AN EMPIRICAL INVESTIGATION OF THE FIRM- AND COUNTRY-SPECIFIC DEBT DETERMINANTS IN FOUR NORDIC COUNTRIES

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Abstract. This work adds to the debate on the determinants of debt-equity mix providing new insights for four Nordic countries - Denmark, Finland, Norway and Sweden, less studied in the existing literature. Using a sample of 79 companies from Nasdaq Omx Nordic Index for the period 1995-2014, and a panel data approach, we draw on a complex set of firm- and country- specific variables to find the determinants for the total debt and, respectively, for the long-term debt ratios. Our results support the hypothesis that the regulatory quality is the most important determinant for both types of leverage, next to the domestic credit to private sector as percentage of GDP. Regarding the firm-specific factors, the tax implications of debt are an important determinant. The substitution effect seems to be not applicable for the Nordic firms due to the positive relation between the leverage and the non-debt tax shield, whatever the measure for the leverage is analysed. We also find that companies with high volatility in earnings have a higher risk of bankruptcy and borrow less than others. We reinforce that profitable companies avoid debt, and that large companies are more indebted than the small ones.

1. INTRODUCTION

A substantial literature is devoted to the debt-equity mix and to the determinants of capital structure. Various theories try to explain the differences between firms' capital structures, over time or across regions. Although there is a vast literature on the determinants of capital structure for developed countries and in the recent years also for developing ones, there are few studies for Nordic countries (Denmark, Finland, Norway and Sweden). These countries are an interesting study case because they have economies which have rapidly grown from emerging to modern economies, and are highly industrialized, as well as worldwide competitive. Their development was boosted by both strong democratic tradition and monetary stability. Also, the institutional development followed similar patterns in the Nordic countries, the state and the public sector playing an important role in their economic development.

According to Moody's Ratings, Denmark stands among the countries with the highest credit score (AAA), which would give it easy access to debt financing, at low interest rates. Moreover, Denmark also has a high score of the index developed by World Bank, regarding the strength of legal rights, indicator which measures the degree for which collateral and bankruptcy laws protect the rights of borrowers and lenders. Finland has a highly industrialized economy, with a competitive financial sector and a credit score lower than Denmark, but still high (AA). Sweden is an export-oriented economy, focused on hydro-energy and iron ore activity, where

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most companies are privately owned. Sweden also has a high credit score (AAA) and a strength of legal rights index with a result of 6 out of 12. Furthermore, Norway has an economy based on oil exploration. The low level of the strength of legal rights index (5 out of 12), indicates that firms may have difficulties in raising debt financing, in comparison to other Nordic countries.

In this paper, a wide range of leverage determinants are investigated for the above mentioned Nordic countries. To the best of our knowledge, little research is done for the Nordic countries, which focuses on emphasizing the influence of several firm specific and also country specific determinants of leverage. Song (2005) focuses only on Sweden, Brunzell et al. (2015) examine all the Nordic countries, whereas De Jong et al. (2008), Fan et al. (2012) or Baxamusa and Jalal (2014) include Denmark, Finland, Norway and Sweden in their analysis along with other states. Our paper is based on a comprehensive set of variables which are analysed over a twenty years' period. Similar analysis periods on Nordic countries are reached by Fan et al. (2012), which extracted information covering only sixteen years, followed by a twelve years observations' sample collected by Demirguc-Kunt and Maksimovic (1999).

Drawing on a sample of 79 companies from NASDAQ Omx Nordic Index, containing the most traded companies on the stock exchanges from Copenhagen, Helsinki, Stockholm and Oslo, we analyse the determinants of long-term debt ratios and total debt ratios for the 1995-2014 period. The analysed time span includes not only the periods of economic boom for these countries, but also one of economic recession (2008–2009).

Our results can be useful for practitioners, as well as for academics. Both managers of listed companies and investors may be interested in the influence of firm-specific and country-specific determinants to establish the most appropriate management and investment strategies, in order to take optimal capital structure decisions or to maximize their own wealth. It is well-known that the cost of capital can help companies obtain competitive advantages on the market. If they have the purpose of minimizing the cost of capital, it seems to be relevant to know the potential determinants of an optimal capital structure.

From our empirical estimations, we find evidence in support of the significant role of both firm-specific and country-specific factors in affecting the debt-equity choice in four Nordic countries. We find a positive relation between leverage (for both leverage measures used in our models) and the size of company, non-debt tax shields, the inflation rate and the domestic credit to private sector (% of GDP). Return on assets (ROA), the volatility of earnings, the economic growth and the regulatory quality are negatively related to both debt ratios. Therefore, we prove that profitable firms are less indebted. For both tangibility and liquidity ratios, the signs of the correlations with debt are different depending on the measure of debt ratio used. Larger firms, with diversified activities can more easily obtain bank loans. Also, we find that Nordic companies choose to use both the non-debt tax shields and the debt tax shields as fiscal advantages which impact the level of net income and implicitly, the level of debt. Tangible assets can be used as collaterals for financial debts, and companies with a low level of tangibility ratio could have limited access to financial debts, short-term debts being the only solution for external financing through debt. A friendly macroeconomic environment and a high level of regulatory quality favour the profitability of the Nordic firms and the internal resources might be preferred to the external ones.

Some of the previously mentioned variables are less studied in the existing literature (the volatility of earnings, the non-debt tax shields, the domestic credit to private sector as percentage of GDP and the regulatory quality indicator) and testing their influence on the leverage of the Nordic firms represents another novelty of our study.

