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# [DETERMINANTS OF CAPITAL STRUCTURE: EVIDENCE FROM THE EMERGING MARKET – THE CASE OF THE BALTIC REGION]

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## **ABSTRACT**

*Firm capital structure is one of the most widely researched topics in corporate finance. However, the results are not always consistent and applicable from one market to another when explaining financing patterns. The majority of available research focuses on finding the role of firm-specific factors to leverage while ignoring macro and institutional factors. This paper examines how the capital structure of firms in the Baltic is influenced by both firm level and country level determinants. The study demonstrates that changes in leverage of firms in the Baltic is subject to both changes in firm specific characteristics, such as asset tangibility, growth opportunity, firm size and liquidity, as well as the changes in macro and institutional factors namely bank development, stock development and financial openness to different extent.*

## **ACKNOWLEDGEMENT**

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# MASTER THESIS IN CORPORATE FINANCE

<b>TITLE</b>	<b>Determinants of Capital Structure: Evidence from the Emerging Market – the case of the Baltic Region</b>
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<b>DATE</b>	26 May 2009
<b>PURPOSE</b>	The aim of this paper is to examine the role of firm- and country-specific determinants to capital structure of firms in the Baltic in the period 2004-2007.
<b>METHODOLOGY</b>	The OLS regression was employed on three different measures of leverage for every country separately. Dummy variables have been incorporated allowing regression coefficients differ across the countries and time. This model has been used as the basis on which country-level variables have been tested; we have run OLS regression of macro-level variables first on dummy coefficients, then on each firm-level variable's coefficient separately.
<b>THEORITICAL FRAMEWORK</b>	Theoretical framework is built upon three dominant capital structure theories, namely the Static trade-off, Pecking order and Agency cost model.
<b>FINDINGS &amp; CONCLUSION</b>	The result suggests that leverage of firms in the Baltic is to a great extent influenced by financial variables such as <i>Asset tangibility</i> , <i>Size</i> , <i>Growth opportunity</i> and <i>Liquidity</i> , whereas <i>Profitability</i> and <i>Effective tax rate</i> appear to be unrelated. At the country level, certain macro variables namely <i>Stock market development</i> and <i>Financial openness</i> influence firm leverage directly and indirectly, whereas <i>GDP growth</i> does so directly only. The role of the bank unexpectedly increases firm leverage. Interest rate and inflation does not play a role in determining capital structure of firms in the Baltic.
<b>KEYWORDS</b>	Baltic region, agency theory, pecking order, trade-off, capital structure, financing, firm level determinants, country level determinants, macro factors, institutional factors.

## TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION</b>	<b>3</b>
1.1	Background	3
1.2	Problem Discussion	4
1.3	Purpose	6
1.4	Delimitation	6
1.5	Thesis Outline	6
<b>2</b>	<b>THEORITICAL FRAMEWORK</b>	<b>7</b>
2.1	Firm-specific factors	7
2.1.1	<i>Theory of capital structure</i>	7
2.1.2	<i>The relation between models and capital structure determinants</i>	9
2.1.3	<i>Empirical research for the Baltic region</i>	14
2.2	Country-specific factors	16
<b>3</b>	<b>METHODOLOGY</b>	<b>19</b>
3.1	The Sample	19
3.2	The Data	20
3.3	Firm-Level Variables	20
3.3.1	<i>The dependent variables</i>	20
3.3.2	<i>The explanatory variables</i>	22
3.3.3	<i>OLS Regression</i>	22
3.4	Country-Level Variables	24
3.4.1	<i>Direct impact</i>	24
3.4.2	<i>Indirect impact</i>	26
3.5	Reliability	26
3.6	Validity	27
<b>4.</b>	<b>EMPIRICAL FINDINGS AND ANALYSIS</b>	<b>29</b>
4.1.	Firm-Level Variables	29
4.1.1.	<i>Descriptive statistics</i>	29
4.1.2.	<i>Regression results and analysis</i>	32
4.2.	Country-Level Variables	36
4.2.1.	<i>Descriptive statistics</i>	36
4.2.2.	<i>Regressions results and analysis</i>	39
<b>5</b>	<b>CONCLUSION</b>	<b>43</b>
<b>6</b>	<b>REFERENCES</b>	<b>46</b>
<b>7</b>	<b>APPENDIX</b>	<b>49</b>

## TABLE OF FIGURES

<b>Table 1: No. of companies in the samples .....</b>	<b>19</b>
<b>Table 2: Dependent variables .....</b>	<b>20</b>
<b>Table 3: Leasing activities .....</b>	<b>22</b>
<b>Table 4: Description of explanatory variables .....</b>	<b>23</b>
<b>Table 5 Description of country-level explanatory variables .....</b>	<b>25</b>
<b>Table 6: Summarized statistics of firm-level variables .....</b>	<b>30</b>
<b>Table 7: Firm-level regression results, estimated from Eq. (2) .....</b>	<b>33</b>
<b>Table 8: Summarized statistics for country level variables .....</b>	<b>36</b>
<b>Table 9: Direct impact of country-level factors .....</b>	<b>39</b>
<b>Table 10: Indirect impact of country-level factors .....</b>	<b>42</b>
<b>Table 11: Pearson correlation matrix for firm level explanatory variables in Latvia ....</b>	<b>49</b>
<b>Table 12: Pearson correlation matrix for firm level explanatory variables in Estonia...</b>	<b>49</b>
<b>Table 13: Pearson correlation matrix for firm level explanatory variables in Lithuania</b>	<b>50</b>
<b>Table 14: STDE model: Growth opportunities and Size explanatory power relatively to the whole model.....</b>	<b>50</b>
<b>Table 15: LTDE model: Growth opportunities and Size explanatory power relatively to the whole model.....</b>	<b>50</b>
<b>Table 16:. TDE model: Growth opportunities and Size explanatory power relatively to the whole model.....</b>	<b>51</b>

# 1 INTRODUCTION

## 1.1 Background

Since Modigliani and Miller (1958, 1963) established the first theoretical framework attempting to explain firm capital structure choice, research on this topic has been vigorously conducted adding many potential explanations to financing policy of firms such as agency cost model and pecking order hypothesis. In order to catch up with the rapid evolution of theory development, another strand of empirical research is also actively and widely undertaken. What characterize this empirical research are the scale as well as the diversity of its design. It ranges from single industry or single country studies to large-scale cross-national research. Developed and emerging markets have been tested and approaches have been qualitative and quantitative or a combination. However, despite this topic being one of the most widely scrutinized in the sphere of corporate finance, the question that Rajan and Zingales (1995) raised more than a decade ago still appears valid: *What do we know about capital structure?*

Indeed, the finance student seeking to understand firms' capital choice structure will have access to a widely accepted theoretical framework, but will quickly become aware of how the application of this framework to different markets and economic settings has been inconsistent. Empirical research carried out across various countries, also show inconsistent results, between developed and developing regions, as well as among developing countries. Recent study of Jong et al. (2008) examined leverage in 42 countries show that determinants of leverage differ across countries. Fan et al. (2008) research results also vary to a great extent, not only between the countries from emerging Latin America markets and emerging Asia markets, but also between the countries within those groups; the difference arrives not only by different set of significant determinants on capital structure, but also by a way how the determinants affect the leverage. Therefore the empirical research in one country about what affect firms' leverage might be different or inapplicable to explain the behaviors in another country.

Another aspect of “understanding” capital structure is the prevailing focus on the developed

market. This is perhaps not too surprising, as this is where the financial markets are already developed and established, allowing both access to information to facilitate the studies as well as reducing the risk of potential biased results due to lower fluctuation compared with emerging one. The emerging market started to draw attention, probably since the work of Demirguc-Kunt (1991). Quite a significant amount of research has up to now been done, but again the focus of international researchers is still on large potential markets like China, India or grouping many small markets into regional comparisons like Southeast Asia, Latin America or Eastern Europe. A dedicated paper for a small region like the Baltic has been waiting to be undertaken. The initial effort has been made 2 years ago by local researchers in the Baltics (Norvaisiene et al. 2007) but still a lot of questions remain unanswered.

The Baltic region has the potential for interesting research. After their break-away from the old Soviet Union in 1991, the Baltic countries (Latvia, Lithuania and Estonia) have gone through an impressive process of transformation from planned economy to market economy. As a result, institutional infrastructure, financial markets, banking system, etc. have been built and developed. Firms now are faced with a range of alternatives when it comes to their financing activities. Firm performance also improved together with the economic growth (the Baltic was one of the fastest growing economy under the study period<sup>1</sup>). Therefore, firm financing activities can be considered fertile ground for research in order to discover what lies behind the decisions.

## **1.2 Problem Discussion**

There is a need for a paper dedicated entirely to the Baltics for the two reasons. Firstly, given that current research has not reached consensus on the influence of certain determinants to capital structure means that they are not necessarily reliable to precisely predict a financing pattern in the Baltic. This problem, to some extent also plagues studies on Eastern Europe or emerging markets in general, which share some characteristics with the Baltic. Therefore, we cannot apply the results of such wider studies directly to the Baltic.

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<sup>1</sup> Source: European Statistics

The lack of attention to this market before can also be attributed to the difficulties in access to information, given the underdevelopment of the capital market. Stock markets in the Baltic countries were set up and developed approximately a decade ago (Estonia 1996, Latvia: 1993, Lithuania: 1993). However, the recent development of financial markets facilitates researchers' access to information when investigating this topic. More specifically, some attempts have been made in recent years, initiated with the work of Mateus (2005) including Lithuania and Latvia in a larger group of Eastern Europe. Since then there have been efforts by Seppa (2007) which is dedicated to Estonia market and paper of Norvaisiene (2007) for listed Baltic firms. The second reason emerges from this; despite the efforts, a clear pattern and a holistic picture of Baltic's firms financing is still vague and scattered. For instance, the Estonian paper clearly focused on only one single market and limited with few determinants. The other one examined interaction between internal determinants and level of debt. Regarding their methodology, they examine only the correlation between leverage and firm-level determinants while disregarding the effects of interdependence of those factors and overall explanatory extent of the variables to the leverage.

More specifically regarding their work, these papers do not take into account the impact of macro factors, which according to Booth et al. (2001) will make a rather considerable difference across countries. Jong et al. (2008) also point out that macro factors can influence capital structure both directly and indirectly, especially when one typical characteristic of emerging market is high fluctuation in macro changes. A research paper on the capital structure in the Baltic which measures the impact of macro factor effects to firms' leverage has been also suggested by authors of previous paper in this topic (Norvaisiene et al. (2007)).

Another problem which emerges is that even empirical studies have employed different methods and leverage definitions, one common attribute shared among the majority of current researches is the fact that they ignore the role of lease financing which is considered as substitute for debt financing. This might be due to the fact that accounting adjustment of lease capitalization is time-consuming and might not be feasible in large scale research. However, this leasing adjustment would reflect firms' leverage more precisely. The first attempt of this is credited to the work of Seppa (2007) in Estonian firms with approximately 50% of the firms in the sample involved in leasing activities.

With the ambition to thoroughly understand what determines capital structure choice of firms in the Baltic, this paper will try to address some of the shortcomings in previous papers. To



be specific, we will incorporate in our study country-level factors together with firm factors, in which country factors will be examined from two different angles. Furthermore, accounting adjustment to lease will be done to arrive at a more accurate reflection of debt in capital structure.

### **1.3 Purpose**

The purpose of this paper is two folded: firstly, to define what are the determinants of capital structure of firms in the Baltic at firm level. Secondly, how country factors in the Baltics influence firms leverage both directly and indirectly.

### **1.4 Delimitation**

Only listed companies are included in our sample while the majority of firms are still out of the loop due to lack of access to information. However, to our knowledge all cross-country empirical researches on capital structure determinants include only listed companies, therefore consistency increases the comparability of the results.

