LISBON
SCHOOL OF
ECONOMICS &
MANAGEMENT
UNIVERSIDADE DE LISBOA

MASTER IN
FINANCE

MASTER´S FINAL WORK
DISSERTATION

INDUSTRY SPECIFICITIES AND DEBT AFTER PRIVATIZATION: EVIDENCE FROM EUROPEAN FIRMS

DÉCIO ARLINDO DA CUNHA CHILUMBO

OCTOBER 2017

LISBON
SCHOOL OF
ECONOMICS &
MANAGEMENT
UNIVERSIDADE DE LISBOA

MASTER IN
FINANCE

MASTER´S FINAL WORK
DISSERTATION

INDUSTRY SPECIFICITIES AND DEBT AFTER PRIVATIZATION: EVIDENCE FROM EUROPEAN FIRMS

DÉCIO ARLINDO DA CUNHA CHILUMBO

SUPERVISION:

PROFESSOR VICTOR MAURÍLIO SILVA BARROS

OCTOBER 2017

Abstract

This paper aims to study the effect of privatization on capital structure decisions, taking into account industry characteristics and capital structure variations across industries. A differences-in-differences model was applied to capture the effects of capital structure derived from the privatization. The results suggest that there is no evidence that leverage ratios are affected by the process of privatization. We then conduct a deeper analysis for Poland, a country engaged in a large scale privatization program in a short time period, and find different results. For Polish privatized firms, there is a significant evidence of increases in the debt ratios after privatization. Regarding the industry component of this paper, results suggest that firms in capital intensive industries have higher levels of leverage derived from the privatization.

JEL Classification: G32; L33

Keywords: Capital Structure; Industry; Privatization.

Resumo

O objetivo desta dissertação é analisar o efeito das privatizações nas decisões de estrutura de capital das empresas, tendo em consideração as diferentes características que cada indústria apresenta e variações na estrutura de capital entre indústrias. Para capturar os efeitos da estrutura de capital ao longo do tempo, foi aplicado um modelo de diferenças-das-diferenças. Os resultados mostram que não há evidência de que os rácios de dívida são afetados pelo processo de privatização. Posteriormente, foi feita uma análise mais profunda para Polónia, um país alvo de um programa de privatização em larga escala num curto espaço de tempo e foram encontrados resultados diferentes. Para empresas polacas, existe evidência de um aumento do rácio de dívida, após a privatização. Relativamente à componente indústria, abordada neste estudo, os resultados sugerem que empresas baseadas em indústrias intensivas em capital terão níveis mais altos de dívida, após a privatização.

Classificação JEL: G32; L33

Palavras-Chave: Estrutura de Capital; Indústria; Privatização.

Acknowledgements

Firstly, I would like to express my sincere gratitude to my supervisor Victor Barros, for the help and guidance provided and the availability showed during these past months. His knowledge and patience were crucial to me during this process.

I would also like to thank my friends for their encouragement showed along the way.

Last but not least, I would like to thank my family, specially my parents and my brother for their continuous support and encouragement, not only during this journey but also throughout my whole life. It would not be possible to be here without them.

Table of Contents

List of Tables

List of Figures

1 Introduction

This study aims to relate the concept of capital structure with the subject of privatization, with the intent of analyzing the specificities of different industries and how firms' capital structure decisions are affected, post-privatization. We also take advantage of an additional analysis on Polish privatizations to assess our findings in a context of a massive program of privatizations in a short-time period.

Over the last decades, privatizations gained predominance in terms of the common policies carried out by countries worldwide, because of three main reasons (Vickers and Yarrow, 1988): i) contribution to reduction of public deficit, given by the income generated by the sale of the privatized firms; ii) increased efficiency of the privatized firms; iii) increased opportunities for redistribution of income and wealth, as privatization allows the easier access to capital markets. Governments are increasingly resorting to privatization programs because of the three reasons above and also because, over the years, there is proof of successful privatization policies that boosted countries' economies (Gilroy and Moore, 2013).

Previous literature studies the relationship between privatization and capital structure and in general, it documents that following the process of privatization leverage ratios decrease (Boubakri and Cosset, 1998; Arcas and Bachiller, 2008; Chahyadi, 2008). Traditionally, state-owned firms have higher levels of leverage because their only access to equity is through retained earnings and capital injections from the government (Ferreira, 2012).

Despite the contributions to the literature, few studies have investigated the influence of different industry characteristics on firms' capital structure decisions following a

privatization. Hall et al. (2000) studied the relationship between the determinants of capital structure for small and medium firms from the UK and industry effects and how these determinants' effect on long and short-term debt would differ across industries. Nevertheless, this paper does not cover the topic of privatizations and their impact on capital structure.