The rest of the paper is structured as follows. In Section 2, the most important studies on capital structure are reviewed, as regards both firm specific and country specific determinants. Section 3 describes the methodology and data. The results are discussed in Section 4. Finally, Section 5 concludes the study.

2. LITERATURE REVIEW

2.1. **Related literature regarding the firm-specific determinants of corporate capital structure.** Up to now, the literature in this field is plentiful of empirical studies which proves that the debt-equity choice is relevant for the value of invested capital and the leverage is determined both by firm-specific and country-specific determinants (e.g. Cook and Tang, 2010). This section briefly discusses some of these firm-specific variables which can affect the debt-equity mix, taking into consideration the peculiarities of the main theories in this field. Some of them have been extensively studied in the existing literature, but there are others which were not sufficiently investigated.

Thus, the trade-off theory suggests a positive relationship between profitability and leverage because high profitability encourages the use of debt, which provides gains from the debt tax shields (Demirguc-Kunt and Maksimovic, 1999; Brunzell et al., 2015). However, in the existing literature the results are mixed. According to the pecking order theory, profitable firms prefer internal finance, and when those resources are insufficient, external financing through debt will be used. Consequently, a negative relationship between profitability and leverage can be expected (Rajan and Zingales, 1995; Booth et al., 2001; Chen, 2004; Song, 2005; Gonzales and Gonzales, 2008; De Jong et al., 2008; Bhaird and Lucey, 2014).

Regarding the firm's age variable, in the existing literature the results are also mixed. On the one hand, some empirical evidence emphasize that the older a company is, more debt would be expected. In order to maintain and expand their market shares, older enterprises with greater business experience, are using more debt over time. This relation is also supported by De Haas and Peeters (2006), Gill (2014) and Brunzell et al. (2015). They emphasize that, in transition economies, older firms on the market can easier obtain funds from creditors due to a lower level of asymmetric information, as well as a good market reputation. Companies from countries with bank-oriented financial system can develop long business relationships with creditors, thus enhancing their chances to attain long-term debt finance. On the other hand, „the longer a firm survives in business, the more profits it can accumulate and subsequently use it to replace debt financing" (Nivorozhkin, 2004). This negative correlation between age and leverage is also obtained by Bhaird and Lucey (2014).

Similarly, previous studies provide mixed results regarding the relation between a company's size and leverage. For example, Titman and Wessels (1988), Loof (2003), Delcoure (2007), Gill (2014) and Brunzell et al. (2015) find a negative correlation between size and leverage, according to the pecking order theory. On the other hand, Rajan and Zingales (1995), Booth et al. (2001), Deesomsak et al. (2004), Gonzales and Gonzales (2008) and Fan et al. (2012) identify a positive correlation between these two variables, explained by a lower information asymmetry. Larger companies have easier access to debt, hence being more tempted to borrow.

Tangible assets can be used as debt collateral, which usually decreases the creditor's risk. Both trade-off and agency theories suggest a positive relation between asset tangibility and leverage, the result being demonstrated in Loof (2003), Deesomsak et al. (2004), De Jong et al. (2008), Gonzales and Gonzales (2008) and Fan et al. (2012). Different correlation signs are also obtained in the existing literature. For example, a negative relation is explained by Morellec (2001) through the risks to which companies with higher access to liquid tangible assets are exposed. In order to obtain short-term debts, managers would underprice the liquid assets for rapid sales, action which would further affect the shareholders and creditors' wealth.

On a sample of companies from 42 countries around the world, including Denmark, Finland, Norway and Sweden, De Jong et al. (2008) identified a negative relation between liquidity and leverage for Sweden. The accumulated cash and other liquid assets can serve as internal sources of funds, instead of debt. However, an excessive level of the liquidity rate could signal poor management, which would reduce the company's ability to obtain external finance (Myers and Rajan, 1998). A negative correlation between liquidity and leverage is also found by Deesomsak et al. (2004) and De Jong et al. (2008), which is explained through the pecking-order theory

and also by the agency costs of debt, determined by the potential manipulation of liquid assets by the managers in the favour of shareholders and against the interests of creditors.

Furthermore, De Jong et al. (2008) find a positive relation between liquidity and leverage for Norway, but statistically insignificant for companies from Denmark and Finland. A similar result is also obtained by Sibilkov (2009), for a sample of US listed companies. A possible explanation can be that less liquid assets are sold at higher costs, thus increasing the company's probability of default. In order to fulfil the short term corporate obligations, it is less costly for companies to reduce leverage. The reverse is also valid: it is easier to liquidate companies with high level of liquidities and creditors will be protected since they have priority on firms' assets. So, the use of debt could be cheaper in such circumstances. On the other hand, a negative relation between liquidity and leverage is explained by Myers and Rajan (1998), who state that it is more likely for a company to obtain greater benefits from operating less liquid assets rather than selling them and expropriate value. Anderson (2002) has identified a positive relation between liquidity and long-term leverage and a negative influence over short-term debt ratio. The explanation is that short-term liquid assets can substitute loans, whereas long-term liquidity will have a protective role for companies heavily indebted.