### **1.5 Thesis Outline**

The remaining part of the paper has the following structure: part 2 deals with building theoretical framework for the paper together with literature review on empirical research with close connection to Baltic and paper examined the impact of macro factors; part 3 discusses methodology of the research in detail; part 4 presents empirical findings and analysis of the result, validity and reliability are also discussed; part 5 draws the final conclusion and implication and further research is also suggested.

## 2 THEORITICAL FRAMEWORK

*In this part, we will firstly describe in general the three models which try to explain firms capital structure choice namely the Static Trade-off Model, the Pecking-Order Hypothesis and the Agency Theoretic Framework. Next, in order to provide with a deeper understanding of how these models are relevant, we discuss a list of common leverage determinants by linking them to capital structure from different perspectives. There are no hypothesis built in this part, rather we leave it open for the result because the theoretical and empirical review show an inconsistent results in most of the determinants. Finally we present empirical researches with close connection to the Baltic region.*

### 2.1 Firm-specific factors

#### 2.1.1 Theory of capital structure

Capital structure theory is initiated by the work of Modigliani and Miller (1958), examining the capital structure and its impact on the firm's capital costs. Despite the unrealistic assumptions, for their theory to be true that firm value should be an increasing function of debt ratio due to the benefits of attracting a tax shield, this work became a reference point for the evolving of new capital structure theories. Many of them were born by modifying or rejecting the previous assumptions of theoretical models, as well as introducing new factors that enable to explain firm's capital structure. The later evolution of capital structure theories is marked by the three dominant branches: trade-off theories, pecking order and agency cost.

The **Static Trade-off Model**, firms are moving toward the optimum capital structure, which involves a trade-off between tax deductibles (initiated by Modigliani and Miller, 1963) and potential bankruptcy cost of additional debt added. Tax advantage comes from beneficial tax shield from debt interest payment. On the other hand, the downside of debt is potential bankruptcy cost which involves both the probability of distress and the magnitude of the aftermath. A target debt ratio would be expected for firms that act along the lines of this model (Myers, 1984).

**The pecking order theory** is credited to the work of Myers (1984) and Myers and Majluf (1984). The theory is based on the argument of information asymmetry and transaction cost. If a firm has three main sources of finance, namely retained earnings, debt, and equity, then there will be no adverse selection problem for retained earnings. External finance with debt or equity are subject to adverse selection problems with different levels due to the fact that managers possess more private information than outsiders. Equity is exposed to serious adverse selection, whereas debt has only a minor adverse selection problem as outsider investors view equity much riskier than debt. Therefore, investors would require a higher risk premium for equity. So from the point of a manager, retained earnings are better than debt, debt is better than equity due to the cost inherent in each choice. Consequently, the financing hierarchy of a firm will be topped down from retained earnings, then debt then equity when one source is exhausted.

**Agency cost model** is originated with the work of Jensen and Meckling (1976). This theory is also based on information asymmetry and conflict of interest between stakeholders. Two typical conflicts are between principals (shareholders) and their agents (managers) and between shareholders and bondholders.

The first conflict is described by Jensen (1986) that managers may have incentives to attempt for firm growth by adopting projects with even a negative net present value (NPV). This is also called free cash flow problem or overinvestment problem when managers have too much excess cash in hand (Jensen (1986); Stulz (1990)). Moreover, Jensen and Meckling (1976) argue that managers may work less efficiently, because they are merely partial or no owners of the firm. Through its fixed obligations debt is considered to be a disciplining device, which might mitigate these principal-agent problems.

The second type of conflict is between shareholders and bondholders and most described by underinvestment problems (introduced by Myers (1977)) and asset substitution problems. The underinvestment problem arises in situations of debt overhang. A high leverage firm might give up good investment opportunities due to this problem. This is explained by the fact that NPV of future profitable projects will be transferred from equity holders to debt holders, thereby resulting in the unwillingness of shareholders to carry on good investment opportunities.

The asset substitution problem, as described by Jensen and Meckling (1976), entails a

reduction in debt. Asset transfers a larger burden of risk to the debt holder without rewarding them with higher compensation. Engaging in higher risk projects will have a higher expected return, but this will not come to the benefit of the debt holders as they get a fixed return. The difference is the profit of solely the equity holder. The higher risk does have an effect on the debt holder however, as the firm has a higher probability of default.

### **2.1.2 The relation between models and capital structure determinants**

Even though the Static trade-off model, Pecking order and Agency cost model try to explain capital structure in different ways and making distinction between these hypothesis proven to be difficult in empirical research (Haris and Raviv, 1991; Booth et al., 2001). Variables that describe the pecking order hypothesis can be classified as static trade-off model or agency theory variables and vice versa, for example firm size can be under pecking order one but also can be categorized in trade-off model. Therefore, in order to structure our theoretical framework and describe how these theories explain the capital structure choice in a greater detail, we use the list of common determinants employed by previous studies, such as Profitability, Asset tangibility, Growth opportunity, Firm size, Effective tax rate, Default risk and Liquidity (Booth et al., 2001, Fan et al., 2008, Mateus, 2005, Jong et al., 2008, Weill 2002, Mitton, 2007, Gracia and Mira, 2007, etc.) based on what effect would be expected to the change of capital structure in response to the volatility of these determinants. This is a common set of factors that has been widely tested in capital structure researches worldwide and has been proved to have a significant impact on leverage in various countries.

#### **a. Profitability**

According to the work of Harris and Ravis (1991), firm's profitability can be used to measure the impact to capital structure choice under pecking order, agency cost, and trade-off theory. Within pecking order hypothesis, firms that are profitable will use their internal funds (retained earnings) to finance their operations and investments and thus they will borrow relatively less than firms with low profitability (Garcia and Mira, 2007, Booth et al., 2001, Fan et al., 2008). Hence, from this perspective, profitability is negatively related to leverage.

Contrast with pecking order, trade-off and agency cost suggest a positive relationship of profitability to leverage. More specifically, a profitable business is expected to have a higher

level of debt in order to offset corporate tax (Garcia and Mira, 2007) so the higher the profitability, the higher the debt level of firm. Also, a profitable firm, which can be associated with high level of free cash flow, would easily face problem of managers' expropriation (Jensen, 1986). Therefore, to avoid this agency problem, profitable firms would employ higher leverage in order to pay out more cash (Fama and French, 2002; Garcia and Mira, 2007).

The above discussion shows an inconsistent relationship of profitability to leverage from different theoretical perspective. A mixed result is also documented by empirical evidence in emerging markets. For instance, in developing markets, while a negative relationship is observed from the work of Fan et al. (2008), Mateus (2005) Latin America, Weill (2002), Seppa (2008), the positive relation is found in the same study of Mateus (2005) for Eastern Europe.

#### **b. Firm size**

Both pecking order and trade-off model can explain capital structure dependency on firm size. As pecking order theory is grounded on the financial market imperfections, therefore transaction costs and asymmetric information influence the firm's ability to undertake new investments to its internally generated funds. Large firms may have better internal resources and easier access to financial markets and benefit from better financial conditions on these markets when requesting new issuance of capital (Booth et al., 2001). Rajan and Zingales (1995) argue that bigger companies try to disclose more information to external investors, so information asymmetry is lower than for smaller firms. Consequently, the relation should then be *negative* between leverage and size.

Within the trade-off framework, especially concerning financial distress, larger firms offer greater collateral guarantees and less risk as they tend to be more diversified and go bankrupt less often than smaller ones (Titman and Wessels, 1988). Consequently, a better reputation on financial markets can help them in reaching a higher level of debt relative to smaller and less reputation firms. Therefore, from the perspective of this model, large firms can be pushed towards a higher leverage, and then the size of the company should be *positively* related to the level of debt (Ang et al., 1992, Titman and Wessels, 1988; Garcia and Mira, 2007)

In line with the contrasting prediction of different theories, mixed results of this variable are

also found in many studies. While there are lot of studies in developing countries supporting the positive relation of firm size to leverage such as Fan et al. (2008), Mateus (2005) for Latin America, Jong et al. (2008), Booth et al. (2001), there are also evidence of negative relationship in the studies of Weill (2002) for Poland and Czech Republic, Mateus (2008) for Easte23rn Europe and Norvaisiene et al. (2007) for the Baltic region.

### **c. Asset tangibility**

The impact which asset tangibility has on capital structure can be explained by agency cost, pecking order and trade-off model (Haris and Ravis, 1991).

Agency cost perspective links asset tangibility with agency cost of debt. If a company has a large proportion of tangible assets, they can be used as collateral when requesting a loan (Jensen and Meckling, 1976). A considerably large collateral will mitigate the risk of the debt holder. A firm which has higher tangible assets as collateral will have better possibilities of obtaining a loan whereas the creditor will have a higher residual value of the loan in case the firm defaults. (Weill, L., 2002). Furthermore, a high value of collateral also sends out a positive signal to the creditor and is thus a factor in solving adverse selection. Low-risk borrowers would opt for a high collateral – low interest rate contract, the high-risk borrower, being unable to put up a collateral, will opt for the high interest rate debt (Booth et al, 2001). Thus, the greater the proportion of tangible assets in a company, the higher the leverage we expect to see.

Collateral value plays a major role in the access to credit across countries both in developing and developed countries as shown in the study of Fan et al. (1996), Booth et al. (2008), but is also ambiguous in Eastern Europe indicated in the study of Mateus (2005), and Weill (2002).

Regarding maturity structure, Booth et al. (2001) argued that the influence of tangibility will differ between the long-term and total-debt ratios as firms match the maturity of their debt to the tangibility of their assets. Generally, the more tangible the asset mix, the higher the long-term debt ratio, but the smaller the total-debt ratio (Booth et al., 2001). However, as also shown in Booth et al. (2001), Demirguc-Kunt and Maksimovic (1999) studies, they found that difference between the total book-debt and long-term debt ratios is much more prominent in developing countries than it is in the developed countries. Developing countries have substantially lower amounts of long-term debt; they are more dependent on short term debt

and trade credit. This might more support the result shown above that collateral value might be weak in developing market.

With respect to a trade-off model, specifically to bankruptcy costs, higher tangibility of assets indicates lower risk for the lender as well as reduced the direct cost of bankruptcy. For instance, if a firm retains large investments in land, equipment and other tangible assets, it will have smaller costs of financial distress than a firm that relies on intangible assets (Gracia and Mira, 2008). Thus, firms with more tangible assets should issue more debt.

From the perspective of testing the pecking order, according to Harris and Raviv (1991), firms with few tangible assets would have greater asymmetric information problems (this is in the same manner with firm size). Therefore, firms with few tangible assets will tend to accumulate more debt over time and become more highly levered. Harris and Raviv (1991) argue that the pecking order predicts that a negative relationship is expected under this framework. Another possible argument from Gracia and Mira (2008) which supports this negative relationship is that lots of tangible assets may mean that a firm has already found a stable source of return which provides it with more internally generated funds and allows avoiding external financing. However, the role of tangibility is much stronger in the sense of collateral thus supporting debt as in previous discussion under agency cost and trade-off model.

#### **d. Growth opportunity**

The impact of this variable to leverage can be described under agency cost model and pecking order theory.

In agency model, growth opportunities are important factors in explaining the interaction between leverage ratio and agency costs. Jensen and Meckling (1976) and Myers (1977) pointed out that a high leverage firm might give up good investment opportunities due to the debt overhang problem. As wealth would be transferred from equity holders to debts holders, in order to minimize the shareholders-bondholders conflict, firms with high growth opportunities go for lower leverage, thus seeking equity financing for their new projects instead of debt financing (Jong, 2008). By contrast, asset substitution problem is when risk is transferred from equity holder to debt holders. Firms with high growth opportunities are involved in riskier projects than other; therefore, they have more difficulty in raising debt.

