays dividends intentionally becomes zero-levered. These companies eschew debt to retain financial flexibility, which helps them to show better financial results in comparison with levered firms in periods of financial crises. Statistical analysis and regression model provided in this paper help to determine the difference between these two groups.

## Methodology and data

### Methodology

This section of the paper consists of three parts. The first one provides and discusses summary statistics which highlight the first insight into the difference in characteristics of zero-levered and levered firms.

The second part is devoted to the regression analysis of the influence of the company's specific variables on its probability to eschew debt. The following specification of logit regression is used for this purpose:

$$\Pr ZL = 1|X = \frac{1}{1 + e^{-\alpha + \chi\beta}} \quad (1)$$

In the above equation  $ZL$  is a dummy, which equals 1 if a firm is zero-leveraged and 0 otherwise. Following the previous studies (for example: [Lemmon et al., 2008; Bessler et al., 2013]), debt ratio is calculated in two ways: book leverage and market leverage.

$$\text{Book leverage}_{i,t} = \frac{\text{Total long term debt}_{i,t} + \text{Total short term debt}_{i,t}}{\text{Total assets}_{i,t}} \quad (2)$$

and

$$\text{Market leverage}_{i,t} = \frac{\text{Total long term debt}_{i,t} + \text{Total short term debt}_{i,t}}{\text{Total long term debt}_{i,t} + \text{Total short term debt}_{i,t} + \text{Market value of Equity}_{i,t}} \quad (3)$$

$X$  represents a vector of variables that are expected to influence the company's debt policy choice and reflect the major hypotheses:

- *Log of assets, Log of age* are responsible to test the hypothesis about financial constrains;
- *Cash and cash equivalents ratio, Growth opportunities, Capex ratio* are the firm's specific factors which are used to test the financial flexibility and underinvestment hypotheses;
- *Tax ratio, non-debt tax shield* are used to test the trade-off theory relevance;
- *Cash flow ratio, Profitability ratio* represent the pecking order theory relevance;
- *Dummy for recession* represents the influence of economic slowdown.

The methodology of calculating these variables is provided in the Appendix.

Going back to the  $ZL$  dummy, it is important to mention that only 391 observations out of 5290 have strictly zero debt, which makes this sample non-representative. One way to deal with this problem is to relax the assumption and include in the  $ZL$  group the companies with debt ratio below 5%. The threshold is also used by Strebulaev and Yang (2013). The authors mention that even 5% is a conservative level, which could be raised further. As stated by Strebulaev (2007), only 1% of the firms in dynamic data have the amount of debt that is lower than 5%. Also, the previous studies have concluded that the optimal leverage is far greater than 5% [Goldstein et al., 2001; Ju et al., 2005]. However, in order to justify the use of 5% of debt instead of 0% in our sample, the robustness of these two groups should be checked. Table 1 in Appendix represents the results for different samples ( $ZL$  if 0% and  $ZL$  if 5%). It can be concluded that the estimated coefficients for both samples are similar and significant. However, the sample with a threshold of 5% has more significant coefficients due to an extended number of zero-levered firms. These findings together with the studies mentioned above justify this expansion of the sample of zero-leveraged firms. This threshold is used in this work afterwards ( $ZL$  dummy equals 1 if debt ratio is below 5% and equals 0 otherwise).

The third part of this study investigates the firm's performance in recession periods. The following OLS-regression is used:

$$\begin{aligned} \text{Firm's performance}_{i,t} = & \alpha + \beta_1 ZL_{i,t} + \beta_2 \text{Dummy for recession}_{i,t} + \\ & + \beta_3 (ZL_{i,t} * \text{Dummy for recession}_{i,t}) + \beta_4 \chi_{i,t} + \varepsilon_{i,t} \quad (3) \end{aligned}$$

In this regression  $ZL$  is a dummy variable, which defined in the same way as in the logit regression. *Dummy for Recession* variable equals 1 for the years of economic downturn and 0 for other years. Recession periods are determined in accordance with the guidelines of the National Bureau of Economic Research. It considers economic recession as a serious decline in real GDP for few months. Also it takes into account other factors such as the unemployment rate, the economic activity of business and others. In this paper all negative rates of real GDP growth are considered as recession as well as the decline of real GDP for more than 6 months accompanied by the rise of the unemployment rate. An interaction term  $ZL_{i,t} * \text{Dummy for recession}_{i,t}$  is added to the regression in order to see if there is a significant difference in the effect of zero leverage during recession compared to growth periods.