To perform this study, we gathered a list of privatized firms from the Privatization Barometer and accounting data from the Amadeus Bureau Van Dijk database for private firms and from Bloomberg for publicly traded firms. The sample runs from 2006 through to 2015 and contains 574 firm-year observations from 67 privatized firms based in 18 countries and classified in 10 different industries.

Our results suggest that there is no evidence for the process of privatization to be relevant to explain capital structure decisions, except when firms are inserted in a large-scale privatization plan. Poland is an example of a privatization program launched by the government during our period of study and therefore, a separate test was performed on Polish firms. When tested alone, we found evidence of an increase of leverage, after privatization. We did not find statistical difference on levels of debt when comparing the type of ownership and the type of privatization. Industry specificities are relevant to explain capital structure variations across industries (Myers, 1984) and the findings in this study support this conclusion. Firms in industries that are capital intensive tend to have higher levels of leverage, following privatization.

These outcomes make a contribution to the literature in a sense that they suggest that, when governments interfere on privatizations, through the implementation of privatization programs at a country level, this approach may be relevant to explain firms' capital structure decisions, after privatization.

The remainder of this study is structured as follows. Section 2 contains previous literature on the topic of capital structure and privatization. Section 3 presents the research hypotheses and the data. Section 4 covers the methodology approached in this paper. Section 5 exhibits and discusses the results and Section 6 concludes the study.

2 Literature Review

2.1 Privatization

Privatization is a term that has two different meanings. Firstly, it corresponds to the process of transferring full or partial firm ownership from a government organization to a privately owned entity. Secondly, a definition that is widely accepted is that privatization occurs when a publicly traded company is bought by a private group of investors, making it no longer listed on the stock exchange. Savas (2000) describes privatization as the "act of reducing the role of government or increasing the role of the private institutions of society in satisfying people's needs". The focus on this paper is on the first definition described above. There are various types of privatization strategies, as suggested by Eaton (1989), but Megginson et al. (2004) state that most frequently, governments choose between three forms: i) the asset sales method, where the government sells company assets (typically through an auction) to a small group of investors; ii) through share issue (SIPs), in which equity shares are sold in the public stock markets; iii) through vouchers, that represent part ownership in formerly state-owned firms and that are distributed to all citizens for free or at a very low price. The authors added that SIPs are the largest and most economically important privatizations, although governments that have less state control over the economy tend to go through asset sales.

As indicated before, privatization can be full or partial, in the sense that the government can transfer the entirety of the ownership to the private sector or not. This ownership transfer to the private sector is complete, different from a public-private partnership, where a concession contract is agreed upon between the public and the private sector, and the responsibilities over that project are distributed by both sectors (Sarmento and

Renneboog, 2016). Gupta (2005) claims that the majority of privatization programs of significant size start with partial privatization, in which only non-controlling shares of firms are sold in the stock market. Under the same conditions, Sheshinski and López-Calva (1998) show evidence that fully privatized firms should perform better than partially privatized firms.

Empirical studies, such as D' Souza and Megginson (1999), Boubakri and Cosset (1998), found that privatized firms had significant increases in profitability, sales, operating efficiency and dividend payments combined with a substantial decrease in leverage ratios. Harper (2002) suggests that in more stable and developed economic and financial markets, the benefits that come with privatization are amplified.

Chahyadi (2008) and Arcas and Bachiller (2008) investigated the capital structure determinants for privatized firms. The authors found that, similarly to other studies, firms are less leveraged following privatization. Chahyadi (2008) added that privatized firms have a target capital structure and it does not change randomly over time. According to Borisova and Megginson (2011), privatizing firms face a higher cost of debt as state ownership diminishes because bond investors could demand higher spreads, especially if the process of privatization occurs through several phases. This may explain why firms' leverage ratios suffer a decline after privatization.

Ownership in firms that were privatized has a major role on their performance post-privatization (D' Souza et al., 2005). According to Boubakri and Cosset (1998), private owners that are more focused on profits and carry out new investments that increase output and employment are more common in privatized firms, and as a result, efficiency improves and profitability ensues. Sheshinski and López-Calva (1998) contend that there are expected

efficiency gains from the change in ownership structure in competitive sectors, given that those sectors have less government controls on prices and quantities. From previous studies there is evidence that, in part, the effect of privatization is caused by new human capital. Boycko et al. (1996) developed a model that could explain the increased efficiency of privatized firms. The authors concluded that privatization is more effective when combined with a tight monetary policy and the presence of outside investors rather than managers also increases efficiency. Frydman et al. (1999) observed that, in the context of Central Europe, privatization has no effect on any performance measure when firms are controlled by managers, as opposed to outside investors. This result can be explained by the influence that communism had on the market economy of the region.