Under agency cost of debt, growth opportunity is *negatively* related with debt.

In relation with pecking order framework, Michaelas et al.(1999) argued that growth will push firms into seeking external financing, as firms with high growth opportunities are more likely to exhaust internal funds and require additional capital. From this point of view, growth is expected to have a *positive* relationship with leverage. Contrast to this argument is Daskalakis and Psillaki (2005), growth causes variations in the value of a firm which in turn can be interpreted as greater risk. As a result, high growth opportunities firm which is considered as a risky firm facing difficulties in raising debt capital with favorable terms whereas a firm whose value is remaining stable reflecting by more predictable cash flow can be more easily to finance with debt. This argument leads to the assumption that firms with growth potential will tend to have lower leverage or *negative* relationship is expected.

Empirical researches also show inconsistent result; negative relationship is found in both developed and developing countries in Fan et al. (2008) studies whereas a positive one is in Mateus (2005) and mixed results in a Jong (2008) study of 42 countries.

#### **e. Effective tax rate**

This determinant can be only explained in the trade-off model. Interest payment from debt is an important source of corporate income deductibility especially for high profitable firms. Therefore, debt financing carries a clear advantage of being tax deductible. If additional debt does not bring any more risk of financial distress, firms would prefer to increase its leverage (Gracia and Mira, 2008; Fama and French, 2002). Consequently, effective tax rate would be *positively* related to debt ratio.

Positive relationship to leverage ratio of this variable is quite consistent in a lot of studies and across countries including emerging market such as Mateus (2005), Fan et al. (2004), Booth (2001). However, in Jong et al. (2008) study, among ten countries show statistical significance on the coefficient of corporate taxation on leverage, only two show positive relationship whereas other eight countries show a negative coefficient.

#### **f. Default risk**

This variable is included in the trade-off model. According to this model, default risk then can work as mechanism to offset debt financing in order to protect firms from bankruptcy,



thus preventing them from having too high leverage (Gracia and Mira, 2008). Default risk gives rise to either direct or indirect financial distress costs. According to (Gracia and Mira, 2008) and Booth et al. (2001), the higher the financial distress costs, the lower the level of debt of the firm or default risk should be *negatively* related to the firm's debt ratio.

However, this negative relationship is also not consistent in empirical researches. Strong support for this relationship is documented in the studies of Brounen et al. (2007), some developing countries such as Thailand and Malaysia in cross national study of Jong et al. (2008). On the other hand, studies show statistic insignificance of the impact of this determinant to leverage including Mateus (2005), Gracia and Mira (2008), and the majority of 42 countries in the study of Jong et al. (2008).

#### **g. Liquidity**

Liquidity is included in Pecking order financing variables. Similar to profitability, liquidity as another proxy for internal resources (accumulated cash and other liquid assets) would be used first as internal sources of funding before external financing. Therefore, the higher the liquidity level of a firm, a lower debt level is expected or a *negative* relationship is expected between liquidity and debt level (Mateus, 2005; Jong et al., 2008).

This variables is not widely tested like others firm variables, we only found the result in Mateus (2005) and Jong et al. (2008). The latter study finds this relationship statistically insignificant whereas Mateus (2005) found a liquidity negatively influence leverages in both Latin America and Eastern Europe.

### **2.1.3. Empirical research for the Baltic region**

We will in turn review three papers closely connected with the region including the study of Mateus (2005) for Eastern Europe, Seppa (2007) for Estonia and Norvaisiene et al. (2007) for the Baltics.

Mateus (2005) studied a sample of 986 non-financial firms from Latin America and 686 from Eastern Europe (7 countries including Lithuania and Latvia) from the period of 1990-2003. They tried to investigate the choice between debt and equity simultaneously with the decision between short-and long-term debt. An interesting result is that a firm more easily changes the maturity of its debt than adjusts its leverage ratio. For Eastern Europe liquidity is shown to

have significantly negative correlation (i.e. more liquid firms choose less and shorter debt) whereas tax effects significantly positive correlation (i.e. higher taxes result to higher leverage). The remaining leverage explanatory variables such as *Size*, *Growth opportunities*, *Profitability*, *Tangibility* and *Business risk* were found to be insignificant.

Seppa (2007) studied a sample of 260 Estonian non-financial companies (including listed and non-listed firms) in the period 2002/2003 or 2003/2004, depending on data access. Their research focuses on the impact of company-factors to leverage and to track behavioral differences between the companies of different size as well as different level of leverage. The originality of the study, according to the author, is accounting financial adjustment (i.e. capitalizing lease is treated as debt; and debt from owners is treated as equity). The results show that Estonian non-financial companies follow pecking order theory of financial hierarchy while making capital structure choices as they prefer internal funds to external funds whereas providing no or very weak supports that the trade-off theory is followed in the long run. This evidence is more robust among large firms as compared to small ones. Further, in case of exhausted internal fund, large firms also raise significantly more debt relatively to small ones. On the other hand, quality of collateral asset is more important for small companies to determine their creditworthiness while large ones are able to raise debt against less valuable collaterals such as inventories and trade receivables. *ROI* and *Tangibility* have been selected as the best variables to describe leverage; the regression equality with only those two variables can explain approximately 50% of leverage variation of firm.

Norvaisiene et al. (2007) studied Estonian, Latvian and Lithuanian listed companies during the period 2000-2005. The results have shown to vary between Lithuania, Latvia and Estonia. For Latvia the majority of obtained findings are statistically unreliable and do not identify any dependence on the capital structure indicators. Therefore it was concluded that when adopting financing decisions the Latvian listed companies did not rationally focus on the specific determinants. In Lithuania larger company size, bigger growth opportunities, higher tangibility and lower free cash flows associate to greater companies leverage. Finally analysis of the Estonian listed companies' decisions on the capital structure shows that companies prefer to use up their internal funds. This was confirmed by the strong negative relationship between return on assets and the total debts ratio and average negative dependence between free cash flows and many indicators describing the level of liabilities in the period of 2000-

2002. Company's size has been also determined to have a significantly negative correlation with the level of debt.

Although the paper finds the correlation between company's level of debt and firm-level determinants it does not consider effect of interdependence of those factors and lacks to describe to which extent they can explain companies' leverage (leverage ratio as a function of firm specific attributes has not been built). In addition, it does not employ any macro-level variable so a complete picture cannot be drawn.

## **2.2. Country-specific factors**

There is no such established theoretical framework trying to explain firm capital structure from the impact of country-factors like those of firm-level (Fan et al., 2007). The first attempt to see the indirect effect is the work of Jong et al. in 2008. We only considered here those variables that show a fluctuation in the three countries under the study period, for those attributes shared similarity across three countries such as common law, shareholders and creditors protection, dividend tax, etc. we exclude in our study. We consider a number of variables characterizing the macro-economic (GDP growth, inflation, interest rate), legal enforcement (corruption perception index) and financial development of countries effecting the availability of financing choice of firms (stock market development and financial openness). In the below section, we will give a brief discussion of how country factors influence leverage then advance with a closer look of to what extent these variable influence firm capital structure.

Regarding direct effects to firm leverage, GDP growth would be positively associated with debt as firms in a growing economy are more willing to take in more debt for their new investment (Jong et al., 2008). Also possible assumption is that GDP growth would be associated with better performance of firms, therefore, firms in a good growing economy would have better internal resources for their financing choice thus relatively less involved in debt. Thus GDP growth would be negatively associated with debt. Inflation influences debt maturity in a way that the higher the inflation the more possible lenders stay away from long-terms debt as debt contracts are generally nominal contracts and high inflation would be associated with high uncertainty about its future fluctuation (Fan et al., 2008). Interest rate should be negatively associated with debt as it is related to direct cost of raising debt. Regarding the level of legal enforcement, with corruption index being one of the proxies,

there are various possible explanations, for instance, Fan et al. (2008) argued that in country with high level of corruption, debt is expected to be used relatively more than equity since it is easier to expropriate outside equity holders than debt holders. Likewise, short-term debt is more favourable in high corruption countries as with the same reason of expropriation.

Another important group of country factors is the one representing the availability of debt financing for a firm. These sources could come from within the country or from foreign sources. Bank development is the proxy to assess the availability of debt financing within the country, the more the banking sector developed, the higher the debt level of firms (Mitton, 2007; Booth et al., 2001 and Fan et al., 2007). External financing could also come from foreign sources which are measured by the level of financial openness of the country (mainly inflow FDI). Financial openness could have an impact on the availability of debt, equity, or both, and so the expected effect of financial openness on debt ratios is ambiguous (Mitton, 2007). Finally, in contrast with credit market development, stock market development is expected to be negatively correlated with debt ratios, as the availability of equity finance should act as a substitute for debt finance (Booth et al., 2001, Mitton, 2007, Jong et al., 2008).

Second dimension of country-factors' impact to leverage is the indirect impact meaning that country factors would influence the way firm-level factors determine firm leverage. For instance, stock market development can mitigate the level of importance of tangibility to leverage because stock market development will promote the use of equity thus reduce the use of debt. As a result, the role of tangibility as collateral value to debt is lessened (Jong et al., 2008).

Fan et al. (2008) studied a sample of 36,767 firms from 39 countries divided into two groups namely developed and developing in 1991-2006. Their strongest finding is that firms in countries that are viewed as more corrupt tend to be more levered and use more short-term debt which is in line with their prediction. They also found that total leverage appears to be unrelated to inflation but a significant positive relation occurs between debt maturity and inflation. The study also reveals that financial institutions have an important influence on the type of capital that is used. For instance, the size of the banking sector is more related to debt maturity that corporations in countries with large amounts of bank deposits tend to have shorter maturity debt.

Jong et al. (2008) studied a set of 42 countries during the period of 1991-2001 with the purpose of analyzing the role of various country-specific factors in determining corporate capital structure. The effects of these factors are examined under two dimensions: direct and indirect impact to firm debt level. Regarding direct impact, they found that bond market development and GDP growth rate consistently show statistically significant impact on capital structure. Clearly and quite intuitively, positive relationship of bond market development and firm leverage is documented. GDP growth also influences debt level in the same manner with the explanation that firms in countries with good economic growth are more willing to take in more debt to serve their growth opportunity. On the other hand, indirect impact also shows some considerable result, for instance a significant negative effect of stock market development on asset tangibility, this is in line with their hypothesis that a developed stock market tends to promote the use of equity, therefore, the role of tangibility as collateral in borrowing is limited. Another considerable result is the significant negative relationship of countries' capital formation to profitability and liquidity. Another note is that their adjusted-R<sup>2</sup> is above 50% in all regressions where coefficients of country dummy variables are as dependant variables and macro factors as independent ones. It indicates that the model specification captures a good part of the variations in leverage regressions across the countries.

Mitton (2007), who studied the reason why debt ratio in emerging market increases over time from 1980-2004, shows that at country level, credit market development, financial openness have positive relation with debt ratio whereas stock market development (same with Booth et al., 2001) and GDP per capita show an opposite sign. The picture that emerges is one of emerging market firms increasing levels of debt in response to changes in their own firm-level characteristics and in response to changes in the availability of external finance.

### 3 METHODOLOGY

We employed OLS regression on three different measures of leverage for every country separately. Then, dummy variables have been incorporated allowing regression coefficients differ across the countries and time. This model has been used as the basis on which country level variables have been tested; we have run OLS regression of macro-level variables first on dummy coefficients, then on each firm-level variable's coefficient separately.