A less analyzed firm-specific factor in the empirical studies is the volatility of earnings, used as a proxy for corporate risk. In his study for 6000 Swedish companies, Song (2005) defined this indicator as a ratio between the EBIT standard deviation and the total assets. He assumes that companies with higher volatility of operating earnings are unable to cover interest payments and thus their probability of default increases. In order to reduce this risk, companies should have a lower leverage. The results show a little impact of this variable over leverage, but still statistically significant. One possible explanation is that the analyzed period (1992-2000) overlaps with a period of strong economic recovery and a growth trend in revenues. Similarly, a negative correlation between these variables is proved by Titman and Wessels (1988) for a sample of US companies. In the study of Loof (2003), close to zero and negative values for volatility coefficients are obtained for Sweden, United Kingdom, and also for US companies.

Moreover, Loof (2003) focuses also on the non-debt tax shields, considered as a variable with an important role for the debt-equity mix. According to the trade-off theory, the main debt incentive is the benefit derived from the deductibility of interest expenses. This advantage is applicable only for those companies that present a high taxable income and for which debt can serve as tax shield. The presence of tax savings, derived from the amortization expenses, reduces the incentive to borrow and thus, it is expected to obtain a negative relation between this variable and leverage (Song, 2005). International studies highlight different computation approaches for this concept of tax savings resulted from the depreciation deduction. For example, Loof (2003) and Haas and Peeters (2006) use the ratio of depreciation to total assets, but Homaifar et al. (1994) prefers the ratio between depreciation and EBITDA. It seems that the previously mentioned authors do not use the tax savings derived from the depreciation deduction from taxable income as a variable in their applied models, but the potential of obtaining such tax savings. Given the fact that Nordic countries register different levels of income tax rates and in order to study, with a greater accuracy, the actual gain obtained through the depreciation deduction, we define the non-debt tax shields as the product of each country's corporate tax rate and each company's depreciation expenses divided with each company's net income.

Even though the dividend payout ratio is one of the key indicators of a company's financial health, in the existing literature it is not a commonly investigated factor in relation with leverage. If a company has high dividend payout ratios, the use of internal resources is diminished. In this case, future investment projects will be financed through debt. On the other hand, high levels of dividends will gain the investors' confidence. According to market timing theory, the external finance through equity will be preferred instead of debt (see also Rozeff, 1982). Taking into account the peculiarities of bank-oriented and market-oriented financial systems,

Antoniou et al. (2008) prove that the dividend policy does not have a significant impact on firms' financing decisions.

2.2. **Related literature regarding the country-specific determinants of corporate capital structure.** Fan et al. (2012) analyze the impact of the inflation rate and the corruption perception index on leverage and prove that the inflation rate can be related to debt due to the fact that loans are generally contracted at their nominal value and high inflation is usually associated with a higher degree of uncertainty, and creditors can become reluctant to lend. Thus, a negative correlation between the inflation rate and leverage is expected and demonstrated for companies from developed countries (Demirgüç-Kunt and Maksimovic, 1999; Gill, 2014). However, a positive correlation is obtained for developing countries, where companies choose external finance, because an increase of the inflation rate diminishes, in fact, the real interest rates, thus the cost of debt decreases. Booth et al. (2001) also investigate this relation for a sample of developing countries and find a negative relation between inflation and total and long-term leverages. Nordic countries, which are the subject of this study, have inflation rates below the EU average. Denmark has its exchange rate anchored to the Euro, Finland is part of the Euro zone, while Norway and Sweden have a floating exchange rate regime and a monetary policy that targets an inflation rate of 2% (IMF Report, 2013).

Fan et al. (2012) find a positive relation between the corruption perception index (CPI) and leverage, which means that companies from "very clean" countries have reduced level of debt ratios. Similar results have Baxamusa and Jalal (2014). Taking into account that the Nordic economies are well-known for their low level of corruption, it is expected to find the same positive relation between these two variables.

According to the existing literature, security market development can be considered as a direct determinant of leverage and the ratio of stock market capitalization to GDP is one of the proxies usually used for financial development, strongly related to the degree of investor protection (Shleifer and Wolfenzon, 2002). The results are different depending on the measure of leverage used. Thus, Demirgüç-Kunt and Maksimovic (1999) identify a positive relation between the ratio of stock market capitalization (% of GDP) and the total debt (as in Baxamusa and Jalal 2014 and De Jong et al., 2008), but a negative correlation with the long-term debt. A possible explanation could be that in developed capital markets that register high levels of transparency, equity financing would be preferred instead of debt financing (market timing theory).

The domestic credit to private sector (% of GDP) can be used as a proxy for the banking sector development. Gill (2014) finds a positive correlation with leverage, which could be explained through the fact that a large volume of loans could cause a macroeconomic trend of corporate borrowing, which would support the private sector development. Another explanation could be that an increase in the volume of granted loans would produce a decrease of the interest rates, and thus the external finance through debt would be enhanced.

The existing literature documents a positive relation between long-term debt and economic growth (De Jong et al., 2008; Muthama et al., 2013) and a negative one with total leverage (Gajurel, 2006; Korajezyk and Levy, 2003). In countries with positive rates of GDP growth, we could expect to have an increase in the creditors' confidence in the companies' ability to repay the granted loans. Therefore, firms would have easier access to long-term debt. On the other hand, these countries have a "healthy" macroeconomic environment, which could boost the firms' performances and then, according to the pecking order theory, companies would choose internal finance, instead of debt.