D'Souza et al. (2005) show that employment after privatization and foreign ownership are negatively correlated. Azmat et al. (2011) studied the relationship between the process of privatization and the labour's share. They came to the conclusion that privatization is the reason for a decline, on average, of the labour's share in 20%, in OECD countries, mainly due to the lower number of jobs.

Carter (2013) proposed that, the more important industries are to a country's economy and social welfare, the less likely firms from these industries will be privatized. Harper (2002) brings evidence that, after privatization, firms and industries that have lower fixed cost structures tend to have better performance results than other industries.

2.2 Capital Structure

Capital structure can be defined as the way a company finances its operations. There are two main sources from which a company can fund itself: either using debt or using equity.

In the words of Myers (2001), “capital structure attempts to explain the mix of securities and financing sources used by corporations to finance real investment”.

When it comes to capital structure, one cannot neglect the importance that Modigliani and Miller (1958) had by being pioneers in deepening the research on this matter. In their seminal article, they introduced two propositions that lead to the conclusion that there is no such thing as an optimal capital structure. Assuming perfect capital markets (non-existence of taxes, no transaction or bankruptcy costs), choosing the amount of debt and equity is irrelevant for the value of the firm, hence the “irrelevance theory”. Years later, Modigliani and Miller (1963) made a correction on the previous article and introduced taxes. The authors reached the conclusion that, taking advantage of the tax benefits when there is debt, firms’ value would increase if they financed themselves through debt rather than equity and therefore, firms can have an optimal capital structure.

Modigliani and Miller (1958) set the foundation for many other research articles and also to one of the two main theories regarding capital structure: the “trade-off theory”. The theory is based on the idea that there is an optimal capital structure that maximizes the value of a company, by balancing the benefits of debt (interest tax shields) and its costs (costs of financial distress and agency costs of debt). Bradley et al. (1984) show that leverage is inversely related with costs of financial distress. Under the assumptions of imperfect capital markets and the possibility that a firm can go bankrupt, Scott (1976) proved that there is only one optimal capital structure. Other main component that is dealt with in this theory is the concept of agency theory. Firstly investigated by Jensen and Meckling (1976), this topic concerns the relationship between principals and agents in a business, in which there are conflicts between them due to both parties having different interests and different objectives.

Barbosa et al. (2012) claim that leverage and privatization are positively correlated, with this result being in line with the agency theory, as firms usually choose to increase the levels of leverage to discipline managers. Errunza and Mazumdar (2001) argue that if bankruptcy costs after privatization are high, firms may have to reduce their leverage levels, so that privatization has a positive effect on the firm.

According to previous studies on this topic (e.g. Hovakimian et al., 2001; de Jong et al., 2011), the "trade-off theory" suggests that the leverage has a positive relationship with the size and profitability of the firm, the tangibility of assets, the use of taxes and also that high industry median leverage should bring more debt. When it comes to growth the prediction is that, due to increasing costs of financial distress, the relationship between this variable and leverage should be negative (Frank and Goyal, 2009).

The second main theory is known as the "pecking order theory". It was based on a study by Donaldson (1961) and then developed by Myers and Majluf (1984). This theory states that the cost of financing increases with asymmetric information between managers and outside investors and thus, firms will prefer internal financing to external financing, through retained earnings. When firms resort to external funds, the preferred source is debt over equity because of lower adverse selection costs. In addition to that, there is no target capital structure as the firms adapt their debt-to-equity ratio to their financing needs.

Arcas and Bachiller (2008) mention that, according to the pecking order theory, the process of privatization has a negative effect on leverage because firms will prefer to use their own funds.

Concerning the relationship between leverage and other variables that can exert some influence on it, the "pecking order theory" defends that there is an inverse relationship

between leverage and size; leverage and profitability and leverage and tangibility of assets (Frank and Goyal, 2009). Opposing the "trade-off theory", growth and leverage are positively related. Myers (2001) claims that the "pecking order theory" may explain why larger and more profitable firms use less debt; due to the fact that these firms have more internal financing available to apply in other investments.

Harris and Raviv's article (1991) comprises several theories, addressed in previous years, about capital structure and, consequently, various results that are summarized. From the compilation of articles, the results lead to believe that the "pecking order theory" is a strong predictor on firms' capital structure decisions. Myers and Shyam-Sunder (1999) argue that the "pecking order theory" explains well the financing decisions, based on their global sample of mature firms. According to Graham and Harvey (2001), CFO's tend to rely on both trade-off and pecking order theories for the capital structure decisions. Hovakimian et al. (2001) and Abe de Jong et al. (2010) both suggest that, while the "pecking order theory" describes well the firms' issue decisions, the "static tradeoff theory" is better in what regards repurchase decisions.