#### 3.1 The Sample

The primary sample consists of 99 companies from Estonia, Latvia and Lithuania that are listed in the NASDAQ OMX Baltic Equity list. The research covers the period from 2004 to 2007<sup>2</sup>. We exclude financial institutions because their assets are highly restricted by regulating authorities and thus leverage is predetermined by other factors than those influencing non-financial firms. Outliers test resulted in the elimination of some data points. The final sample has from 79 to 85 companies depending on the year studied. Sample distribution between the countries is the following: Lithuanian companies represent 44% of the total sample, Latvian – 40% and Estonian 16%.

<i>Year</i>	<i>Estonia</i>	<i>% of total</i>	<i>Latvia</i>	<i>% of total</i>	<i>Lithuania</i>	<i>% of total</i>	<i>Total</i>
<b>2007</b>	14	17%	33	40%	36	43%	<b>83</b>
<b>2006</b>	13	15%	33	39%	39	46%	<b>85</b>
<b>2005</b>	11	14%	33	42%	35	44%	<b>79</b>
<b>2004</b>	13	16%	31	39%	35	44%	<b>79</b>
<i>Total</i>							<b>326</b>

*Table 1: No. of companies in the samples*

<sup>2</sup> the choice of interval is due to the limited data access

## 3.2 The Data

Secondary data is employed including both firm and country level factors. At the firm level, the main source is Reuters 3000 Xtra database and firms annual reports for lease adjustment purpose. Financial statements during the period studied are prepared (on an annual basis) in compliance with International Financial Reporting Standards, therefore there is no inconsistency in the data neither between countries, nor across time periods. Also, firm-level data is denominated in Euro to make the measurement consistent and comparable across the sample. Since macro level determinants are ratios, a currency unification is not relevant as long as ratios are constructed on a currency consistent way. Country-level explanatory variables were extracted from World Development Indicators and World Bank Financial Structure Database retrieved from World Bank and Eurostat websites (See Table 5) .

## 3.3 Firm-Level Variables

### 3.3.1 The dependent variables

We adopt 3 definitions of leverage in our analysis.

Variables	Description	Supported by
<i>Total debt ratio</i>	Total debt / total asset	Rajan and Zingales (1995), Booth et al. (2001), Weill (2002), Gracia and Mira (2008), Mitton (2007)
<i>Long-term debt ratio</i>	Long-term debt/ total asset	Titman and Wessels (1988), Demirguc-Kunt and Maksimovic (1999), Booth et al. (2001), Jong et al. (2008), Mateus (2005), Weill (2002), Gracia and Mira, (2008)
<i>Short term debt ratio</i>	Short-term debt/ total asset	Mira (2005)

**Table 2: Dependent variables**

All the debt ratios mentioned above indicate the share of the external financing in the whole balance sheet. A remark to be made here is that debt is with excluded operating liabilities such as account payable.

Total debt ratio and its measurement mentioned in Table 2 is the broadest definition of leverage (Rajan and Ringal, 1995). The two alternative sub-definitions of leverage are to facilitate the observation of debt maturity discussed in theoretical framework (e.g. collateral value affects not only the level of debt but also its maturity structure). Also, according to the Booth et al. (2001), Demirguc-Kunt and Maksimovic (1999) studies, developing countries have substantially lower amount of long-term debt compared with developed countries. Therefore, it would be interesting to see the relative proportion and the effects to debt maturity in this emerging market.

All the ratios here are referred to book value of equity instead of market value. This is due to the market value being subject to distortions encouraged by low liquidity and a market which is dominated by few participants; this is quite typical for an underdeveloped stock market in an emerging country (Weill, 2005). Moreover, in Booth et al. (2001) and Mitton (2007) studies, the regression coefficients are almost identical compared between book debt ratio and market-book debt ratio. Finally, book value of debt is also employed instead of market value which is consistent with all research that we are aware of in this topic.

**Operating lease adjustment:** to arrive at value of lease to adjust the level of debt, we apply this formula:

$$Lease\ value = \frac{Rental\ Expense}{cost\ of\ debt + \frac{1}{asset\ life}} \quad (Koller\ et\ al.,\ 2005,\ page\ 198)$$

The proxy for cost of debt is average interest rate for corporate lending under the study period in each country. For each country we had a different cost of debt and we applied it uniformly to all firms in each specific country. As there is no public rating of each firm, we can not calculate each specific cost of debt for one single firm. Rental expense and asset life are extracted from the annual reports. Finally, lease value is added to long-term debt and total debt level and also to all ratios related such as Tangibility and Profitability.

Companies' from the sample involvement in leasing activities is defined in the Table 3.



	Latvia	Estonia	Lithuania	Total
No. of companies that involve lease, % of total	33%	33%	52%	41%
Lease value, % of total debt	39%	18%	30%	25%

*Table 3: Leasing activities*

### 3.3.2 The explanatory variables

Our set of firm-level determinants consists of 7 factors (See Table 4) which proved to have a significant impact on leverage in various countries. In defining our variables, our choices were subject to a number of considerations: firstly, they are commonly tested, secondly, the accessibility of the data, and finally, the variable's relevance to the Baltic region.

### 3.3.3 OLS Regression

Ordinary-least square (OLS) regression is the most widely used method to define a relationship between capital structure choice and firm specific variables. We primarily run a following regression for each of the 3 countries separately:

$$Leverage_{ij} = \beta_{0j} + \beta_{1j}PROF_i + \beta_{2j}SIZE_i + \beta_{3j}TANG_i + \beta_{4j}GROWTH_i + \beta_{5j}TAX_i + \beta_{6j}RISK_i + \beta_{7j}LIQ_i + \varepsilon_i \quad (1)$$

Where:  $Leverage_{ij}$  denotes one of the dependant variables, defined in Table 2, for the  $i^{th}$  firm in the  $j^{th}$  country. Independent variables are defined in Table 4.  $\beta_{0j}$  is the country-specific intercept.

After the elimination of outliers, we tested for multicollinearity between independent variables. As noted before the aim of this regression is not only to see firm-level variable effect on capital structure but also to reveal if a single model for all three countries can be built. In order to have model comparability, we eliminated the same explanatory variables for all three countries even if multicollinearity appeared only in one. As can be seen from the

Appendix Tables 11, 12 and 13 the highest correlation in Latvia is between *Growth opportunity* and *Size* (0.72) and in Estonia between *Liquidity* and *Tax* (0.62), whereas in Lithuania none of

Variable	Description	Supported by
<i>Profitability</i> ( <i>PROF</i> )	$\frac{EBIT^*}{Average\ total\ asset}$	Daskalakis and Psillaki (2005), Booth et al. (2001), Fan et al., (2008), Jong et al. (2008), Gracia and Mira (2008), Weill (2002), Seppa (2008), Mateus (2005)
<i>Size</i> ( <i>SIZE</i> )	$Ln\ (totalaverage\ asset^{**})$	Daskalakis and Psillaki (2005), Booth et al. (2001), Fan et al. (2008), Jong et al. (2008), Weill (2002), Seppa (2008), Rajan and Zingales (1995), Ang et al. (1992), Titman and Wessels (1988), Gracia and Mira (2008), Mateus (2005)
<i>Asset tangibility</i> ( <i>TANG</i> )	$\frac{Average\ fixed\ asset^{***}}{Average\ total\ asset}$	Fan et al. (2008), Booth et al. (2001), Mateus (2005), Weill (2002), Gracia and Mira (2008)
<i>Growth opportunity</i> ( <i>GROWTH</i> )	$\frac{Tangible\ asset_t - Tangible\ asset_{t-1}}{Tangible\ asset_{t-1}}$	Daskalakis and Psillaki (2005), Mateus (2005), Fan et al (2008), Seppa (2008) Norvaisiene et al. (2007).
<i>Effective tax rate</i> ( <i>TAX</i> )	$\frac{Taxes^{****}}{EBT}$	Mateus (2005), Fan et al. (2008), Booth et al. (2001)
<i>Default risk</i> ( <i>RISK</i> )	$\frac{EBIT_t - EBIT_{t-1}}{EBIT_{t-1}}$	Gracia and Mira (2008), Booth et al. (2001), Jong et al. (2008)
<i>Liquidity(LIQ)</i>	$\frac{Total\ current\ assets - inventories}{Current\ liabilities}$	Jong et al. (2008), Mateus (2005)

\* EBIT denotes Earning before interest and taxes; \*\* Total average asset denoted in million EUR; \*\*\* Average fixed assets are net of depreciation; \*\*\*\* EBT denotes to Earnings after interests and before taxes

**Table 4: Description of explanatory variables**

independent variables strongly correlate to each other. *Tax* did not show to be significant in any model (consistent with Booth et al. 2001), so we kept *Liquidity*. In order to decide whether to eliminate *Size* or *Growth opportunity*, we conducted several tests. Although *Growth opportunity* has been significant in more models than *Size* (5 vs. 3), *Size* showed to have a higher explanatory power (partial R-Square) relatively to the whole model (Appendix,

Table 14, 15 and 16 respectively for STDE, LTDE and TDE models), so we kept the latter. The final regression is the following:

$$Leverage_{ij} = \beta_{0j} + \beta_{1j}PROF_i + \beta_{2j}SIZE_i + \beta_{3j}TANG_i + \beta_{4j}RISK_i + \beta_{5j}LIQ_i + \varepsilon_i \quad (2)$$

Variance inflation factor for each coefficient in a regression (2) is far below 10, which means that the auxiliary regressions do not exceed 0.9 and hence there is no high collinearity left among the explanatory variables (Damodar, 2002, page 362).

The results from the regressions will not only show the influence of firm-level determinants on capital structure, but also whether it is acceptable to use a single model for firms in all three Baltic countries.

### 3.4 Country-Level Variables

Having established the impact of firm-specific variables on corporate leverage, we proceed to examine both direct and indirect impact of country-specific variables by estimating the effect on coefficients of dummy variables and firm-specific determinants.

The first step is to incorporate dummy variables to regression (2) allowing regression coefficients to differ across the countries during the time. Due to a considerable gap between  $R^2$  and adjusted- $R^2$  values, we excluded *Profitability* and *Risk* from regression since it appeared to have no significant role in explaining leverage in any country. The final regression, on which country-level variables' test has been built is as following:

$$Leverage_{ijk} = \sum_{j=1}^3 \sum_{k=2004}^{2007} \alpha_{jk} d_{jk} + \sum_{j=1}^3 \sum_{k=2004}^{2007} \beta_{1,jk} d_{jk} SIZE_{ijk} + \sum_{j=1}^3 \sum_{k=2004}^{2007} \beta_{2,jk} d_{jk} TANG_{ijk} + \sum_{j=1}^3 \sum_{k=2004}^{2007} \beta_{3,jk} d_{jk} RISK_{ijk} + \sum_{j=1}^3 \sum_{k=2004}^{2007} \beta_{4,jk} d_{jk} LIQ_{ijk} + u_{ijk} \quad (3)$$

Where :  $d_{jk}$  denotes a dummy variable, specifying the country in a particular year

#### 3.4.1 Direct impact

In the second step, we explore the impact of country-level determinants on estimated coefficients  $\hat{\alpha}_{jk}$  of country-and-year dummy variables (which are the countries' leverages in

a particular year after correcting for impacts of firm-specific determinants).

$$\hat{\alpha}_{jk} = \gamma_{jk} + \gamma_1 GDP_{jk} + \gamma_2 INF_{jk} + \gamma_3 INT_{jk} + \gamma_4 CORR_{jk} + \gamma_5 STOCK_{jk} + \gamma_6 BANK_{jk} + \gamma_7 OPEN_{jk} + w_{jk} \quad (4)$$

Where: *dependant var*

*iable:*  $\hat{\alpha}_{jk}$  is estimated  $\alpha_{jk}$  from Eq. (3); *independent variables:*  $GDP_{jk}$ ,  $INF_{jk}$ ,  $INT_{jk}$ ,  $CORR_{jk}$ ,  $STOCK_{jk}$ ,  $BANK_{jk}$  and  $OPEN_{jk}$  are country-level determinants defined in Table 5.