Bhaird and Lucey (2014) emphasize the importance of the institutional variables, such as the regulatory quality. Based on a seven-year analysis and a database composed of companies from thirteen European countries, the previously mentioned authors demonstrate that the regulatory quality influences the level of corporate leverage and this influence is negative over short-term

debt ratio and positive over long-term debt. A possible explanation could be that when a country implements or changes the government's legislation, the trust of the private sector decreases on the short-term period, but as the time passes and the legislative framework stabilizes, the companies tend to increase their debt. Regulatory quality is also analysed by Gill (2014), on a sample of companies from twenty countries, using the Government's effectiveness measure, along with other indicators that assess the political stability and the absence of terrorism. The results show their negative impact on corporate leverage. In line with the principles of the pecking order theory, a possible explanation could be that when the Government's actions are effective, the economic environment would lead to a positive evolution of the companies and an increase in their profitability. Hence, firms would have enough internal resources for their development plans, and the need for debt would therefore decrease.

3. METHODOLOGY AND DATA

This paper studies the impact of different firm-specific and country-specific determinants of leverage in four Nordic countries, using a sample of 79 listed companies. The dependent variables are defined both as ratios of total liabilities to total equity (Total debt ratio) and, respectively, as long-term liabilities to total equity (Long-term debt ratio). Both indicators were calculated in book values, which register a higher stability and can better highlight the corporate financing policies.

The analysed period is 1995-2014, which is long enough to provide a complete picture of the financing policy of the four Nordic countries, both in times of economic boom and during the recession period. According to Jonung (2010), in the early 1990s, these countries experienced severe financial crisis that led to large bankruptcies, decreasing investments, banking-system crisis and currency variations. However, since the mid-1990s, the Nordic countries passed through an important transformation process, with significant structural changes, which allowed them to recover from their losses and to obtain good financial results. Nevertheless, even though during the 1995-2007 period stable economic environment and a well-balanced financial development were encountered, the Nordic countries were also affected by the global financial crisis registered in 2008-2009. In the next years, those countries succeeded to quickly recover, the main engine being the significant growth in the level of exports and the companies' ability to adapt to difficult economic circumstances.

All data is collected for 120 large-sized companies from Denmark, Finland, Norway and Sweden, included in NASDAQ OMX NORDIC (NOMXN120) index. According to NASDAQ methodology, this index contains the most traded companies on the stock markets from Copenhagen, Helsinki, Stockholm and Oslo. We excluded all financial companies because they have specific regulations regarding leverage and they can also affect the data homogeneity for the return on assets (see Isakov and Weisskopf, 2014). In our sample, we kept only the companies for which complete information was available for the entire 1995-2014 period, in order to be able to correctly compute the financial indicators used in our analysis. Therefore, from the initial sample of 120 companies, we used in our analysis only 79 companies. To increase the reliability of our results, we also winsorized the extreme 5% of the series of all variables used in our regression models.

All financial indicators collected for 1995- 2014 period, are acquired through the S&P Capital IQ platform. Data regarding the economic growth, inflation rate and stock market capitalization as a percentage of GDP are obtained from the World Bank's database. International Monetary Fund Organization represents the data source for the domestic credit to private sector (% of GDP). Regulatory quality data are gathered from the Worldwide Governance Indicators' database and represent country rankings, taking values between 0 (economies with poor governance performance) and 1 (economies with a high degree of governance performance). Corruption is measured through the corruption perception index, provided by Transparency International Organisation. The index is measured between 0 and 1, with greater values signifying a low level of corruption.

In order to asses the impact of different firm specific and country specific determinants on leverage, we apply a panel data analysis. Same technique is also used in the existing literature (Song, 2005; Jamal et al., 2013; Sayilgan et al., 2006).

In order to determine which panel data model (with fixed or random effects) is more appropriate for each regression, we applied the Hausman test (1978). According to its hypotheses, the appropriate panel data model (fixed and random effects) was chosen. Thus, for the regression of total debt, a probability of 10.08% was registered, which is higher than the significance level of 10%. In this case, according to the Hausman test, it is recommended to use the model with random effects for the total debt regression. However, for the long-term debt regression, the probabilities are lower than the considered significance level, and therefore the fixed-effect model was applied.

The following *panel data model with random effects* is applied for the total debt ratio:

$$TotalDebtRatio_{it} = \alpha_t + \Sigma_k \beta_k X_{kit} + \Sigma_j \gamma_j Z_{jt} + \omega_{it} \qquad (3.1)$$

Where $\omega{it} = \varepsilon i + \nu_{it}$ represents the random effects and i is the index corresponding to each company from the sample; t records the year; X_k are the firm specific determinants; Z_j are the country specific determinants; α is the level of the leverage ratio assumed to be independent of exogenous variables; β_k and γ_j are the coefficients.

For long-term debt ratio we estimate a *fixed-effect panel data model*, using the regression model described below:

$$LongTermDebtRatio_{it} = \alpha_t + \Sigma_k \beta_k X_{kit} + \Sigma_j \gamma_{jt} + \varepsilon_{it} \qquad (3.2)$$

Where the long-term debt ratio is represented for the i-th firm at time t and ε_{it} represents the "normal" error term.

For each of the models obtained we specify the proper form (FE – for fixed effects and RE – for random effects), the probability returned by the Hausman test, the overall significance tests (F-tests) with their probabilities and the values of R2 (see Table 2).

The following table reports some descriptive statistics of all firm-specific and country-specific leverage determinants, along with a short description for all the dependent and explanatory variables used in our regression models.