Regarding the influence that industries have on capital structure, Talberg et al (2008) demonstrate that there is a major difference on the capital structure, depending on the industry a company is inserted. Myers (1984) argues that because the asset type, asset risk and requirements for external funds are different from industry to industry, this will lead to different average debt ratios across industries, if the theory is correct. Across industries, Degryse et al. (2012) claim that the effects of firm characteristics on leverage for each industry are mostly in line with the "pecking order theory". Bradley et al. (1984) infer about leverage ratios on firms set in the same industry and reach the conclusion that there are

similarities on those ratios intra-industry. Regarding the degree of industry competition, Fosu (2013) found evidence that industries inserted in more competitive environments have more benefits when they increase leverage. The author relies on the Herfindahl-Hirschman Index to define industry competition. On the other hand, MacKay and Phillips (2005) affirm that the leverage ratio is higher and less dispersed in concentrated industries. The authors also use the Herfindahl-Hirschman Index to capture industry concentration. Higher values on this index indicate less competitive environments and more concentrated industries.

Leverage decisions are largely influenced by the type of investments a firm undertakes (Long and Malitz, 1985). Gupta (1969) found a positive relation between the leverage ratio and fixed assets turnover, meaning that industries with a high level of fixed asset turnover tend to have more debt.

Capital markets can also affect capital structure. Grinblatt and Titman (1998) suggest that the globalization of capital markets has contributed to a decrease of the cost of borrowing, encouraging the use of more debt. Faulkender and Petersen (2004) came to the conclusion that firms that have access to public debt markets tend to have higher leverage ratios than those that don't have access. The authors also state that capital structure decisions are limited by the capital markets. Berger et al. (1997) examined the connection between capital structure decisions and managerial entrenchment. The authors find that entrenched managers can have an impact on firms' capital structure decisions, with most of the results suggesting that leverage ratios decrease when the degree of managerial entrenchment rises. Regarding the managers' characteristics, Antonczyk and Salzmann (2014) and Fauver and McDonald (2015) claim that firms in countries whose managers are more individual - i.e., that believe they are the most important entity in making decisions - tend to have higher debt ratios.

Fauver and McDonald (2015) added that risk aversion brings a significant and negative effect on firms' debt ratio.

3 Research Hypotheses, Data and Sample Selection

3.1 Research Hypotheses

This research aims to test the effect of the process of privatization on firms' capital structure decisions, with the intent of analyzing the specificities of different industries, as the academic literature provides little information regarding these three main concepts.

Research Question: How do different industry characteristics affect capital structure decisions, after privatization?

Chahyadi (2008) documents that, when state-owned firms initiate a privatization process, their leverage ratios should decrease because there is an additional source of external capital, through equity. In addition to the reasons stated above in the literature review (Boubakri and Cosset, 1998; D'Souza and Megginson, 1999), this gives the motivation to test the first research hypothesis:

H1: The level of leverage decreases after privatizations, for all privatized firms

According to the academic literature (e.g. Megginson et al., 2004 D'Souza et al., 2005), share issue privatizations (SIPs) are the largest so it is predictable that the largest firms go through this method of privatization, although the asset sale method is more frequent. If a firm are privatized through SIPs, it means that they have access to the stock markets,

suggesting that their debt-to-equity ratio would be smaller. Therefore, the second research hypothesis is as follows:

H2: The decrease in the level of leverage after privatizations is lower for privatizations through asset sale

Regarding ownership structure, Borisova and Megginson (2011) found evidence for a decrease in the cost of debt for fully privatized firms, when compared to firms that are partially privatized, suggesting that there is easier access for fully privatized firms to finance their investments through debt. This outcome suggests our third hypothesis:

H3: The decrease in the level of leverage after privatizations is higher for partially privatized firms

Talberg et al. (2008) claim that each industry has its own reaction to changes in market conditions. Berman and Pfleeger (1997) added that some industries may be relatively immune to business cycles while others are very sensitive. The authors found evidence that industries such as consumer-related services, construction and manufacturing are mostly correlated with business cycles. According to Opler and Titman (1994), highly leveraged firms in industries experiencing economic declines tend to experience losses on profits, when compared to firms with lower leverage. Given that leverage variations are highly dependent on business cycles because of interest rates (Jordà et al., 2012) and that there usually is an

inverse relationship between leverage and profitability (Titman and Wessels, 1988), the fourth research hypothesis is the following:

H4: The decrease in the level of leverage after privatizations is less significant for firms inserted in industries mostly correlated with business cycles - Construction and Trade (retail)