The firm's performance dependent variables are presented by variables that have been already considered in the previous parts of the analysis. The first dependent variable is *Profitability ratio*, which is calculated in the same way as in the literature devoted to capital structure [Rajan, Zingales, 1995; Frank, Goyal, 2009; Dang, 2013]. The next one is *Dividend ratio*, which is calculated for dividend-paying firms only. Higher dividend ratio is a signal of company's strong positions. It would be interesting to see if unlevered or levered firms pay higher dividends. The positive relation between the firm's performance and dividend payout ratio in developing countries is confirmed by researchers [Ouma, Murekefu, 2012; Ajanthan, 2013]. *ROA* is another dependent variable considered in this work. It is commonly used in studies of the firm performance in developing markets [Amran et al., 2012, Akeem, 2014; Hussain et al., 2014]. represents the control variables for financial constraints.

Table 1 is presented below for better understanding of the coefficients estimated by (3).

**Table 1.** Logistic regression on factors that influence firms' decision to become ZL. Column (1) represents results for firms, with total debt=0. Column (2) results for the sample with book leverage<5%. Column (3) results for the sample with market leverage < 5%

VARIABLES	(1)	(2)	(3)
Log of assets	-0.383*** (0.092)	-0.351*** (0.076)	-0.364*** (0.074)
Log of age	0.212 (0.131)	0.217** (0.103)	0.236** (0.109)
Cash flow ratio	-11.264** (5.505)	-13.032*** (3.505)	-12.109*** (3.767)
Cash and cash eq. ratio	3.468*** (0.817)	6.349*** (0.755)	6.184*** (0.902)
Growth opportunities	0.010** (0.005)	0.014*** (0.003)	0.560*** (0.043)
Capex ratio	-0.686 (1.075)	-2.654*** (0.993)	-2.109** (0.870)
Dummy for recession	-0.552* (0.297)	-0.141** (0.058)	-0.158* (0.081)
Fixed assets ratio	0.570 (0.455)	0.161 (0.551)	0.250 (0.549)
Tax ratio	-0.001 (0.007)	0.005 (0.008)	0.007 (0.008)
Non-debt tax shield	-10.000 (6.626)	-6.689 (4.172)	-4.836 (4.008)
Profitability ratio	12.591*** (4.881)	15.432*** (2.871)	15.149*** (3.208)
Constant	-1.092 (0.797)	-0.334 (0.461)	-1.103** (0.481)
Observations	5,290	5,290	5,290

*Robust standard errors in parentheses*

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

This table 2 helps to estimate the difference between zero-levered and levered firms' performance in the recession. From the table it is clear that the difference in performance of ZL firms and non-ZL firms during recession equals

**Table 2.** Predicted effects of recession on ZL and not-ZL firms

Variable	ZL=0	ZL=1
Dummy for recession = 0	0	$\beta_1$
Dummy for recession = 1	$\beta_2$	$\beta_1 + \beta_2 + \beta_3$

$\beta_1$  effect of ZL on profitability;

$\beta_2$  effect of recession on all firms;

$\beta_3$  additional effect of recession on ZL firms.

## Data

The panel of listed companies from Eastern Europe countries is studied: particularly, the Russian Federation, Bulgaria, the Czech Republic, Estonia, Croatia, Ukraine, Hungary, Lithuania, Poland, Romania, Slovenia, Turkey [Kokoreva, 2012]. (Latvia is out of the sample because all firms there have missing values for some determinants.) Data belongs to the period from 2000 till 2013. The year of 2014 has not been included due to the large amount of missing values. The data has been collected from the *Compustat* datastream as it is one of the major sources of the previous studies on capital structure [Titman, Wessels, 1998; Devos et al., 2012; Bessler et al., 2013]. Following the standard practice [Frank, Goyal, 2009; Dang, 2013] firms which belong to the financial economic sector have been excluded from the sample. That is done because these firms have different regulations. Furthermore, the amount of total assets has been adjusted by the inflation data from the *Worldbank*. Only the firms with the adjusted amount of assets greater than 10 mln US dollars have been remained in the sample. This is because the firms with a lower amount of assets have a greater probability of accounting distortion [Strebulaev, Yang, 2013]. All the firms which characteristics (except debt) are at the 1<sup>st</sup> and 99<sup>th</sup> percentiles have been excluded from the sample to avoid extreme observations. The total sample consists of 890 unique companies and 5290 company-year observations.