The minimum value of -35% registered for the return of assets indicator is probably caused by the financial distress recorded by the Nordic companies, during the 2008-2009 financial crisis. In the same period, Nordic companies registered also a high level of leverage, with maximum ratios of 370% for the total debt ratio and of 186% for the long-term debt ratio. However, the financial difficulties were overcome by using their cash flows, the dividend payout rate registering a minimum level of 0% during the period 2008-2009.

This recession period is also confirmed by the macroeconomic environment, when the GDP growth rate indicates a negative minimum value of -1.5% and an inflation rate that decreases up to -0.2%. This economic contraction resulted in a lower confidence of investors and consumers, which affected the firms' performances and their financing policies.

The mean value of tangible assets is 55% of the total assets. This proportion can be an advantage when these companies need external financing through debt, due to the fact that fixed assets can be used as debt collateral. Furthermore, Nordic companies also register a high mean value of 149% of the liquidity ratio during the analysed period of twenty years. This measure reflects the ability of these companies to rapidly convert current assets into cash, in order to cover credits with short-term maturity.

The volatility of earnings is relatively low for the Nordic companies, the mean values of 11% indicating that the risk and the probability of default are reduced. This indicator is important for investors because it shows a reduced level of earnings' unpredictability.

Table 1: Description and summary statistics on firm-specific						
and country-specific leverage determinants						
Variable	Definition	Mean	Median	Max.	Min.	Std. Dev.
TOTAL DEBT RATIO	$\frac{Total\,Liabilities}{Total\,Equity}$	157%	140%	370%	37%	89%
LONG TERM DEBT RATIO	$\frac{Long-Term\,Liabilities}{Total\,Equity}$	72%	65%	186%	7%	49%
ROA	$\frac{Net\,Profit}{Total\,Assets}$	6%	5%	30%	-35%	6%
SIZE	ln(TotalRevenue)	7.65	7.74	12.01	1.88	1.57
AGE	ln(ObservationYear-	4.17	4.38	6.00	0.69	0.86
	YearInWhichTheFirmWasEstablished)					
TANGIBILITY	$\frac{Fixed\,Assets}{Total\,Assets}$	55%	55%	100%	1%	20%
DIVIDEND RATIO	$\frac{Dividends\,Payed}{Net\,Profit}$	45%	35%	124%	0%	32%
LIQUIDITY RATIO	$\frac{Current\,Assets}{Current\,Liabilities}$	149%	136%	338%	37%	77%
EBIT VOLATILITY	$\frac{STDEV(EBIT)}{Total\,Assets}$	11%	6%	53%	2%	14%
TAX SAVINGS[1]	$\frac{Corporate\,TaxRate*Depreciation}{Net\,Profit}$	18%	14%	80%	0%	24%
GDP GROWTH	$\frac{GDP_n-GDP_{n-1}}{GDP_{n-1}}$	2.4%	2.6%	5.4%	-1.5%	1.9%
INFLATION RATE	$\frac{IPC_n-IPC_{n-1}}{IPC_{n-1}}$	1.5%	1.4%	3.4%	-0.2%	1.0%
MARKET CAPITALIZATION[2]	$\frac{Share\,Prices*No.of\,Shares}{GDP}$	87%	89%	144%	36%	34%
CREDIT PRIVATE SECTOR[3]	$\frac{Domestic\,Credit\,To\,Private\,Sector}{GDP}$	102%	94%	200%	40%	40%
CORRUPTION INDEX	0-Highly corrupt country	0.92	0.92	1.00	0.79	0.03
	1-Very clean country					
REGULATORY QUALITY[4]	0-Country with the lowest	0.95	0.95	1.00	0.84	0.04
	rank of governance performance					
	1-Country with the highest					
	rank of governance performance					
Source: Authors' computation in EViews 7.						

Hyytinen and Pajarinen (2001) emphasize that the type of financial system can affect the performance of an economy due to the relation obtained between the structure of the financial system, such as the ownership structure and the mechanisms of corporate governance, and the types of activities that the companies undertake. As expected, due to the bank-oriented financial system of the Nordic countries, it appears that the domestic credit to private sector (% of GDP) has a mean value higher than the stock market capitalization to GDP (102% compared with 87%). The Nordic countries' inclination for external financing through debt is also confirmed by the high levels of leverage, with the mean around 157% for the total debt ratio and 72% for the long-term debt ratio.

[1]Non-debt tax shields were not calculated for the years when the Nordic companies registered financial loss (negative net profit). The annual corporate tax rate for the Nordic countries, during the period 1995- 2014, was obtained from the OECD database.

[2]Market capitalization as percentage of GDP is also known as a country's market value and it reflects the development of the capital market, being measured as the product of the shares' prices and the number of the outstanding shares of the market, divided by each countries' GDP. In the calculation of this indicator, the World Bank includes listed companies at the end of the year, but does not include investment companies, mutual funds or other collective investment vehicles. (Data are end of year values)

[3]Domestic credit to private sector as GDP percentage reflects the financial market development. The World Bank and the International Monetary Fund defines this indicator as all the financial resources submitted to the private sector (loans, bonds acquisitions, commercial loans, etc.).

[4]The regulatory quality indicator was gathered from the Worldwide Governance Indicators' database and reflects all the actions and policies implemented by the government of a country that supports the private sector's development. This indicator creates a countries' ranking on the quality of regulations and can take values on a scale from 0 (poor performance of government's regulations) to 1 (economy with the highest degree of government's performance).