Variable	Description	Supported by	Source
<i>GDP growth (GDP)</i>	Annual real GDP growth rate	Jong et al. (2008), Fan et al. (2008) Booth et al. (2001), Mitton, T (2004)	European Statistics
<i>Inflation (INF)</i>	Annual rate of change on Consumer Price Index	Fan et al. (2008), Booth et al (2001)	European Statistics
<i>Interest rate (INT)</i>	1 year VILIBOR, RIGIBOR and TALIBOR for Lithuania, Latvia and Estonia respectively	Booth et al. (2001), Fan et al. (2008)	Central bank of Lithuania, Latvia, Estonia
<i>Corruption index (CORR)</i>	An index ranges from 0 to 10, with larger value indicating less severe corruption	Fan et al. (2008), Jong et al. (2008)	Corruption Perception Index, Transparency International
<i>Stock market development (STOCK)</i>	Total stock market capitalization over GDP	Jong et al. (2008), Mitton, T(2004)	European Statistics
<i>Bank sector development (BANK)</i>	Banks asset and liabilities over GDP	Fan et al. (2008)	International Financial Statistics, International Monetary Fund
<i>Financial openness (OPEN)</i>	Total capital flows over GDP	Mitton, T (2004)	International Financial Statistics, International Monetary Fund

**Table 5 Description of country-level explanatory variables**

In order to eliminate explanatory variable's multicollinearity, we eliminated *Interest rates*, *Corruption* and *Inflation* as they had too high variance inflation factor. For the purpose to decrease the gap between the model R-Square and Adjusted R-Square we also eliminated *Inflation* which appeared to be not significant for any leverage maturity in any country. The final regression testing direct country-variable effect on the leverage is as the following:

$$\hat{\alpha}_{jk} = \gamma_{jk} + \gamma_1 GDP_{jk} + \gamma_2 STOCK_{jk} + \gamma_3 BANK_{jk} + \gamma_4 OPEN_{jk} + w_{jk} \quad (5)$$

### 3.4.2 Indirect impact

For an indirect impact analysis we examine the role of country-level variables on coefficients of firm-specific determinants in the Eq. (3). We run OLS regression to only those firm-specific determinants that are significant at least in one of the countries since this is in line with our study interest. Therefore the regression is defined as following:

$$\hat{\beta}_{ljk} = \lambda_{jk} + \lambda_1 GDP_{jk} + \lambda_2 STOCK_{jk} + \lambda_3 BANK_{jk} + \lambda_4 OPEN_{jk} + \varepsilon_{jk} \quad (6)$$

Where:  $j$  denotes a country,  $k$  denotes a particular year from a study period and  $l$  denotes a particular variable, i.e.  $\hat{\beta}_{1jk}$ ,  $\hat{\beta}_{2jk}$ ,  $\hat{\beta}_{3jk}$  and  $\hat{\beta}_{4jk}$  are regression coefficients of all firm-specific variables from Eq. (3) (*Size*, *Tangibility*, *Growth* and *Liquidity*) for each country and each year.

### 3.5 Reliability

Unreliability in general refers to two main possible problems related with sources of data used and the process of conducting the whole research. In our study data is extracted from reliable sources, i.e Reuters 3000 Xtra database and companies' annual reports. Cross-checking between two sources has also been done to ensure the figures are consistent. Macro factors values are also retrieved from prestigious organizations websites such as World Bank, IMF and Eurostat.

Furthermore, the process of conducting this research is clear, straightforward and consistent, which allows a test or any similar measuring procedure yielding the same result.

Another aspect of reliability is the representativeness of the sample. We included all listed companies from all three stock markets in the Baltics (only financial institutions are excluded). Even though a large part of firms are still out of the loop of the research, these firms also share some main characteristics with the listed ones, especially regarding size

(above 99.6% of all non-financial firms in the Baltic countries are categorized as SME)<sup>3</sup>. Therefore, we believe that our sample is reliable to represent a general financing pattern in the Baltics. This is also consistent with other studies in this topic, since the majority of them analyze only listed firms as well.

As regards to the research process, all regression models have been performed in a cautious manner and tested for OLS assumptions and specification error. Where needed, adjustments for outliers and multicollinearity have been adopted. Residuals appeared to be homoscedastic in all the models). “Appealing to central limit theorem” certain violation of the assumptions, such as data normal distribution, is “virtually inconsequential” for “sufficiently large” samples (Damodar (2002)). Very close explanatory results from nonparametric Wilcoxon model<sup>4</sup> ensures the robustness of the results.

### **3.6 Validity**

Validity refers to stating the “truth” (i.e. that it is real and more or less reflects reality) about the studied topic. There are two principal dimensions regarding validity of our paper: the first dimension concerns the validity of results, which are derived by using an appropriate research technique, ensuring that the findings are reliable and fairly represent the topic being studied. The second dimension regards how we draw our conclusions and interpret the results.

To arrive at an appropriate method of processing the data, we run through several tests including an analysis of firms’ data deviation across the year. We have realized that some variables such as *Leverage* and *Profitability* highly vary in a study period therefore model, built on average of the data, although very common in a study field, would not represent valid results. Instead, we used pooled cross-sectional data with outliers eliminated.

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<sup>3</sup> Source: Eurostat (SBS size class)

<sup>4</sup> Wilcoxon model does not require any particular data distribution and has only one crucial assumption about data symmetry around the median which holds in our data set with chosen variables

There are studies that pool data from different countries into one regression (Booth et al., 2001; Fan et al., 2008). Our findings show that it is not valid to construct a single model with a pool of all three countries which would wrongly assume that cross-country firm-level determinants are equal. Therefore, models and data sets have been carefully chosen after a thorough analysis that aims to ensure the maximum validity of the results.

Objectivity has been the crucial criteria of the analysis of our data and results. Firstly, the analysis aims to merge findings and theory and thus to ensure the impartiality of the discussion. Secondly, the conclusions drawn aspire to be logically derived from the analysis while maintaining an unbiased approach.

## 4. EMPIRICAL FINDINGS AND ANALYSIS

*In this part we will present the findings and analysis at both firm-level and country-level. At country level analysis, direct and indirect impact of country factors to leverage is analyzed. Descriptive statistics of each part is also presented for a general overview of the sample.*

### 4.1. Firm-Level Variables

#### 4.1.1. Descriptive statistics

In the period of 2004-2007, the total debt level in all three Baltic countries varied from 33% in Latvia to 52% in Estonia<sup>5</sup>. In general, these ratios fall in the total liabilities range of 30%-72% in the sample of 10 developing countries in Booth et al. (2001) study. However, debt level in Latvia without lease adjustments accounts to only 19% which indicates that Latvian companies scarcely use borrowed capital. This is consistent with the previous research on the Baltic region (Norvaisiene et al., 2007).

Although previous researchers (Booth et al., 2001, Demirguc-Kunt and Maksimovic, 1999) suggest that in developing countries short term debt plays a more important role than long term debt, this is not the case of listed companies in the Baltic region. In Latvia and Estonia the average portion of STD is very close to LTD (45% and 48% respectively). However, according to our data, Lithuanian companies tend to have a preference for long term debt as 85% of the companies were LTD holders, compared to only 57% STD holders. Also, more than half of the listed companies there involve lease finance (See Table 3). As a result, long term debt in Lithuania represents 66% of total financial debt. This might be due to the fact that in Lithuanian sample there are proportionally more manufacturing companies so they can use their asset as a collateral.

Profitability of Latvian and Lithuanian companies is very similar (about 7% on average), whereas there were no observations of loss in Estonia in a study period; it resulted in a

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<sup>5</sup> if excluding the lease value, total debt to equity ratio in Estonia, Lithuania and Latvia was 44%, 33% and 19% respectively



greater average profitability rate (16.5%).

Regarding size, Latvian listed companies are considerably smaller than Lithuanian and Estonian ones (on average total assets in Latvia amounted to 11 million EUR, whereas 60 million EUR in Lithuania and Estonia). This stems from the fact that in the Latvian sample, there are 37 companies (28.5% of total) that are very small (total asset below 3 million EUR), whereas there are no such observations in Lithuania or Estonia.

	Mean	Median	Std Dev	Minimum	Maximum	Obs.
<b>Latvia(*)</b>						
STDE	0.181	0.099	0.235	0	0.921	130
LTDE	0.151	0	0.238	0	0.918	130
TDE	0.332	0.284	0.574	0	1.452	130
Profitability	0.076	0.068	0.08	-0.173	0.336	130
Size (ln(asset))	2.362	2.024	1.851	-0.324	6.345	130
Tangibility	0.519	0.488	0.192	0.173	0.932	130
Growth op.	0.156	0.114	0.224	-0.191	0.611	130
Tax	0.108	0.087	0.092	0	0.311	130
Risk	-0.093	-0.036	3.716	-12.57	10.459	130
Liquidity	1.918	1.283	5.011	0.224	30.645	130
<b>Estonia(**)</b>						
STDE	0.265	0.151	0.377	0	2.11	51
LTDE	0.257	0.184	0.583	0	2.447	51
TDE	0.522	0.471	0.947	0	3.652	51
Profitability	0.165	0.14	0.099	0.023	0.374	51
Size (ln(asset))	4.403	4.348	1.036	2.455	7.425	51
Tangibility	0.610	0.631	0.227	0.14	0.94	51
Growth op.	0.352	0.277	0.353	-0.058	1.516	51
Tax	0.18	0.159	0.082	0	0.439	51
Risk	0.212	0.159	1.281	-2.083	3.258	51
Liquidity	1.269	0.847	1.251	0.145	5.785	51
<b>Lithuania(***)</b>						
STDE	0.146	0.008	0.262	0	1.196	141
LTDE	0.286	0.202	0.444	0	2.653	141
TDE	0.426	0.297	0.571	0	2.828	141
Profitability	0.075	0.067	0.076	-0.088	0.296	141
Size (ln(asset))	0.109	0.073	0.244	-0.615	1.605	141
Tangibility	0.668	0.704	0.226	0.016	0.966	141
Growth op.	0.279	0.067	0.831	-0.573	4.246	141
Tax	0.123	0.971	0.109	0	0.377	141
Risk	0.303	0.201	5.951	-8.482	7.291	141
Liquidity	1.036	0.886	1.002	0.144	6.372	141

(\*)In 43 observations (33% of total) Latvian companies did not have STD; in 64 observations (49%) did not have LTD or lease and in 38 observations (29%) did not have any kind of debt or lease.

(\*\*)In 7 observations (14% of total) Estonian companies did not have STD; in 11 observations (21%) did not have LTD or lease and in 7 observations (14%) did not have any kind of debt or lease.

(\*\*\*)In 60 observations (43% of total) Lithuanian companies did not have STD; in 21 observations (15%) did not have LTD or lease and in 9 observations (6%) did not have any kind of debt or lease.

*Table 6: Summarized statistics of firm-level variables*

All three countries share a common pattern of tangibility. Median shows that at least half of all the companies have asset tangibility not greater than 60%; fixed asset level varies from 2% to 97% of the total asset, meaning that in all countries there are various business type firms.