Arsov and Navmoski (2016) stated that firms investing more heavily in fixed assets have shown higher levels of leverage, even though their sample selection consisted in only 4 countries. Nevertheless, previous studies, such as Talberg et al. (2008), corroborate with this conclusion, which gives us reason to test the following hypothesis:

H5: The decrease in the level of leverage after privatizations is lower for firms inserted in capital intensive industries

3.2 Data and Sample Selection

The sample comprises 574 firm-year observations from 67 European privatized firms, 24 of which currently listed on a public stock exchange. The list of privatized firms was taken from the Privatization Barometer database[1] and the accounting data was obtained from the database Amadeus Bureau Van Dijk for private firms and from Bloomberg for publicly traded firms. The privatization of these firms occurred from 2009 through to 2013 and the period for the financial statements data ranges from 2006 to 2015. Firms were excluded from the sample because: i) the accounting data did not provide observations from at least two years before and after the privatization; ii) some privatization deals that are registered on the Privatization Barometer database ended up not happening; iii) other firms listed on this

[1] Privatization Barometer database: http://www.privatizationbarometer.com

database were already fully private, before the period of study. For this research, the goal was to have a uniform and diverse sample, without the presence of privatization programs. For this reason, Polish firms were excluded from this sample, since the country underwent a massive privatization plan from 2008 until 2012 and therefore, could have a big influence in our results. This case will be treated separately and analyzed on Section 5. Regarding the countries that are included in the sample, it is important to note that Italy accounts for the most observations. When it comes to the industries present in the sample, the one with the most observations is the Utilities industry. Table 1 describes the countries and the industries that are included in this study.

4 Methodology

4.1 Measuring Leverage

Leverage can be defined as a ratio of debt to total assets. Across the literature, the definition of this variable can have slight differences. Boubakri and Cosset (2013) and Frank and Goyal (2009) consider that leverage ratios should take into account both short-term and long-term debt. Other authors such as Talberg et al (2008) and Chahyadi (2008) argue that only long-term debt should be considered for the measure of leverage, because trade credit is associated with short-term debt and can influence the operations of the firm. Keeping in mind that the industry component is also present and different industries display different characteristics, also when it comes to debt usage, in this research the focus will be on the following ratio:

$$Leverage = \frac{Total\ Debt}{Total\ Assets}$$

4.2 Econometric Approach

Most empirical studies present in the literature regarding privatized firms' performance carry out the Wilcoxon signed-rank test in order to analyze the impact of privatization on the variables in study (e.g., D' Souza and Megginson, 1999; Arcas and Bachiller, 2008; Harper,2002) . In this research, as the main objective is to test the effect of privatization on capital structure over time, we considered that it was adequate to apply differences-in-differences models. This method allows to examine the influence of an event on the dependent variable by comparing the estimated averages of two groups, one before the event and one after the event. In this case, the event is the process of privatization.

In order to evaluate these effects, a dummy variable was created, *Privatization*, which is equal to 1 from the year when a firm is privatized onwards, and 0 otherwise.

As a starting point for the empirical study of the research question in the paper, we have included, in the Appendix, a graph (see Figure 1) that illustrates the effect that time has on the sample firms' leverage ratio, in which a relationship was established between the mean of the ratio of debt to assets and *t*, which corresponds to the year of privatization of any firm in the sample. In this graph we can see the evolution of the ratio over time, starting from *t*-7 until *t*+6. The graph begins with the debt ratio on the highest point (0.703) and it decreases until *t*-3 (0.609). The average debt ratio goes up until *t* (0.636), where it starts decreasing again until *t*+2 (0.601), rising until *t*+4 (0.611) and finally decreasing, reaching its lowest point in *t*+6 (0.485). The main conclusion to take from this analysis is that, after privatization, the average debt ratio values tend to decrease over time, which is consistent with the academic literature.

To test the first research hypothesis, the following equation was estimated:

$$LEVERAGE_{it} = \beta_0 + \beta_1 Privatization_{it} + \beta_2 EBITm_{it} + \beta_3 LnAssets_{it} + \beta_4 FixedAssets_{it} + \beta_5 Efficiency_{it} + \beta_6 GDP_{it} + \beta_7 MoneySupply_{it} + \beta_8 MktCap_{it} + \sum_{t=1}^{10} \delta_t + \sum_{z=1}^{12} \varphi_z + \sum_{c=1}^{18} \gamma_c + \varepsilon_{itzc} \quad \text{(eq.1)}$$