Regarding the institutional variables, it seems that all the Nordic countries are economies with a very low corrupted public system and highly efficient government regulations. During the entire analysed period, Denmark, Finland, Norway and Sweden have occupied the top places in the world rankings, recording values of the corruption perception index between minimum 0.79 and maximum 1, whereas the regulatory quality indicator have taken values ranging between 0.84 and 1.

4. EMPIRICAL RESULTS

Table 2 presents evidence on the relation between leverage and several firm-specific and country-specific variables discussed in the previous sections. This table reports the results for the impact of different firm-specific and country-specific variables on leverage across four Nordic countries (Denmark, Finland, Norway and Sweden) for the period 1995–2014.

Table 2. Estimates of panel regressions (the models from equations 1 and 2)			
on total debt and long term debt ratios, with fixed/ random effects			
ROA	+ / -	-2,12***	-1,70***
		(0,0003)	(0,0000)
SIZE	+ / -	0,07**	0,10***
		(0,0239)	(0,0005)
AGE	+ / -	-0,10	-0,02
		(0,1414)	(0,8290)
TANGIBILITY	+ / -	-1,12***	0,72***
		(0,0000)	(0,0000)
DIVIDEND RATIO	-	-0,04	-0,08
		(0,5660)	(0,1084)
LIQUIDITY RATIO	+ / -	-0,32***	0,12***
		(0,0000)	(0,0000)
EBIT VOLATILITY	-	-0,74***	-0,33
		(0,0059)	(0,1125)
NON-DEBT TAX SHIELD	-	0,43***	0,31***
		(0,0005)	(0,0002)
GDP GROWTH	+ / -	-0,03**	-0,02
		(0,0102)	(0,1008)
INFLATION RATE	+ / -	0,04**	0,02
		(0,0339)	(0,1008)
MARKET CAPITALIZATION	+ / -	-0,01	-0,09*
		(0,9020)	(0,0863)
CREDIT PRIVATE SECTOR	+	0,13*	0,02
		(0,0503)	(0,5988)
CORRUPTION INDEX	+	-0,23	0,20
		(0,7804)	(0,7193)
REGULATORY QUALITY	+ / -	-3,62***	-1,93***
		(0,0000)	(0,0000)
Prob (Hausman Test)		0,1008	0,0254
R-squared		0,1678	0,5918
Adjusted R-squared		0,1549	0,5473
Number of observations		918	918
F- statistic		13,0048	13,3196
Prob (F- statistic)		0,0000	0,0000
Notes: * p $<$ 0.10, ** p $<$ 0.05, *** p $<$ 0.01.			
Source: Authors' calculations in Eviews 7			

We found a strong and negative relation between the leverage and the **profitability**, measured using as a proxy, the return of assets. The result is in line with Rajan and Zingales (1995) and Booth et al. (2001), among others. The profitable companies seem to be less interested to be indebted as long as they have enough internal financial resources, according to the pecking order theory.

Moreover, through the positive and significant coefficient of the **size** variable, we proved that big and diversified Nordic companies can obtain loans more easily. The result is in line with the previous literature (Titman and Wessels, 1988; Rajan and Zingales, 1995; Booth et al., 2001) and can be explained by the fact that creditors trust more the larger companies than the smaller ones. Big companies have a lower level of bankruptcy risk and the bank loans are, in this case, less risky for the creditors, thus strengthening the capacity of companies to obtain external financing through debt. Also, the agency theory assumes a positive relation between these two variables, due to larger agency costs associated with the separation of ownership and control, thus making more important the disciplining role of debt. Information asymmetry and large probability of risk-shifting are common behaviours which occur more in bigger companies, than in smaller ones (Venanzi et al., 2014).

We also found that the **age** of a company is irrelevant for financing decisions. A possible explanation for the irrelevance of the age criterion for the access to external financing through debt can be that an older company is not necessary a profitable one if it does not evolve with market tendencies (it does not sell innovative products or services, as a newly founded company). Thus, the age criterion can be difficult to be analysed for financing decisions, when the information asymmetry between investors and companies occurs.

The significantly negative impact of the **assets tangibility** on the total debt ratio (as in Jamal et al., 2013) can be explained through the pecking order theory: a company with more tangible assets can obtain a higher level of income, which can then be used for internal finance, and therefore the external financing through debt can be avoided. This negative relation is also supported by the agency theory regarding the conflict of interests between shareholders and managers. Companies with a low level of tangible assets have not enough collateral to attract long-term debt. For this type of companies, shareholders can encounter difficulties to monitor the cash-outflows, which are usually decided by the managers, and thus the agency costs increase. Consequently, debts are used to discipline the managers and to reduce the agency costs. The positive and statistically significant relation with long-term debt ratio is in accordance with the existing literature (see Harris and Raviv, 1991 and Rajan and Zingales, 1995 among others). Companies with high level of tangible assets can use them as collateral to attract long-term debt easier, in accordance with the maturity matching principle and also with the trade-off theory.

In the existing literature, different perspectives were debated regarding the relation between the **dividend policy** and leverage. We find weak evidence of a negative relation between dividend payout ratio and long-term debt, as in Rozeff (1982), which can be explained by the market timing theory. Companies which pay high dividends are viewed as sending positive signals to investors and its stakeholders regarding the firm's value and its future prospects. Therefore, the prices of the company's shares would rise and those firms would tend to issue equity instead of debt when the shares' market value would be high, in comparison to the book value and the past market values (Baker and Wurgler, 2002). On the other hand, the result could also be explained through the reticence of creditors to lend money to companies with high dividend payout ratios, whose debt collateral level would be more diminished. As regards the impact on total debt ratio, the relation is statistically insignificant, as in Antoniou et al. (2008).