Liquidity, calculated as a quick ratio, also shows a common pattern. On average quick asset (cash, marketable securities and account receivables) exceeded current liabilities by a factor of 1.4; that entails a strong liquidity. However lots of companies seem to be extremely liquid, especially in Latvia and Estonia. In the former, 26 companies (20% of total) had a quick ratio higher than 3 and even 8 companies (6%) with the ratio higher than 10; in the latter 8 companies (16%) had a quick ratio greater than 3. In contrary, such a high quick ratio has only 6 (4%) companies in Lithuania. Since the level of quick asset that is considered to be sufficient depends in the industry specificity, we compared extremes mentioned above with the global industry average using Reuters 3000 Xtra. In all cases it appeared that companies in the Baltics sample have a higher quick ratio than the industry average, therefore it shows that a considerable portion of the companies in our sample have idle cash reserves.

In terms of growth, Estonian companies on average had greater opportunities than Lithuanian or Latvian ones; average annual increase in fixed asset in Estonia was 35%, compared to 27% and 16% in Lithuania and Latvia respectively. This is consistent with the findings that on average listed Estonian companies are more profitable, which is usually related to greater growth opportunities as well. In extreme cases, Lithuanian companies increased their fixed asset more than 5 times, in Estonia almost tripled; that indicates a strategy for an aggressive future growth. In contrast, fixed asset change in Latvian companies was moderate therefore we conclude that they are comparably more inclined to remain at their current size. There fixed asset on average increased by 16% and none of the companies raised fixed asset by more than 61%.

Baltic countries adopt a linear tax system. On average, effective tax rate in Latvia, Lithuania and Estonia was 11%, 12% and 18%. Effective tax rate in the study period is quite similar to the existing flat income tax rate in a country. In Lithuania and Latvia, income tax rate in the study period was 15% and it varied between 20% and 24% in Estonia. Given the fact that there are companies that reported loss under the study period and therefore did not pay taxes, a relatively lower mean of effective tax rate than actual tax rate in the countries is observed.

Finally, risk, measured as variability in profitability, is overall greatest in Latvia. At least in half of the observations here annual operating profit decreased by 3.6%, this might be due to a generally less favourable economic environment during the study period. In contrary, EBIT in Lithuania and Estonia on average increased by 25% every year.

#### **4.1.2. Regression results and analysis**

Even though our initial ambition was to establish a model representing the whole Baltic region, the impact of the independent variables is not completely uniform across the countries. For instance, the sign on tangibility is generally positive, but turns out to be negative for total debt ratio in Lithuania. Similarly, the influence of liquidity is significant for all dependent variables in Lithuania but totally irrelevant to those of Estonia. Furthermore, when we run one model all the data of three countries pooled in one, the adjusted- $R^2$  is reduced significantly 3% compared with the range of 7% to 23% of individual models. Compared with models from other papers, our adjusted  $R^2$  is also in the same range, for instance, in Weill, L. (2005) model, the adjusted  $R^2$  are 12% and 3.6% for Western Europe and Eastern Europe respectively, 18% in Fan et al. (2007) model for developing country, from 3% to highest 61% for 42 models in Jong et al.(2008) study of different countries.

	STD/E			LTD/E			TD/E		
	Latvia	Estonia	Lithuania	Latvia	Estonia	Lithuania	Latvia	Estonia	Lithuania
<b>Interception</b>	0.0636	3.2087 ***	1.3386 ***	-0.3085 **	-0.4663	0.877 ***	-0.245	2.742 **	2.216 ***
<i>t-stat</i>	<i>0.41</i>	<i>2.7</i>	<i>4</i>	<i>-2.31</i>	<i>-1.17</i>	<i>4.69</i>	<i>-1.03</i>	<i>2.12</i>	<i>5.21</i>
<b>Profitability</b>	0.4877	-1.2976	-1.5548	-0.282	-0.275	-0.067	0.206	-1.572	-1.622
<i>t-stat</i>	<i>0.84</i>	<i>-0.49</i>	<i>-1.43</i>	<i>-0.56</i>	<i>-0.31</i>	<i>-0.11</i>	<i>0.23</i>	<i>-0.54</i>	<i>-1.17</i>
<b>Size</b>	-0.0197	-0.6669 ***	-0.0030	-0.053 **	0.115	-0.158 ***	-0.073	-0.552 **	-0.161
<i>t-stat</i>	<i>-0.69</i>	<i>-3.06</i>	<i>-0.04</i>	<i>-2.11</i>	<i>1.57</i>	<i>-4.21</i>	<i>-1.63</i>	<i>-2.32</i>	<i>-1.88</i>
<b>Tangibility</b>	0.5792 **	1.0934	-0.9459 ***	1.356 ***	0.876 **	0.468 **	1.936 ***	1.969	-0.478
<i>t-stat</i>	<i>2.34</i>	<i>1</i>	<i>-2.62</i>	<i>6.33</i>	<i>2.37</i>	<i>2.32</i>	<i>5.07</i>	<i>1.65</i>	<i>-1.04</i>
<b>Default risk</b>	-0.0025	-0.0169	0.0164	-0.002	0.000	0.011	-0.0047	-0.017	0.027
<i>t-stat</i>	<i>-0.46</i>	<i>-0.41</i>	<i>1.09</i>	<i>-0.46</i>	<i>0.01</i>	<i>1.26</i>	<i>-0.56</i>	<i>-0.37</i>	<i>1.41</i>
<b>Liquidity</b>	-0.0186 *	-0.0574	-0.2295 ***	-0.0045	-0.084	-0.141 ***	-0.0232	-0.141	-0.371 ***
<i>t-stat</i>	<i>-1.81</i>	<i>-0.32</i>	<i>-2.93</i>	<i>-0.5</i>	<i>-1.38</i>	<i>-3.23</i>	<i>-1.46</i>	<i>-0.72</i>	<i>-3.72</i>
<b>R-Squared</b>	0.1054	0.2661	0.0962	0.2625	0.2367	0.1918	0.2198	0.2687	0.1271
<b>Adj. R-Sq.</b>	0.0694	0.1863	0.0628	0.2328	0.1537	0.1619	0.1883	0.1892	0.0947
<b>F (p value)</b>	2.92 (0.0157)	3.34 (0.0118)	2.88 (0.0169)	8.83 (<.0001)	2.85 (0.0252)	6.41 (<.0001)	6.99 (<.0001)	3.38 (0.0111)	3.93 (0.0023)
<b>No.of obs.</b>	129	51	140	129	51	140	129	51	140

\*, \*\* and \*\*\* indicate statistical significance at 1%, 5% and 10% level, respectively. T-statistics are reported in *italics*. Obs. is the number of firms per country in the regressions. Adj.R-Sq is the value of adjusted-R2 for the regression.

**Table 7: Firm-level regression results, estimated from Eq. (2)**

The overall results at firm-level determinants give a varied impression. While *Tangibility*, *Size* and *Liquidity* show a significant relationship to leverage across the sample, *Profitability* and *Default risk* appear to be unrelated to capital structure in the Baltics. In a paper by Norvaisiene et al. (2007), there is no relationship between debt and *Profitability* identified in the Baltics, only a clear pattern is found in Estonia that *Profitability* is *negatively* related with debt (Seppa, 2007). Our strongest finding is the influence of *Tangibility* to debt maturity structure across countries. We found a significant *positive* relationship of *Tangibility* to long-term debt. This confirms the collateral role of tangibility, especially to long-term debt. The result consistent with other empirical evidence in developing market (Fan et al., 2008; Weill, 2002; Jong et al. 2008; Mitton 2007) and in Estonia in particular (Seppa, 2007, Norvaisiene et al., 2007). However, our evidence goes against Booth et al. (2001) assumption that collateral value is weak in developing market as they are more dependent on short-term debt and trade credit. The revealed relationship is in line with the prediction from the perspective of agency cost and trade-off model.

Latvia is the only country where an increase in tangible asset has a positive effect on all kinds of debt ratios indicating a high employment of tangible asset to corporate financing purpose. Lithuania is documented with an opposite effect of tangibility to short-term debt and long-term debt as negative and positive respectively showing the substitution of long to short-term debt and once more time confirming the collateral role of tangibility. The result is consistent with descriptive statistic that Lithuania is the only country in the Baltics having long-term debt higher than short-term debt (long-term debt account for 66% of total debt). This also shows the maturity matching purpose of firm in their financing, as suggested in a Booth et al. (2001) study. The relationship of asset tangibility to short-term debt and total debt ratio is statistically insignificant in Estonia which is consistent with evidence in the study of Seppa (2007).

The negative relationship of *Size* to leverage has been shown to be consistent where it appears, in line with previous evidence of negative relationship in some developing markets like Eastern Europe (Mateus, 2005), Czech Republic and Poland (Weill, 2002), and the Baltics (Norvaisiene et al., 2007). With this negative impact, the relationship between firm *Size* and leverage in the Baltics appears to be favouring the prediction of Pecking order that the larger the firm, the bigger the internal resources which will be exploited first for financing

purpose. They also tend to have higher information disclosure then will result in a relatively lower cost of external equity financing compared with smaller companies, thus reducing the level of debt. The result appears to some extent to indicate that the stock market development in the Baltics facilitates the external financing of large firms. However, there was no consistent pattern across three countries. For instance, only in Estonia, *Size negatively* influences short-term debt and total debt ratios, whereas this relationship appears to be irrelevant in the other two countries. In contrast, there is no relationship found between long-term debt and *Size* in Estonia but a strong *negative* to long-term debt is documented in Latvia and Lithuania.

Similar to the effect of *Size* to leverage, the *Liquidity* ratio also shows a consistent negative coefficient to all leverage ratios wherever it appears (i.e. Lithuania). Even though profitability is ambiguous in terms of explaining capital structure, the negative relation between liquidity and leverage somehow confirms the Pecking order theory in Lithuania which postulates that firms would use liquid asset (accumulated cash and other liquid assets) to serve as an internal source of fund before opting for external debt. The result in Lithuania is consistent with the study of Mateus, C. (2005) in developing countries group (Eastern Europe and Latin America) that more liquid firms choose less debt both in short-term and total ratio. The papers in the Baltics have not included this ratio in their study. We also found no support for this relationship neither in Estonia, nor in Latvia.

As mentioned in the methodology part, we eliminated *Growth opportunity* from the model due to the high correlation with *Size*. However, the influence of growth to leverage in the Baltics is worth mentioning here as it shows statistic significance across countries when we run regression (Eq. (2)) with *Growth opportunity* instead of *Size*. A consistent and statistically negative relationship is observed between leverage and growth opportunity, which is in line with the prediction of the Agency cost model that firms with high growth opportunity will have less debt under both the assumption of under-investment problem and the asset substitution problem. Growth opportunity influences all three ratios of leverage in Latvia whereas this relationship is vague in Estonia. This evidence is observed only with long-term debt and total debt ratio in Lithuania.

## 4.2. Country-Level Variables

### 4.2.1. Descriptive statistics

In order to make the reader acquainted with the Baltic region, we provide a summarized statistics of the macro- level factors. However, our research requires a more comprehensive knowledge about the macro situation in the studied countries therefore in this section we incorporate a relevant region overview as well.

	Mean	Median	Min	Max
GDP growth, %	8.91	8.80	6.30	12.20
Inflation,%	5.13	5.10	1.20	10.10
Interest rate, %	4.91	4.04	2.67	11.68
Corruption index	5.19	4.80	4.00	6.70
Stock development	0.24	0.26	0.09	0.47
Banks development	0.30	0.30	0.24	0.36
Financial openness	0.04	0.03	0.01	0.16

*Table 8: Summarized statistics for country level variables*

In a study period all three Baltic countries' GDP was growing constantly every year until a slowdown due to economy cyclicity which in Latvia and Estonia changed the trend from the year 2007.

Rapid GDP growth is one of the main characteristics of the emerging market. We also compared GDP growth with other 8 emerging European countries; none of them had a quicker GDP growth over the period 2004-2007. Average annual GDP growth in the Baltic countries was 8.9%, whereas in the set of analyzed developing countries – 6.1%.