## Results and discussions

### Descriptive statistics

The number of observations distributed by time, country and industry are reported in Tables 3, 4 and 5 respectively. During the considered period of time the percentage of unlevered firms was approximately 20%, which is presented in Table 3. This finding is in line with the previous research [Bessler et al., 2013]. As for the country data in Table 4, the percentage of these observations is different across the countries and varies from 8% (Bulgaria) to 41% (Romania).

**Table 3.** Distribution of zero-leverage observations by time

Year	Number	ZL	% of ZL
2000	83	17	20.48
2001	103	23	22.33
2002	135	29	21.48
2003	164	34	20.73
2004	185	41	22.16
2005	258	56	21.71
2006	317	62	19.56
2007	417	84	20.14
2008	467	82	17.56

Year	Number	ZL	% of ZL
2009	513	107	20.86
2010	582	121	20.79
2011	628	120	19.11
2012	696	141	20.26
2013	742	137	18.46
Total	5290	1054	19.92

**Table 4.** Distribution of zero-leverage observations by country

Country	Number	ZL	% of ZL
Bulgaria	95	8	8.42
Croatia	224	42	18.75
Czech Republic	68	24	35.29
Estonia	123	22	17.89
Hungary	117	18	15.38
Lithuania	244	42	17.21
Poland	2200	462	21.00
Romania	152	63	41.45
Russian Federation	668	100	14.97
Slovenia	195	22	11.28
Turkey	1179	243	20.61
Ukraine	25	8	32.00
Total	5290	1054	19.92

**Table 5.** Distribution of zero-leverage observations by industry

Country	Number	ZL	% of ZL
Consumer Discretionar	1083	197	18.19
Consumer Staples	749	109	14.55
Energy	178	44	24.72
Health Care	170	41	24.12
Industials	1301	289	22.21
Information Technolog	328	94	28.66
Materials	918	169	18.41
Telecommunication Ser	159	35	22.01
Utilities	404	76	18.81
Total	5290	1054	19.92



Table 6 shows means for firms' characteristics for unlevered and levered firms separately. Also t-statistics indicating if the difference between these two groups is significant is provided. Unlevered firms have a smaller amount of assets than levered ones. The amount of fixed assets, which can be used as collateral, is lower for zero-levered firms. However, while their age is smaller it does not differ significantly. So at this stage the hypothesis about financial constraints is not rejected.

**Table 6.** Summary statistics for levered firms (ZL=0) and unlevered firms (ZL=1). With the t-statistic

	ZL=0 (1)	ZL=1 (2)	tstat (1) vs. (2)
Log of assets	5.68	5.03	11.57***
Age	4.92	4.85	0.47
Cash flow ratio	0.07	0.12	-13.06***
Cash and cash eq. ratio	0.07	0.17	-26.44***
Growth opportunities	1.24	3.41	-4.09***
Capex ratio	0.06	0.05	4.49***
Fixed assets ratio	0.41	0.32	10.98***
Tax ratio	0.14	0.22	-0.76
Non-debt tax shield	0.042	0.038	4.35***
Profitability ratio	0.08	0.14	-14.55***
Dividend ratio	0.03	0.06	-10.90***
<b>Number of obs.</b>	<b>4236</b>	<b>1054</b>	

It is also showed that unlevered firms accumulate larger cash reserves, which supports the idea that firms try to retain financial flexibility [Minton, Wruck, 2001]. Zero-levered firms have considerably higher growth opportunities and have less capital expenditure. All these findings do not reject the financial flexibility and underinvestment hypothesis that some unlevered firms strategically mitigate debt [Myers, 1977].

However, summary statistics rejects the trade-off theory. The difference in tax ratio is statistically insignificant. Non-debt tax shield is lower for zero-levered firms, which contradicts with the theory predictions [DeAngelo, Masulis, 1980]. While the trade-off theory is rejected, the pecking-order theory is not rejected by the following data. Unlevered firms have significantly higher cash flows.

In Table 7 the sample has been split into dividend payers and non-payers. The previous literature provides evidence that firms with different dividend status have different motives to eschew debt [Strebulaev, Yang, 2013; Dang, 2013]; also this variable could be a proxy for financial constraints [Fazzari et al., 1988]. All the findings are in line with the previous table except for the age variable for firms which do not pay dividends. This variable is statistically lower for unlevered firms than for levered firms. This observation fully supports the hypothesis about financial constraints. Young firms that have a small amount of assets are likely to face financial constraints.