Liquidity is negatively related with total debt ratio, which proves that companies having more liquid assets tend to lessen their debt levels (similar to De Jong et al., 2008). This result can be explained in the context of the pecking order theory: it is more probable for firms with more liquid assets to use these assets to finance their investments and, consequently, to have

less debt. According to Myers and Rajan (1998), a high level of the liquidity ratio could also signal the managers' lack of ability to have a credible investment strategy that would protect investors, and would therefore reduce the ability of those types of companies to raise external financing (the agency costs of liquidity).

On the contrary, the positive relation with the long-term leverage can be explained through the companies' preference to use assets with a high liquidity as financial protection against financial distress. In difficult times for a company, when the earnings could register low levels or the cost of capital found on the market could increase significantly, highly liquid asset would give the certainty that long-term debts could be covered (Anderson, 2002; Sibilkov, 2009; Akinlo, 2011). Anderson (2002) also finds a negative relation between short-term debt and liquid assets of the company. This result can explain the different sign of the correlation between long-term debt ratio and, respectively, total debt ratio and liquidity. Moreover, Anderson and Carverhill (2012) find that high levels of long-term debt are associated with a reduction of the optimal utilization of short term debt and with high level of liquidity. These findings are consistent with the trade-off theory, through the fact that the costs of inefficient liquidation and financial distress are economically significant, influencing therefore the debt-equity mix.

The negative correlation between the **earnings' volatility** and the total leverage is in line with the existing literature (see the study of Song, 2005 for Swedish listed companies). Companies with high volatility in earnings have a higher risk of bankruptcy and thus, borrow less than others firms.

In our study, we find more puzzling results than the ones previously presented, such as the positive correlations between leverage and **non-debt tax shields**. On one hand, a possible explanation could be the analysed period, related to the financial crisis of 2008-2009, which affected the behaviour of firms, the decisions of the financial institutions and also the macroeconomic environment, treated as a whole. On the other hand, it could be possible to have an income effect of the non-debt tax shield (Dammon and Senbet, 1988). High depreciations arise from large capital expenses, which could be determined by new investments that would also lead to a high taxable income. Normally, the non-debt tax shield reduces the level of earnings before interest and taxes, and therefore the use of debt versus equity financing becomes less important for firms due to the substitution effect which occurs between the debt and the non-debt tax shield. The positive correlation between leverage and non-debt tax shield seems to prove that the substitution effect does not prevail against the income effect for the sample of the four analysed Nordic countries.

The **economic growth** is negatively related to the total debt ratio, aspect which proves that favourable macroeconomic environment sustains the profitability of the Nordic companies and, consequently, a reduced need for debt is registered. As regards to the relation with the long-term debt, the negative correlation is weak.

A part of the existing literature documented the positive relation between leverage and the **inflation rate** (see De Angelo and Masulis, 1980; Hochman and Palmon, 1985; Kim and Wu, 1988, among others). Inflation can lead to more use of debt due to the reduction in the real cost of debt that occurs during an inflationary period.

We found a negative relation between the capital market development (measured using as a proxy the **market capitalization as a percentage of GDP**) and the long-term debt, as in Demirguc-Kunt and Maksimovic (1998) and Booth et al. (2001). Due to the well-developed stock markets, Nordic firms benefit of stock markets with low information asymmetry, with high liquidity and great diversification, environment that would help those companies to finance their investment projects through equity, in an easier and relatively cheaper way. Therefore, financing through financial debt would be avoided, result which is in line with the market timing theory of capital structure.

Our results also prove that the total leverage registered for the four Nordic countries is positively related with the **domestic credit to private sector (% of GDP)**, as in Gill (2014) where a similar analysis was performed on 20 European countries including Denmark,

Finland, Norway and Sweden. A general economic environment which is prone to indebtedness can boost the companies' external financing through debt. Further, more granted credits can lead to lower interest rates (as banks would gain more customers), and thus, leverage can turn out to be considered a cheaper and more advantageous source of financing than others.

The corruption perception index is statistically insignificant in all regression models which were performed. Therefore, this criterion seems to be less relevant for the financing policies adopted by the listed companies in our sample. The result is similar to those obtained by Hanousek and Shamshur (2011), who also find that publicly traded firms are not closely connected to the perceived levels of public sector corruption of the countries where they are listed.

The regulatory quality is a highly statistically significant variable for both types of leverages, analysed in our regression models. The negative relation is similar to those from the studies of Gill (2014) and Bhaird and Lucey (2014) and proves the equilibrium between politics and economics, equilibrium promoted in all the analysed countries. Thus, a sustainable development of the private sector is continuously maintained.

Through this research, it is noted that both microeconomic and macroeconomic factors have a significant influence on the financing decision taken by the companies in Denmark, Finland, Sweden and Norway during the period 1995-2014. Overall, the results obtained are the same for both dependent variables. However, the results for the tangible assets and the liquidity ratio prove that these variables have different impact on total debt versus long-term debt. Finally, we emphasize that there are some variables which are proved to be determinants only for one of the analyzed dependent variables. Thus, the volatility of EBIT is statistically significant only for the total debt ratio, as is the case of the GDP growth rate, the inflation rate and the domestic credit to private sector (% of GDP). We find a single independent variable, the market capitalization as a percentage of GDP, which is statistically significant only for long term debt ratio, and not for total debt ratio.