Inflation rate in all three counties was constantly increasing during a study period and reached a considerably high level of about 5% in the year 2007. High inflation is also a characteristic of emerging markets; it is usually a consequence of a rapid economic growth.

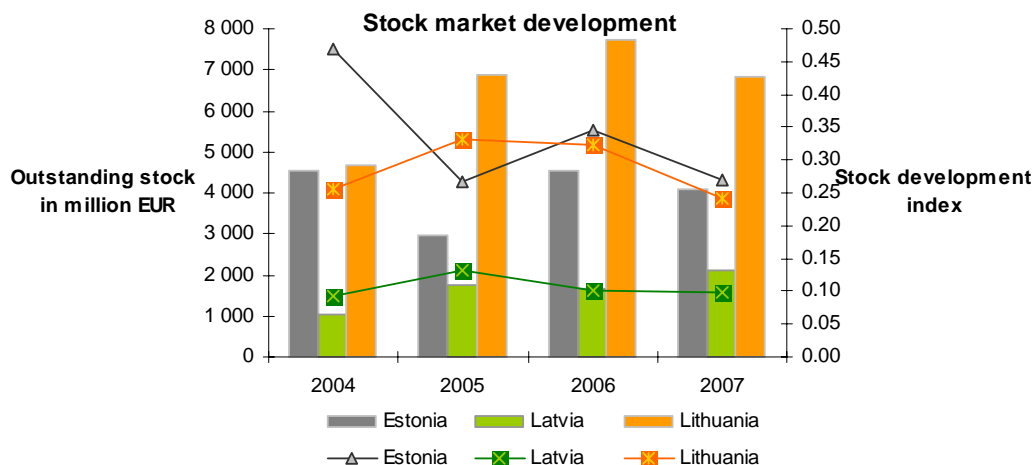
We used 1 year inter-bank rates in local currency, i.e. VILIBOR, RIGIBOR and TALIBOR for interest rates in Lithuania, Latvia and Estonia respectively. TALIBOR and VILIBOR every year was very similar (from 3% in 2004 to 7% in 2007), whereas in Latvia the rates have always been higher and in 2007 reached a 11.68% level. In 2007 in Latvia there were

intensive rumours about devaluation of local currency lat, thus by keeping high RIGIBOR the Bank of Latvia aimed to protect lat from speculations and at the same time slow down the consumption boom and growth of inflation rate (BBN).

Corruption level in all three countries decreased very slightly year by year. From the beginning of the study period till the end corruption has been least severe in Estonia (on average 6.4, where 10 means “no corruption at all”), whereas in Lithuania and Latvia corruption index was on average 4.6. Quite a high index value indicates that existing legal reinforcement was not sufficient; that is usually a concern of the outside investors.

Stock markets in the Baltic countries were set up and developed approximately a decade ago. This is a common time duration of stock exchange existence for all emerging Europe countries that belonged to the Soviet Union. Generally stock exchanges were established a couple of years after regain of independence, due to the increasing number of equity issues and massive privatization in particular. However, Baltic stock market capitalization remained quite a moderate level with a market value of shares outstanding accounting to approximately 5 billion EUR (30% of GDP) in Estonia, 4.5 billion EUR ( 28% of GDP) in Lithuania and 1.8 billion EUR (11% of GDP) in Latvia. One of critical factors of moderate stock development could be that from the beginning of the stock exchange legal and regulatory environment was not sufficient – there was inadequate minority shareholder protection, in general weak supervision over the financial sector (for instance, insider trading existed) (Alar, 1998). In a study period regulatory institutions already functioned on a standardized European Union framework. However, quite a high corruption level in the region (See Section 4.2.1.) might result in concern of outside investors which possibly deter them from investing to certain extent. The obvious factor limiting the stock market expansion (in terms of size and role) is the modest size of the economy, depressing both, the demand and supply side of securities; as a result stock market in the Baltic states is illiquid and therefore fair pricing of stocks should be questioned.





Banks development shares a very common pattern in all three Baltic countries with the bank's asset and liabilities approximately accounting for 30% of GDP. Lending has developed in the Baltic countries starting from a very low baseline; thus the rapid growth on annual basis (for instance in Latvia in 2007 - 37%, in 2006 - 56% <sup>6</sup>) is due to the very low initial position. Furthermore, such a high lending growth should be related with a booming real estate market during the whole study period that influenced an extremely rapid growth of housing loans, not for corporate financing. In only four years (2004-2007) in all Baltic countries real estate and lending market saturation became typical on average figures of European markets and could be regarded as a very high rate. <sup>7</sup>

In the Baltic countries, national policies have been changed during a study period in the direction of greater openness to foreign direct investments (FDI) WIR (2008), so that domestic firms could raise capital in both domestic and foreign sources. As a result inward and outward FDI consistently increased. On average inflow FDI value in the Baltic countries increased 2.86 times from 2004 to 2007. This is very close to the average in transition economies - 2.84. <sup>8</sup> As typically for emerging markets, in the Baltic countries the greatest

<sup>6</sup> Source: Annual Report of the Financial and Capital Market Commission of the Republic of Latvia for 2007

<sup>7</sup> Source: The Securities Commission of the Republic of Lithuania, Capital Market Commission of the Republic of Latvia and Estonian Financial Supervisory Authority

<sup>8</sup> according to United Nations categorization transition economies are South-East Europe and the Commonwealth of Independent States

proportion of FDI flow belongs to inward investments (on average 83%). The latter is to a high extent associated with privatizations process in a study period.

## 4.2.2. Regressions results and analysis

### 4.2.2.1. Direct impact

		STD/E: dummy coef.	Std.coef <sup>9</sup>		LTD/E: dummy coef.	Std.coef		TD/E: dummy coeff.	Std.coef
Intercept		2.7054	0		-0.4696	0		2.2358	0
	<i>t-stat</i>	<i>0.34</i>			<i>-0.23</i>			<i>0.25</i>	
GDP		1.7382	0.7100 *		0.4997	0.9210 *		2.2379	0.7803 *
	<i>t-stat</i>	<i>2.04</i>			<i>2.27</i>			<i>2.36</i>	
StockDev		29.4645	0.8473 **		7.3277	0.9508 **		36.7922	0.9032 ***
	<i>t-stat</i>	<i>3.04</i>			<i>2.92</i>			<i>3.39</i>	
BankDev		-85.1871	-0.7831 **		-9.2972	-0.7991 *		-104.4513	-0.8197 ***
	<i>t-stat</i>	<i>-2.37</i>			<i>-2.07</i>			<i>-2.6</i>	
Openness		-59.2756	-0.6477 **		-6.0546	-0.3881		-67.1475	-0.6263 **
	<i>t-stat</i>	<i>-2.53</i>			<i>-1.3</i>			<i>-2.57</i>	
<b>R-Squared</b>		<b>0.73</b>			<b>0.64</b>			<b>0.73</b>	
<b>Adj. R-Sq.</b>		<b>0.54</b>			<b>0.38</b>			<b>0.58</b>	
<b>F (p-value)</b>		4.18 (0.0484)	**		3.27 (0.0909)	*		4.76 (0.0358)	**

\*, \*\* and \*\*\* - significant at the 10, 5 and 1 percent respectively. No. of obs. 12  
t-statistics are defined in *italics*.

**Table 9: Direct impact of country-level factors**

Despite the limited observations of country factors in the sample, the adjusted R-Square varied from 38% to 58%. This is fairly similar to that of the Jong et al. (2008) model of above 50%. Such a high result indicates that country level factors have a significant high explanatory power to a firm level model interception in Eq. (3), i.e. to a part of a linear model which is not explained by firm-level determinants.

The regression results show that corporate leverage is directly related to all the remaining country-specific factors in the table above, namely *GDP growth*, *Stock development*, *Bank development* and *Financial openness*. These factors consistently show a statistically significant impact on capital structure. According to standardized coefficients, in all models the stock development is the most important while making leverage decisions; fairly less important are GDP growth and bank development and least important – financial openness.

<sup>9</sup> we estimated standardized coefficients as different units of measurement of explanatory variables has been used (See Table 8)

The *GDP growth* rate variable positively influences all corporate leverage ratios. This result is consistent with Jong et al. (2008) study. A possible implication of this coefficient sign is that the higher the rate of economic growth, the more willingly firms use debt to finance their investments, especially in emerging markets where the economic growth is more aggressive, offering greater chance of expansion or investment. The relationship of *Stock market development* to leverage is clear and intuitive, as reflected through the significant negative relationship across all ratios. This result seems to be consistent with the assumption above (in *Size* variable) about the role of stock markets in facilitating firms with external equity. However, surprisingly, the coefficient sign of the *Bank development* variable to leverage appears to indicate that bank development does not enhance the debt level of firms. The possible reasons that we might advance to explain this phenomenon is that 2004-2007 is the exact time period in the Baltic of a continuous and rising real estate boom (more details are in section 4.2.1.). Therefore, bank development might not reflect increased variety and accessibility of debt products for corporate customers. In the study of debt in emerging markets by Mitton (2007), he also found a very weak association of credit market development with increased leverage while in Fan et al. (2008) and Jong et al. (2008) the result was the opposite. Similarly to firm-level factors, the influence of macro factors to firm leverage is also case-specific and is characterized by certain behaviors and conditions of its environment like our case. *Financial openness* is negatively associated with both short-term and total debt ratio, possibly indicating that the availability of foreign financing decreases the use of leverage. Our result is contrasting the findings of Mitton (2007) but to a great extent, it can be explained by the fact that in section 4.2.1, foreign investments are largely associated with privatization process in a study period (WIR, 2008).

We found no association between inflation and interest rate with neither leverage nor maturity structure, which is consistent with the study of Fan et al. (2008).

#### **4.2.2.2. Indirect impact**

In this section of the study, we will analyze country-level factors by examining to what extent they can influence the importance of firm determinants (i.e. how they enhance or reduce the coefficient of firm-factors to leverage). For instance, if the predicted relationship of firm's *Size* to leverage has the same sign as the coefficient of *Stock market development* to the *Size* then it indicates that stock development strengthens the importance of *Size* to capital structure decision.

In order to get a decent measure of the model explanatory power, we also ran a regression (Eq. (6)) with significant variables only (See results in Table 10). The model explaining *Stock market development* impact on *Size* importance to leverage is significant at 1% level and has an adjusted R-Square of 56%. Whereas for the model explaining *Financial openness* impact on *Tangibility*, the importance to leverage is significant at the 10% level and has an adjusted R-Square of 20%. This is also in a line with a Jong et al. (2008) where the range of adjusted R-Square is 12-60%. The results show that country specific variables, namely *Financial openness* and *Stock market development*, to a considerable extent effect a capital decision indirectly.

The overall results indicate that indeed country-specific factors do not only exert a direct impact on leverage, but influence indirectly as well. Due to a similar pattern of the results from regressions built on STD, LTD and TD firm-level models (Eq. (6)), we present the results showing macro factor importance to the specific firm variables in the TD model only.

We found that *Stock market development* has a significantly negative effect on *Size* coefficient. This indicates that the more the stock market is developed, the stronger the importance of firm size to the leverage choice of firms. This phenomenon can be explained from the perspective of pecking order theory. If firm size is a proxy for the level of information asymmetry, then a larger firm tends to be exposed to less information asymmetry. And this information asymmetry problem is related to the development of stock markets as well. Therefore, when stock markets reach a more advanced stage of development, bigger listed firms tend to be subject to evermore stringent legislation to disclose information, and thus face a lower adverse selection cost of issuing equity than small firms. Hence, they are more likely to opt for equity financing than debt financing. As a result, the negative effect of firm size to leverage would be enhanced.