**Table 7.** Summary statistics for levered and unlevered firms which pay dividends as well as for firms that do not pay dividends. With the t-statistic

Variable	Dividend status=1		Dividend status=0		tstat (1) vs. (2)	tstat (3) vs. (4)
	ZL=0	ZL=1	ZL=0	ZL=1		
	(1)	(2)	(3)	(4)		
Log of assets	6.22	5.41	5.21	4.49	10.84***	9.16***
Age	5.39	5.53	4.51	3.90	-0.68	2.98***
Cash flow ratio	0.10	0.15	0.05	0.08	-11.86***	-5.46***
Cash and cash eq. ratio	0.08	0.18	0.07	0.16	-21.61***	-15.43***
Growth opportunities	1.24	2.64	1.24	4.50	-4.89***	-3.01***
Capex ratio	0.07	0.06	0.06	0.05	3.67***	3.50***
Fixed assets ratio	0.43	0.34	0.39	0.29	8.50***	7.92***
Tax ratio	0.24	0.21	0.04	0.23	0.17	-1.36
Non-debt tax shield	0.05	0.04	0.04	0.03	2.52**	5.06***
Profitability ratio	0.11	0.17	0.06	0.10	-12.82***	-6.28***
Dividend ratio	0.06	0.10	-	-	-8.33***	-
<b>Number of obs.</b>	<b>1977</b>	<b>617</b>	<b>2259</b>	<b>437</b>		

The fact that firms which do not pay dividends suffer more from financial constraints is predicted by the literature and supported by summary data. So the next step is to find if unlevered firms in recession show better financial results. That is why summary statistic for dividend paying firms in recession and growth periods has been done. The results are represented in Table 8. Unlevered firms perform statistically better in periods of recession as well as in growth periods. They have higher profitability and pay greater dividends than levered firms. This finding is in line with the hypothesis (H3). Further analysis of differences under adverse conditions is conducted in Part 3.

**Table 8.** Summary statistics for dividend paying firms under different economic conditions. With the t-statistic

Variable	Dummy for recession=1		Dummy for recession=0		tstat (1) vs. (2)	tstat (3) vs. (4)
	ZL=0	ZL=1	ZL=0	ZL=1		
	(1)	(2)	(3)	(4)		
Log of assets	5.74	5.05	6.60	5.78	6.54***	8.33***
Age	5.79	5.30	5.07	5.76	1.63	-2.58**
Cash flow ratio	0.10	0.13	0.10	0.16	-6.63***	-10.45***
Cash and cash eq. ratio	0.08	0.16	0.08	0.20	-12.90***	-17.73***
Growth opportunities	1.44	2.37	1.08	2.91	-2.14**	-4.85***
Capex ratio	0.07	0.06	0.07	0.06	1.19	3.78***
Fixed assets ratio	0.36	0.31	0.48	0.38	4.30	7.07***
Tax ratio	0.13	0.24	0.33	0.19	-2.25**	0.44
Non-debt tax shield	0.04	0.04	0.05	0.05	1.83*	1.34
Profitability ratio	0.11	0.15	0.12	0.19	-7.42***	-11.00***
Dividend ratio	0.06	0.09	0.06	0.12	-3.04***	-8.90***
<b>Number of obs.</b>	<b>2201</b>	<b>581</b>	<b>2035</b>	<b>473</b>		

## Results on factors that influence firms' decision to become ZL

Results of logistic regressions for the whole sample (1), for firms which pay dividends (2), and for those which do not pay dividends (3) are presented in Table 9. R-squared equals 0,18; 0,21; 0,14 respectively.

**Table 9.** Logistic regression for the whole sample and for samples depending on dividend status. Column (1) represents the whole sample. Column (2) is the regression for dividend paying firms. Column (3) is the regression for firms that do not pay dividends

VARIABLES	(1)	(2)	(3)
Log of assets	-0.39*** (0.08)	-0.42*** (0.08)	-0.40*** (0.11)
Log of age	0.20* (0.11)	0.32*** (0.09)	0.06 (0.16)
Cash flow ratio	-12.03*** (3.04)	-12.08 (7.90)	-9.32** (3.66)
Cash and cash eq. ratio	6.19*** (0.81)	8.21*** (0.74)	4.55*** (0.76)
Growth opportunities	0.02*** (0.00)	0.02*** (0.00)	0.02*** (0.01)
Capex ratio	-2.39*** (0.81)	-3.62** (1.63)	-1.60** (0.68)
Dummy for recession	-0.15** (0.07)	0.09* (0.05)	-0.42*** (0.14)
Fixed assets ratio	0.37 (0.45)	1.17** (0.49)	-0.28 (0.66)
Tax ratio	0.01 (0.01)	-0.00 (0.01)	0.03 (0.03)
Non-debt tax shield	-6.23 (4.08)	-6.89 (5.71)	-6.84 (4.91)
Profitability ratio	14.92*** (2.63)	15.76** (6.98)	11.68*** (3.35)
Dividend status	0.53*** (0.09)	- -	- -
Constant	-0.74 (0.45)	-0.89** (0.43)	0.11 (0.63)
Observations	5,290	2,594	2,696