5. CONCLUSION

We revisited an important and widely studied topic in the literature, the determinants of the leverage, by using a sample of 79 listed companies from Nordic countries, analysis made on a 20 years period. To our best knowledge, these countries are less studied in the literature using a detailed and comprehensive analysis and considering a wide range of firm specific and country specific determinants.

Our empirical findings proved that the return on assets is the most significant firm-specific determinant for both types of leverage, in accordance with the pecking order theory. The profitability of the Nordic companies increases their retained earnings and therefore their indebtedness will be diminished.

The abovementioned theory of the capital structure and also, the agency theory are validated by the negative correlation between the assets tangibility and the total debt ratio. It is possible that some conflicts between managers and shareholders to be mitigated through leverage. Furthermore, the maturity matching principle and the trade-off theory are validated through the positive correlation between the assets tangibility and the long-term debt ratio.

We can affirm that the tax implications of debt are an important determinant at a firm level. The substitution effect seems to be not applicable for the Nordic firms due to the positive relation which occurs between the leverage and the non-debt tax shield, whatever the measure for leverage is analysed.

As the existing literature has already proved, liquidity has a significant effect on leverage, but our positive, and also negative, effect on the capital structure decision can be related to the diversified theoretical backgrounds found in this field. The positive correlation of the ratio of current assets to total assets with the long-term debt shows that the listed companies from the four Nordic countries consider liquidity as a guarantee for difficult periods, when the cost of capital is too high, the capital market funds are relatively hard to be raised, or the earnings

are insufficient. In fact, Nordic firms use liquidity to get more financial debt. Despite the fact that assets liquidity can be seen as an advantage for any company, in some cases, the increased liquidity can transmit a bad signal to creditors and therefore, a negative correlation between the liquidity ratio and leverage can occur. The agency costs of liquidity between managers and creditors can be considered as a possible explanation for this correlation.

The positive relation between size and both types of leverage is in line with the existing theories and with the most empirical studies. Larger companies are more diversified and thus, the bankruptcy risk will be reduced. Also, the principle of the agency theory could explain this positive relation between the two mentioned variables.

The statistically significant results, obtained for the earnings volatility, highlight a negative impact on the total debt ratio. However, this relationship disappears when the long-term debt ratio is taken into consideration. We do not find robust correlation neither between leverage and the dividend payout ratio, nor between leverage and the company's age.

Among the country-specific variables, we prove that regulatory quality is the most significant institutional factor for the listed companies from the four Nordic countries, which are analysed in the 1995-2014 period. In these countries, which register a higher degree of confidence in the government's ability to formulate and implement solid policies and regulations that would permit and promote the private sector's development, investor's protection is thus guaranteed and the need for all types of debt is lower than in the countries with lower levels of this indicator. If the shareholders' interests are better protected, the agency benefits of debt are less needed and therefore, the leverage is lower. Moreover, this result can be interpreted in connection with the protection level of the creditors' rights. The higher is the level of this protection, the lesser will be the firms' leverage, aspect explained by the low levels of risk induced by those external financial resources. Low risk levels are being obtained by including protective clauses in the contracts closed with the creditors.

We also find that a higher level of the domestic credit to private sector (% of GDP) promotes a general borrowing tendency in the analysed Nordic countries. Moreover, we find that the development of the stock market would negatively influence the level of long-term debt ratio, due to the fact that the predilection for equity financing is higher in an environment with a lower informational asymmetry between managers and shareholders. The impact of these financial characteristics, analysed at a country level, should be investigated, by taking into account the type of financial system for the Nordic countries. They have a bank-oriented system and the customs regarding the debt-equity mix can have a significant impact.

Even though the following two variables, which are widely used in the empirical studies as macroeconomic determinants for leverage, have the lowest level of volatility coefficients in our regression model for total debt ratio, the negative impact of the economic growth and the positive influence of the inflation rate are worth mentioning. Firms operating in growing economies have a higher tendency to use their own financial resources (the retained earnings) instead of any kind of debt. Inflation is associated with higher total debt ratios, maybe due to the fact that the interest rates do not properly reflect the inflation rate.

Systematically, the Nordic countries registered very good scores for the corruption perception index, due to the continuous actions taken to defeat corruption conducted by the public authorities of these countries. This aspect can explain the statistical irrelevance of this variable in our regression models.

Our results can be useful for both practitioners, as well as for academics. From a practical perspective, the conclusions are important for the potential investors in any of the analysed countries, and especially for foreign ones, who are not accustomed to the Nordic economic environment. Furthermore, our study helps in the understanding and the optimization of the capital structure decision, at least for the listed companies, from the four Nordic countries.

Our most general conclusion is that country specific variables matter, along with the firm specific ones. We appreciate that, if a country's policymakers intend to develop some political measures to boost or, on the contrary, to restrain some economic activities, a wide range of

economic, financial and institutional variables should be taken into account. However, the study can be developed by extending the list of determinants. Future studies should investigate this phenomenon by incorporating other institutional factors such as the Worldwide Governance indicators and the legal efficiency index, and also different corporate governance variables, in order to see how the debt-equity mix would be influenced.

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