We also observe that *Financial openness* indirectly influences leverage through a significant negative impact on the *Tangibility* coefficient to leverage. This indicates that the more open the economy is to foreign capital, the weaker the importance of tangible asset to the leverage choice of firms. In the direct effect section, the identified negative relationship of financial openness seems to explain that inward FDI flows into the equity market rather than into the debt market as credit. Therefore in the case of the Baltic region, if financial openness increases, then the importance of tangibility as collateral is lessened, as availability of equity is increased.

We found no support that *GDP growth* or *Bank development* would have any impact on the importance of *Size*, *Tangibility* or *Liquidity* to leverage. Also, the role of liquidity seems to be unaffected by the country specific factors analyzed.

		Size TD/E	Tangibility TD/E	Liquidity TD/E
Interception		-0.08303	0.55034	-0.47127
	<i>t-stat</i>	<i>-0.30</i>	<i>0.45</i>	<i>-0.71</i>
GDP		-0.00182	0.00691	0.02723
	<i>t-stat</i>	<i>-0.30</i>	<i>0.05</i>	<i>0.38</i>
StockDev		-0.18361 **	-3.63273	-0.00847
	<i>t-stat</i>	<i>-2.55</i>	<i>-1.42</i>	<i>-0.01</i>
BankDev		-0.35015	3.07595	0.06517
	<i>t-stat</i>	<i>-0.28</i>	<i>0.55</i>	<i>0.02</i>
Openness		2.22853	-8.59750 *	1.24473
	<i>t-stat</i>	<i>1.26</i>	<i>-2.38</i>	<i>0.64</i>
R-Squared		0.6326	0.7276	0.1367
Adj. R-Sq.		0.4226	0.5719	-0.3566
F (p-value)		3.01 (0.0966)	4.67 (0.0374)	0.28 (0.8838)

**Results of regression with significant variables only**

R-Squared	0.6003	0.27
Adj. R-Sq.	0.5603	0.20
F (p-value)	15.02 (0.0031)	3.65 (0.0852)

\*, \*\* and \*\*\* - significant at the 10, 5 and 1 percent respectively.

No. of obs. 12, t-statistics are defined in *italics*

**Table 10: Indirect impact of country-level factors**

## 5 CONCLUSION

The initial ambition at the onset of our research was to address all the shortcomings of existing paper in the Baltic and to draw a holistic picture of regional firms' financing choice. This aim was reflected in a three-fold agenda: firstly to investigate the impact of firm-specific variables to leverage, secondly, the direct and indirect influence of country factors to leverage and thirdly, to construct a survey instrument to understand the perception of CFOs when making financing decisions. Under these three main tasks, our methodology in dealing with the data is also enhanced to ensure a more reliable result. This includes utilization of the lease capitalization technique and generally the way we build the model. Even though we were forced to abandon our survey as a consequence of a low response rate of what was already a small sample, making it impossible to extract patterns or generalizations, we still believe that the result of our research characterizes the financing pattern in the Baltic in a fairly rich and complete way.

At the firm-level, we first found out that it is not possible to build a model representing the whole Baltic, despite the fact that the three countries share many similar characteristics. This, confirms our initial understanding that even though the topic is widely tested, using evidence from one market to explain what variables influence the financing choice in another market is not necessarily applicable. The main pattern that is consistent between the three countries in the Baltic is the important role of tangible assets as collateral value when firms increase their leverage. This result is coherent with the prediction of the conventional agency cost theory. Other firm-level variables such as *Size*, *Liquidity* and *Growth opportunity* influence leverage of each country to different extents but are consistent in the direction of causality. On the other hand, we also observed that some variables failed to explain the financial decisions made by firms in the Baltic, such as *Profitability*, effective tax rate and default risk. While both the pecking order theory and the agency cost model appear to have some explanatory power as regards firm financing behaviour in the Baltics, the trade-off model appear to be less related given the indeterminate impact of the tax effect. The low descriptive power reflected through the adjusted-R2 in our model, as well as the majority of models on other research on this topic, indicates that, apart from firm-level variables, there are many other factors influencing corporate financing which are not incorporated in this kind of study possibly such as macro (or) and institutional factors.

This reasoning leads us to the next step in analyzing how country factors affect firm leverage. Having analyzed the impact of country factors on leverage, the direct impact suggests that similar to other parts of the world, GDP growth, stock market development, bank development, financial openness in the Baltic do influence corporate capital structure one way or another. Even though bank development is not working in the same manner with conventional prediction, we believe this effect might be specific only for this study period since study year is strongly related with the boom in real estate and household lending; we assume that in the long term, the role of bank would be more profound to firm financing. We found that stock market development and financial openness consistently impact leverage of firms in the Baltic, both directly and indirectly. The findings imply that the stock market here did play a role in determining leverage of firms in the Baltic, such that when it is more developed, firms are more likely to reduce debt. Likewise, a decreased level of leverage is expected when the country is more open to foreign capital. We also found that the influence of firm level determinants to corporate financing is also reinforced.

Even though the topic of understanding financing behaviour of firms is interesting and attracts a lot of academic research, country level or cross-country level research is rarely able to draw a specific implication for the practitioner, rather it serve the interests of the academic domain. Therefore, quite a general implication might emerge from this study. More specifically, the findings on the effect of institutional factors to capital structure to some extent result in an unexpected role for financial institutions (i.e. the banks) in providing capital to corporations in Baltic. While feeding the needs of the private customer segment, the firm segment seems to be somehow forgotten. At the same time, firms have more choice in their equity finance through a positive inflow of foreign capital (the pattern in the Baltic is quite clear as opposed to in other emerging markets). The two events would suggest that maybe the banking sector in the Baltic should reinforce its role as a capital supplier to the corporate sector to capture all business opportunities. However, to confirm this, detailed research into the matter would be needed.

In conclusion, even though the low descriptive power of firm-specific models is to some extent compensated by the country factor model, we believe that many others factors beside financial and macro variables are still undefined and tested. As was our original intention, a survey would give more insight into this subject. Clearly, the high response rate which would be required to be able to draw clear and significant patterns from a small sample is very difficult to obtain. However, a significant larger sample including private firms (like the

sample of Seppa, R. 2007) may solve this problem as a lower response rate would still be acceptable to have representative and reliable data. Also, to identify potential hidden explanatory factors determining firm leverage, it would be interesting to approach the subject qualitatively, namely by interviewing CFOs to unveil more drivers behind their decisions.



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## 7 APPENDIX

Latvia	Profitability	Size	Tangibility	Tax	Risk	GrowthOp	QuickRatio
t-statistics are defined in <i>italic</i>							
<b>Profitability</b>	1						
<b>Size</b>	0.01954 <i>0.8253</i>	1					
<b>Tangibility</b>	0.15156 <i>0.0852</i>	0.40784 <i>&lt;.0001</i>	1				
<b>Tax</b>	0.12673 <i>0.1508</i>	-0.1245 <i>0.1582</i>	-0.05756 <i>0.5154</i>	1			
<b>Risk</b>	0.16165 <i>0.0661</i>	0.19046 <i>0.03</i>	0.12258 <i>0.1647</i>	0.01584 <i>0.858</i>	1		
<b>GrowthOp</b>	0.09063 <i>0.3051</i>	<b>0.71833</b> <i>&lt;.0001</i>	0.41216 <i>&lt;.0001</i>	-0.06731 <i>0.4467</i>	0.30298 <i>0.0005</i>	1	
<b>Liquidity</b>	-0.24884 <i>0.0043</i>	-0.26264 <i>0.0025</i>	-0.31116 <i>0.0003</i>	0.04938 <i>0.5769</i>	-0.02477 <i>0.7797</i>	-0.10062 <i>0.2547</i>	1

**Table 11: Pearson correlation matrix for firm level explanatory variables in Latvia**

Estonia	Profitability	Size	Tangibility	Tax	Risk	GrowthOp	QuickRatio
t-statistics are defined in <i>italic</i>							
<b>Profitability</b>	1						
<b>Size</b>	0.243 <i>0.0826</i>	1					
<b>Tangibility</b>	-0.2603 <i>0.0623</i>	-0.10625 <i>0.4534</i>	1				
<b>Tax</b>	0.40183 <i>0.0031</i>	0.22735 <i>0.105</i>	-0.17728 <i>0.2087</i>	1			
<b>Risk</b>	0.36054 <i>0.0086</i>	-0.20309 <i>0.1487</i>	-0.05069 <i>0.7212</i>	0.0493 <i>0.7285</i>	1		
<b>GrowthOp</b>	-0.12473 <i>0.3783</i>	0.42402 <i>0.0017</i>	0.25798 <i>0.0648</i>	-0.30706 <i>0.0268</i>	-0.31055 <i>0.025</i>	1	
<b>Liquidity</b>	0.45386 <i>0.0007</i>	0.31275 <i>0.024</i>	-0.39975 <i>0.0033</i>	<b>0.60572</b> <i>&lt;.0001</i>	0.04311 <i>0.7616</i>	-0.12365 <i>0.3825</i>	1

**Table 12: Pearson correlation matrix for firm level explanatory variables in Estonia**

Lithuania	Profitability	Size	Tangibility	Tax	Risk	GrowthOp	QuickRatio
t-statistics are defined in <i>italic</i>							
<b>Profitability</b>	1						
<b>Size</b>	-0.13485 <i>0.1109</i>	1					
<b>Tangibility</b>	-0.18829 <i>0.0254</i>	0.47787 <i>&lt;.0001</i>	1				
<b>Tax</b>	0.0583 <i>0.4916</i>	-0.18474 <i>0.0283</i>	-0.13445 <i>0.1119</i>	1			
<b>Risk</b>	0.21794 <i>0.0094</i>	0.35326 <i>&lt;.0001</i>	0.19234 <i>0.0223</i>	-0.04189 <i>0.621</i>	1		
<b>GrowthOp</b>	-0.15646 <i>0.0639</i>	0.42224 <i>&lt;.0001</i>	0.33116 <i>&lt;.0001</i>	-0.00356 <i>0.9666</i>	0.00693 <i>0.935</i>	1	
<b>Liquidity</b>	0.12671 <i>0.134</i>	-0.02478 <i>0.7705</i>	-0.238 <i>0.0045</i>	0.30353 <i>0.0003</i>	0.20017 <i>0.0173</i>	-0.2385 <i>0.0044</i>	1

**Table 13: Pearson correlation matrix for firm level explanatory variables in Lithuania**

Growth opportunities				Size			
Model where significant	Partial R-Square	Model R-square	% of model R-square	Model where significant	Partial R-Square	Model R-square	% of model R-square
Latvia: STDE	0.022	0.1173	19%	Estonia: STDE	0.2176	0.2713	80%
Estonia: STDE	0.0536	0.2713	20%				
<b>Total</b>			<b>19%</b>	<b>Total</b>			<b>80%</b>

**Table 14: STDE model: Growth opportunities and Size explanatory power relatively to the whole model**

Growth opportunities				Size			
Model where significant	Partial R-Square	Model R-square	% of model R-square	Model where significant	Partial R-Square	Model R-square	% of model R-square
Latvia: LTDE	0.0699	0.3004	23%	Lithuania: LTDE	0.0626	0.1819	34%

**Table 15: LTDE model: Growth opportunities and Size explanatory power relatively to the whole model**

Growth opportunities				Size			
Model where significant	Partial R-Square	Model R-square	% of model R-square	Model where significant	Partial R-Square	Model R-square	% of model R-square
Latvia: TDE	0.061	0.2481	25%	Estonia: TDE	0.1551	0.24	65%
Lithuania: TDE	0.0337	0.1107	30%				
<b>Total</b>			<b>26%</b>	<b>Total</b>			<b>65%</b>

*Table 16.: TDE model: Growth opportunities and Size explanatory power relatively to the whole model*