where δ_t is the time fixed-effect variable for year t; φ_z is the industry fixed-effect specification for industry z and γ_c is the country fixed-effect variable for country c. *LEVERAGE* represents the measure of leverage explained above. To control for firms' characteristics, common capital structure determinants present in the literature were used as variables. *EBITm* is equal to the ratio of EBIT to sales and, according to Hall et al. (2000), can be used as a proxy for profitability. *LN ASSETS* is the logarithm of the total assets of the firm and is used as an approximation for the firm's size. *FIXED ASSETS* is equal to the ratio between fixed assets and total assets of the firm. *EFFICIENCY* is denoted as the ratio of sales to assets and is used as a proxy for efficiency. Also, some country level variables were included. *GDP* is equal to the logarithm of the yearly GDP. *MONEY SUPPLY* is defined as the ratio of a country's money supply to the GDP[2]. *MARKET CAPITALIZATION* is defined as the total value of all listed shares in a country's stock market divided by the GDP. These three country level variables were included to verify if the growth of a country's economy, the improvement of the access of the financial system and the development of the financial markets are indeed important factors on capital structure ratios. All firm-specific and country-

[2] Data retrieved from: *The Global Financial Development Database*, available on https://data.worldbank.org

specific control variables will be applied in every equation. The standard errors were computed using White's robust procedure. Table 2 shows the definitions of all variables.

To test the second research hypothesis, we added the interaction $Privatization \times Type$ in which Type is a dummy variable that is equal to 1 if a firm is privatized through asset sale and 0 if it is privatized through share issue. The equation is presented below:

$$LEVERAGE_{it} = \beta_0 + \beta_1 Privatization\_Type_{it} + \beta_2 Privatization_{it} + \beta_3 Controls_{it} + \sum_{t=1}^{10} \delta_t + \sum_{z=1}^{12} \varphi_z + \sum_{c=1}^{18} \gamma_c + \varepsilon_{itzc}$$

(eq.2)

To test the third research hypothesis, we added the interaction $vatization \times Partial$, which is an interaction term between *Privatization* and the dummy *Partial*, which is equal to 1 if the privatization is partial and is equal to 0 if the firm is fully privatized and also the interaction term $Privatization \times Partial \times Percentage$, which is a variable that describes the percentage of privatization for each firm. This is a similar approach to Borisova and Megginson (2011). The equation is the following:

$$LEVERAGE_{it} = \beta_0 + \beta_1 Privatization\_Partial_{it} + \beta_2 Privatization\_Partial\_Percentage_{it} + \beta_3 Privatization_{it} + \beta_4 Controls_{it} + \sum_{t=1}^{10} \delta_t + \sum_{z=1}^{12} \varphi_z + \sum_{c=1}^{18} \gamma_c + \varepsilon_{itzc}$$

(eq.3)

To evaluate the impact of an industry on leverage after privatization, a new variable was included, $Privatization \times Industry$. This variable consists on an interaction between *Privatization* and each industry present in the sample. The equation is presented below:

$$LEVERAGE_{it} = \beta_0 + \beta_1 Privatization_{it} + \beta_2 Privatization\_Industry_{itz} + \beta_3 Controls_{it} + \sum_{t=1}^{10} \delta_t + \sum_{z=1}^{12} \varphi_z + \sum_{c=1}^{18} \gamma_c + \varepsilon_{itzc} \quad \text{(eq.4)}$$

Finally, to test the relationship between capital structure and capital intensive industries, an interaction variable was created, $Privatization \times Industry \times Fixed\ Assets$, and it consists on the interaction between the dummy *Privatization*, the different industries and the ratio of fixed assets to total assets. The equation is presented below:

$$LEVERAGE_{it} = \beta_0 + \beta_1 Privatization_{it} + \beta_2 Privatization\_Industry\_FixedAssets_{itz} + \beta_3 Controls_{it} + \sum_{t=1}^{10} \delta_t + \sum_{z=1}^{12} \varphi_z + \sum_{c=1}^{18} \gamma_c + \varepsilon_{itzc} \quad \text{(eq.5)}$$

4.3 Descriptive Statistics

Panel A of Table 3 presents descriptive statistics for variables used in the equations depicted above. In this sample, the mean (median) firm presents a leverage ratio of 62.4% (63.4 %) and a standard deviation of 0.272. In addition to that, Panel A provides data for sub-samples regarding privatization. In this sample, the average (median) firm that is privatized through asset sale presents a leverage ratio of 61.84% (60.51%), whereas the firm privatized

through share issue has a mean (median) leverage ratio of 63.81% (68.92%). A fully privatized firm shows an average (median) debt ratio of 61.28% (61.09%) and a firm that is partially privatized presents a mean (median) leverage ratio of 63.4% (65.03%). Regarding the proportion of fixed assets of the firms in the full sample, we find that the average firm, out of the total assets, allocates 50% to fixed assets. Table 3 – Panel B presents the t-test for the comparison of the debt levels before and after privatization. In this table, we can see that the levels of debt before privatization are higher, suggesting that privatization has a negative effect on leverage. Panel B also presents the debt ratio means before and after privatization, for each of the countries included in this study. We can notice that, based on this sample, 10 countries registered, on average, a decrease in the leverage ratios following privatization and the remaining countries, on average, increased their leverage levels, after privatization. If we examine closely, we can infer that the most developed economies exhibit lower leverage ratios after privatization, consistent with Harper (2002).