*Robust standard errors in parentheses*

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

According to the regression for the whole sample (1), variable *Dividend status* is significant at 1%. As a result, in the further analysis the sample of dividend paying firms and the sample of non-dividend paying firms are considered separately.

The first hypothesis (H1), which is about financial constraints, is tested by the significance of coefficients at such variables as *Log of assets*, *Log of age*. As it was discussed in the literature review, these variables are expected to have a negative impact on firms' decision to be unlevered. *Log of assets* is in line with the theory; it has a negative sign and is significant at 1% in all three regressions. However, the variable of *Log of age* has a positive sign and is significant at 1% in the regression for the whole sample and for the dividend paying firms; however, it is insignificant for firms with zero dividend status. This puzzling evidence of the positive influence of age on probability to follow zero-levered policy can be explained by the fact that dividend paying firms usually represent unconstrained firms [Dang, 2013]. As they become more mature, they are more self-sufficient with their own funds and the probability to eschew debt increases. This finding corresponds to the work of Pfaffermayr et al. (2013) who find evidence that older firms depend less on debt financing than younger firms. Dang (2013) in his research also finds the same effect and explains it through collinearity with the firm's size. Following Dang, *Log of assets* has been included in regression (3). In this specification *Age* becomes significant at 1% level and changes the sign to negative. So it can be concluded that firms which are non-payers of dividends are more likely to suffer from financial constraints than dividend payers.

The next hypothesis is about the underinvestment and financial flexibility (H2). They are captured by the following proxies: *Growth opportunity ratio*, *Cash and cash equivalents ratio*, *Capex ratio*. According to the analysis, *Growth opportunity ratio* and *Cash and cash equivalents ratio* are significant at 1% level and have a positive sign in all three regressions. This finding does not reject the hypothesis (H2). Firms with the expected high future growth opportunities tend to follow unlevered policy. These firms try to limit current capital expenditures to save cash for future large investments [Hennessy, Whited, 2005]. This hypothesis is also confirmed by the findings, where *Capex ratio* has a negative impact on the firm's propensity to become zero-levered and is significant at 1% level in the whole sample and at 5% in the regressions with different dividend status. All things considered, the underinvestment and financial flexibility hypothesis (H2) is not rejected by the data.

Next, it is important to consider the influence of external factors on the firm's capital structure. In the whole sample the *Dummy for recession* is significant at 5% interval and has a negative sign. This means that firms during adverse macroeconomic factors are less likely to be unlevered. However, a striking difference is in the regressions with different dividend status (2 and 3). Firms that pay dividends try to have zero-levered in their capital structure during economic crises. The variable is significant at 10% and has a positive sign. This result can support the hypoth-

esis (H3) that unconstrained firms follow unlevered policy for strategic decisions to outperform their levered peers. This hypothesis (H3) is presented in the next section. As for non-payers of dividends, the dummy is highly significant and has a negative sign, which represents that the probability to eschew debt decreases with the regression for non-payers.

Other variables have been included in the model to test the pecking order theory. *Profitability ratio* is one of these variables. It is significant in all regressions and has a positive sign. This finding is in line with the pecking order theory, which predicts that firms that generate high profit have ability to use internal financing funds and rely less on debt. Another variable is *Cash flow ratio*. According to the pecking order theory, if a firm has a large cash ratio, it tends to be unlevered because of sufficient earnings. However, our results do not support the theory. This variable is not significant in the regression for firms that pay dividends (2), while in other regressions (1) and (3) it is significant but has a negative sign, which contradicts with predictions of the pecking order theory.

The trade-off theory has also been tested in this analysis. The following variables are used: *Tax ratio* and *Non-debt tax shield*. The theory predicts that tax ratio has a positive influence on tax shield so firms with higher ratio will be less likely to follow zero-levered policy. *Non-debt tax shield* has an opposite influence on debt: firms with greater non-debt tax shields are more inclined to be unlevered because non-debt and debt tax shields are considered to be substitutions. The following data are not able to decline the trade-off theory as these two variables are insignificant in all the regressions.