Table 4 presents the Pearson correlation matrix for the variables used in the empirical models. Most of the variables are not significantly correlated with the dependent variable except for *FIXED ASSETS*, *EBITm*, *LN ASSETS* and *GDP*. Comparing to the academic literature, most of the measures have a consistent relationship but there is one variable whose coefficient of correlation is the inverse of what would be expected. With this sample, the correlation between *LEVERAGE* and *FIXED ASSETS* is negative (-0.139), meaning that a firm that is more dependent on fixed assets is expected to have less leverage.

5 Empirical Results

5.1 Leverage Ratio after Privatization

The first research hypothesis aims to test whether the capital structure of a firm contain less debt following the process of privatization. The results observed in Table 5 are as expected, given that the coefficient *Privatization* is negative, which is consistent with the existent literature (e.g Boubakri and Cosset, 1998; Arcas and Bachiller, 2008). However, this result is inconclusive, given that there is no statistical significance. This means that there is no evidence to support the argument that the process of privatization can explain variations in firms' leverage ratios. When it comes to the control variables, we can observe that *EBITM*'s coefficient is negative, suggesting that more profitable firms exhibit lower levels of leverage, which is consistent with Hall et al. (2000) and Boubakri and Cosset (2013). For *LN ASSETS*, there is evidence for a positive association between size and leverage. This was expected according to Faulkender and Petersen (2006), given that bigger firms are more diversified and face less risk, and therefore, the expected costs of bankruptcy and the probability of distress are lower. In addition to that, larger firms may have a stronger position to negotiate their financing needs (Degryse et al., 2012). The variable *FIXED ASSETS* exhibits a negative although not significant coefficient, which is in contrast with existent literature. Regarding efficiency, we observe a negative coefficient, as in Berger and Bonaccorsi di Patti (2006). The authors claim that more efficient firms may use more equity to protect future income derived from higher efficiency from the possibility of liquidation. Moving on to the country-specific variables, in line with Hanousek and Shamshur (2011), *GDP* presents a statistically positive coefficient. Having a higher GDP usually reflects a more developed economy and, therefore, more business investment and more possibilities for a firm to enter different markets, whether capital or debt markets. For *MONEY SUPPLY*, even

though it is not statistically significant, we can observe a positive relationship with leverage. This is consistent with Mokhova and Zinecker (2014). According to the authors, increasing the supply of money is associated to lower interest rates and, consequently, to a lower cost of debt. This factor provides firms with opportunities to access debt markets, and thus increase leverage ratios. The coefficient for *MARKET CAPITALIZATION* is negative but it is not statistically significant, which is consistent with Bokpin (2009). This variable is a proxy for equity markets' development and, as the equity market gets more developed, the easier a firm will access such markets and, therefore, one can suggest that the public access to debt markets would be reduced, leading to lower debt ratios.

5.2 Leverage Ratio and the Type of Privatization

In the second research hypothesis we examine the effect on leverage for privatizations through asset sale, as opposed to a firm privatized through share issue. The findings present in Table 6 are inconclusive for *Privatization_type*. Even though this is not the predicted result, this result brings no conclusion as to whether the type of privatization is relevant to explain debt ratio variations.

5.3 Leverage and Ownership Structure

The third research hypothesis assesses whether a partially privatized firm exhibit higher leverage ratios than those that are fully privatized. The findings in Table 6 show that the results are inconclusive, as both variables that were added for this hypothesis are not statistically significant. The output shows a negative sign on the coefficient for the variable *Privatization_partial*, and a positive sign on the coefficient for the variable

Privatization_partial_perc. The signs are consistent with the hypothesis but again, we can't conclude as to whether the ownership structure, after privatization, can impact firms' leverage ratios.