*Fixed assets ratio* is one of the standard determinants in literature devoted to capital structure [Rajan, Zingales, 1995]. As stated by Jensen and Meckling (1976), firms that have lower fixed assets ratios are more likely to avoid debt in their capital structure because of the assets substitution effect. The results contradict with the theory. The only significant coefficient (at 5%) for this variable is in the regression (2) and it has the opposite sign than predicted. However, following previous researchers [DeAngelo, Masulis, 1980; Huizinga et al., 2008; Pfaffermayr et al., 2013], these results can be explained by the fact that the amount of fixed assets is positively correlated with the amount of depreciation expenses. As it was stated above, depreciation expenses generate non-debt tax shield. That is why *Fixed assets ratio* may have a positive effect on the firm's decision to become unlevered.

In all specifications above, total debt is used to estimate if companies are zero-leveraged or not. However, long-term debt is the most widely used variable in the literature devoted to capital structure. Thus, in order to explore debt in this traditional concept, a new variable which takes into account only long-term debt is used. Firms with long-term debt ratio below 5% are considered as unlevered. The reasons and rationale for this step have already been explained in the methodology. Table 10 represents the results of logistic regression.

**Table 10.** Logistic regression for the sample with long-term below 5%, which takes into account only long term debt

VARIABLES	(1)
Log of assets	-0.30*** (0.03)
Log of age	0.10* (0.05)
Cash flow ratio	-10.81*** (2.44)
Cash and cash eq. ratio	-1.05*** (0.35)
Growth opportunities	0.00 (0.00)
Capex ratio	-3.97*** (0.86)
Dummy for recession	-0.34*** (0.08)
Fixed assets ratio	-1.82*** (0.23)
Tax ratio	0.01 (0.01)
Non-debt tax shield	-0.07 (1.69)
Profitability ratio	9.97*** (2.20)
Dividend status	0.18** (0.08)
Constant	0.76*** (0.19)
Observations	5,292

Standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

The hypothesis about financial constraints cannot be rejected. Coefficients before *Log of assets*, *Log of age* and *Dividend status* are significant and have the same signs as in Table 9. As for the hypothesis about financial flexibility and underinvestment incentives, it is rejected in this regression. *Growth opportunities* are insignificant, while the effect of *Cash and cash equivalents ratio* is significant and negative, which contradicts the theory. The insignificant effect of future growth opportunities on the probability of having no long-term debt could be explained by findings of previous studies, which showed that firms in developing markets rely more on short-term financing than on long-term debt [Booth et al., 2001; Delcours, 2007]. In our case, all companies limit their long-term financing, that is why the effect is insignificant.

Taking into account this finding, the effect on short-term debt should be studied separately. Here the firms with the ratio of short-term debt below 5% are considered zero-leveraged. The results of this part are presented in Table 11. It can be concluded from the table that the hypothesis about growth opportunities is not rejected; the coefficients of the corresponding independent variables are significant and have signs that are in line with the theory.

**Table 11.** Logistic regression for the sample with debt ratio below 5%, which takes into account only short term debt

VARIABLES	(1)
Log of assets	-0.23*** (0.02)
Log of age	0.08* (0.04)
Cash flow ratio	-4.22 (2.57)
Cash and cash eq. ratio	6.95*** (0.36)
Growth opportunities	0.01** (0.01)
Capex ratio	-1.77*** (0.55)
Dummy for recession	0.02 (0.07)
Fixed assets ratio	2.02*** (0.18)
Tax ratio	0.00 (0.01)
Non-debt tax shield	-7.91*** (1.40)
Profitability ratio	7.33*** (2.24)
Dividend status	0.43*** (0.07)
Constant	-1.20*** (0.15)
Observations	5,292

Standard errors in parentheses

\*\*\* p &lt; 0.01, \*\* p &lt; 0.05, \* p &lt; 0.1

The results of testing the two hypotheses with three different specifications of debt are summarized in table 12.

**Table 12.** “+” indicates that the hypothesis is not rejected depending on the definition of debt used, “-” indicates that the hypothesis is rejected.

	Total debt	Long-term debt	Short-term debt
<b>H1: Financial constraints</b>	+	+	+
<b>H2: Financial flexibility and underinvestment</b>	+	-	+

## Results on the difference in performance of ZL and non-ZL unconstrained firms in recession

**Table 13.** OLS regression for dividend-paying firms.

Dependent variables: Profitability ratio- (1); ROA-(2); Dividend ratio-(3).

VARIABLES	(1)	(2)	(3)
ZL	0.073*** (0.008)	0.060*** (0.006)	0.062*** (0.009)
Dummy for recession	-0.008* (0.004)	0.000 (0.003)	0.008 (0.005)
ZL*Dummy for recession	-0.025** (0.010)	-0.020** (0.008)	-0.039*** (0.012)
Log of assets	0.003*** (0.001)	0.002** (0.001)	-0.001 (0.001)
Constant	0.097*** (0.009)	0.041*** (0.007)	0.060*** (0.010)
Observations	2,594	2,594	2,594
R-squared	0.072	0.073	0.032

*Robust standard errors in parentheses*

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

The previous findings in logistic regression show that different macroeconomic situations have an effect on firms' propensity to become unlevered. Unconstrained firms which belong to the dividend payers are more likely to become unlevered during the periods of macroeconomic decline. As presented in the summary statistic, unlevered firms have higher profitability in recession as well as in the period of economic growth. So the regression which has dummies for recession and leverage is used to measure the real impact of zero-leverage policy on firms' performance. To be more precise, different measures of firms' performance are used in the regressions. As stated in the logistic regression, *Log of Assets* can be used as proxy for financial constraints. The results for the regression are presented in Table 13. The small R-squared represents the fact that the status and economic situation cannot fully explain firms' performance. However, for the goal of this research the R-squared amount is not the case because the model studies only the influence of two dummy variables and, what is more important, their influence on each other.

As mentioned in the methodology, the coefficient before *ZL* shows the impact of zero-leverage status on the firm's

performance. In all three regressions the coefficient is significant and has a positive sign. This indicates that unlevered firms perform better in periods of growth than firms that have debt in their capital structure. The next coefficient before *Dummy for recession* depicts the difference in levered firms' performance during periods of economic decline against favorable economic conditions. This coefficient is significant only in the regression (1) for *Profitability ratio*. In this regression the coefficient has a negative sign so profitability of levered firms declines in periods of recession. The last variable represents the difference of the effect of distinctive economic conditions on zero-levered firms compared with levered firms. It is significant in all three regressions and has a negative sign. From this data it can be concluded that in recession unlevered firms lose more in performance in comparison with levered firms. However, methodology states that to determine the group of firms that performs better in the recession coefficients before *ZL* and *ZL\*Dummy for recession* (if significant) should be summarized.

For the regression (1): all the coefficients are significant, consequently:  $0.073 - 0.025 = 0.048$ . To find the economic

significance of this amount the mean for dividend paying firms has been calculated. The mean equals 0.128, so the effect is  $0.048/0.128=37.5\%$ . The economic effect can be considered as significant.

For the regression (2): the coefficients before ZL and before interaction are significant, the coefficient for *Dummy for recession* is insignificant. This indicates that the regression does not observe the difference between return on assets during a crisis and during a growth period. However, for the calculation of difference between levered and unlevered firms' performance in a crisis only ZL and *Dummy for recession* coefficient are important. The difference is the following:  $0.06 - 0.02=0.04$ . This represents  $0.04/0.066=60\%$  so it has an economic significance.

For the regression (3): the same explanation as for the regression (2). The difference is  $0.0616-0.039=0.0226$ . The ratio with the mean:  $0.0226/0.068=33\%$ .

All three regressions provide support that unconstrained firms which eschew debt show better financial results than levered firms during favorable economic conditions as well as during periods of economic downturn even though recession has a more detrimental effect on zero-levered firms than on levered ones.

However, *Firm's performance* in period t is measured by the book values from the financial statement at the end of the year. The same is with the amount of debt. As a result, it cannot be concluded whether zero amount of debt was at the beginning of the year or it was just at the end. This means that previous, in period t-1, decisions on capital structure may have a more serious effect on firms' performance in period t than the capital structure in the same period as firms' performance. The equation (4) is used to provide more accurate results.

$$\begin{aligned} \text{Firm's performance}_{i,t} = & \alpha + \beta_1 ZL_{i,t-1} + \beta_2 \text{Dummy for recession}_{i,t-1} + \\ & + \beta_3 (ZL_{i,t-1} * \text{Dummy for recession}_{i,t}) + \beta_4 \chi_{i,t} + \varepsilon_{i,t} \quad (4) \end{aligned}$$

The results are presented in Table 14; the dependent variables are the same as in Table 13.

The results for regressions which are based on the capital structure from the previous period are in line with the simple regression. One striking difference is that the dividend ratio is greater for levered firms in periods of recession than in growth periods. This can be because firms are not likely to decrease dividend payouts [Lintner, 1956]. However, in periods of economic slowdown the firm's value of assets goes down. As a result, the dividend ratio goes up (the amount of dividend payouts, which is a numerator, stays the same, while a denominator, which is the amount of total assets, decreases).

**Table 14.** OLS regression for dividend-paying firms.  
Dependent variables: Profitability ratio- (1); ROA-(2); Dividend ratio-(3)

VARIABLES	(1)	(2)	(3)
ZL	0.067*** (0.008)	0.057*** (0.007)	0.072*** (0.011)
Dummy for recession	-0.006 (0.005)	0.001 (0.004)	0.010* (0.006)
ZL*Dummy for recession	-0.034*** (0.011)	-0.026*** (0.008)	-0.055*** (0.013)
Log of assets	0.004*** (0.001)	0.003*** (0.001)	-0.000 (0.002)
Constant	0.094*** (0.010)	0.036*** (0.008)	0.057*** (0.010)
Observations	2,134	2,134	2,134
R-squared	0.057	0.061	0.038

*Robust standard errors in parentheses*

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$



Comparing the results of two last tables, it can be concluded that unlevered unconstrained firms perform better than levered firms in recession periods as well as in periods of growth.

The next step is to check if constrained unlevered firms perform worse than constrained levered firms. This should be because these firms are forced to maintain zero leverage. As in the previous part, the dividend status is considered to be a proxy for financial constraints in this sample where only firms that do not pay dividends are studied. Table 15 presents results on two modifications with *Profitability ratio* and *ROA*; *Dividend ratio* is omitted in this sample because these firms do not pay dividends.

Table 15 provides unexpected results that unlevered firms perform better in periods of growth. There is no evidence on difference in performance during recession because the relevant variables are insignificant. Firms' performance in growth periods cannot be explained by the considered hypothesis, so it is interesting to explore this point in future research.

**Table 15.** OLS regression for firms, which do not pay dividends.  
Dependent variables: Profitability ratio- (1); ROA-(2)

VARIABLES	(1)	(2)
ZL	0.055*** (0.014)	0.182*** (0.043)
Dummy for recession	0.002 (0.005)	-0.034 (0.098)
ZL*Dummy for recession	-0.016 (0.017)	0.103 (0.139)
Log of assets	0.010*** (0.002)	0.070** (0.036)
Constant	0.005 (0.011)	-0.471** (0.211)
Observations	2,699	2,699
R-squared	0.031	0.034

*Robust standard errors in parentheses*

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

## Conclusion

This paper sheds light on the zero-leverage puzzle in developing markets of Eastern Europe. Those companies that do not pay dividends are younger and smaller on average. They are likely to be unlevered because of financial constraints. Meanwhile, dividend-paying zero-levered companies avoid debt strategically in order to maintain financial flexibility and avoid underinvestment incentives. Such dividend-paying firms have higher profits, cash reserves and growth opportunities. The probability to become zero-levered decreases for the constrained group, while the probability for the unconstrained group rises during periods of economic slowdown. These findings are in line with the empirical results on developed countries.

Furthermore, this paper covers the gap in the current literature on comparing unlevered unconstrained firms' performance with levered unconstrained firms' performance. The empirical results show that zero-levered firms have better financial results during different economic cycles. They earn greater profits and pay higher dividends.

There are still some important gaps left for future investigation. First of all, private firms in developing markets can also be considered. The goal is to compare if there is a difference in determinants for private firms that lead them to become zero-leveraged. Also, other studies may take managerial and governance characteristics into account. It is important to explain constrained unlevered firms' performance in comparison with levered firms. The sample could be extended to Asian developing countries.

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## Appendix

Variables	Description
Log of assets	Log of total assets in prices of year 2000
Log of age	Log of the difference between the year observed and the IPO year
Cash flow ratio	(Net income + Depreciation)/Total assets
Cash and cash eq. ratio	Cash and cash equivalents/Total assets
Growth opportunities	(Market value of the firm + Book value of debt)/Total assets
Capex ratio	Capital expenditures/Total assets
Fixed assets ratio	Fixed assets/Total assets
Tax ratio	Income taxes/Pre-tax income
Non-debt tax shield	Depreciation/Total assets
Profitability ratio	EBITDA/Total assets
Dividend ratio	Cash dividends/Total assets
ROA	Net income/Total assets