5.4 Leverage and Industry Influence

The fourth research hypothesis tests the influence of the industry in which a firm is inserted on its capital structure, through a series of regressions containing an interaction term between *Privatization* and each of the industries present in the sample. The output is presented in Table 7 and the results show positive coefficients for half of the industries in the sample (Trade, Transport, Services, Telecommunications and Construction) and negative coefficients for the other half (Finance, Real Estate, Utilities, Natural Resources, Manufacturing) . The outcomes suggest that the Telecommunications industry is the most affected after privatization, with an expected increase on the leverage ratio of 15.8%, after privatization. This result is not consistent with Berman and Pfleeger (1997), as they found evidence for the Telecommunications industry to be among the least correlated with business cycles. Looking at the negative coefficients, we can observe that the industry whose effect of privatization is stronger is the Finance industry, with an expected reduction on the debt ratio of 10.2%, after privatization. When it comes to the industries referred in the hypothesis, there was evidence for the Construction industry to have a positive relationship with leverage, with an expected increase of 7%. We found no statistical evidence for the Trade industry to be related with leverage.

5.5 Leverage and Capital Intensive Industries

The final hypothesis in Table 8 assesses whether industries that are more intensive in fixed assets exhibit a different variation in the level of leverage following privatizations. Given that capital intensive firms are characterized for higher depreciation and more fixed assets, in this study the industries that are marked as capital intensive are: Real Estate; Utilities; Telecommunications and Transportation. To define capital intensive industries was to divide the fixed assets totals per industry by the number of firms present in each industry, in order to find the average proportion of fixed assets per firm in each industry. The industries selected have on average, at least two billion euros in fixed assets per firm. The results show that half of the industries have positive coefficients on the interaction variable between each industry, *FIXED ASSETS* and *Privatization*. Out of the four industries that are identified as capital intensive, only Real Estate has a negative coefficient. Nevertheless, we observe that the interaction terms with the Transportation and Telecommunications industries are statistically significant. These results are the expected results and they suggest that firms more dependent on fixed assets have more leverage, after privatization. Rampini and Viswanathan (2013) add that firms with low leverage are essentially firms with few tangible assets, due to the strong and positive relationship between leased capital and asset tangibility.

5.6 Case Study - Poland

Given that with the main sample only the main research hypothesis was validated, we opted for an additional analysis specific for massive programs of privatization. Therefore, we focus on the Polish case to understand and how the firms' debt ratios are affected by a large scale privatization plan. Political reasons are behind this process, as the Polish government

launched in 2008 a plan whose main objective was to reduce the ownership role of the government in all industries. (Patena and Błaszczyk, 2016).

In this privatization program, 802 state-owned firms were included in the plan and, until 2011, 458 were fully privatized. Firms from industries in several sectors, ranging from Utilities, Transportation, Pharmaceuticals, etc. were covered by this program.

The sample for the analysis comprises 634 firms from 12 industries. Figure 2 describes the evolution of the sample firms' leverage ratios over time. It shows that before privatization, the mean debt ratios never surpassed 50% and after privatization, the average debt levels increase, suggesting that debt ratios tend to increase over time, contrary to what was concluded in Section 3.

Table 9 shows the output for the main hypothesis and for the hypotheses concerning the privatization type and the ownership structure. The results show a positive and statistically significant coefficient on the variable *Privatization*, for Polish privatizations. This suggests that, after privatization, a firm will have an expected increase on the debt levels of 12.5%. Patena and Błaszczyk (2016) claim that managers of Polish state-owned enterprises were very conservative regarding the use of debt. Analyzing the effect on leverage from privatizations through asset sale versus equity market, we found evidence for higher debt ratios for firms privatized through asset sale, in 26.9%, when compared to a firm privatized through share issue. This result is consistent with Megginson et al (2004). The authors found evidence that firms are more likely to be privatized through SIPs when profitability is higher. Regarding ownership structure, evidence is inconclusive as to whether the type of ownership has an influence on debt ratios, as both coefficients are not statistically significant. On the topic of industry characteristics, even though it is not tabulated, we also

found evidence that after privatization, industries more dependent on fixed assets tend to have more leverage, when compared to firms that are less capital-intensive.

From this analysis, we can document that the Polish large-scale privatization program launched by the government can explain the changes on leverage ratios by the firms, which gives us reason to suggest that political approaches to privatization may be important to explain firms' capital structure decisions, as we could not reach any conclusions regarding the main sample in the study. Moreover, risk aversion characteristics of managers before privatizations may well be a driver for changes in leverage from privatizations, as suggested by Patena and Błaszczyk (2016).

5.7 Robustness Check

To assess the robustness of our findings, the sample was encompassed into an equally distant period of time, before and after privatization, to see if the model is well-structured and can be used for a shorter period of time. This was tested on the main model and the time span selected was 3 years before and after privatization. The output is presented in Table 10 and, when compared to the results presented in Table 5, we can see that the initial conclusions are not altered. Table 10 also presents the results for the Polish sample and, comparing to table 9, we notice that the coefficients are robust and the conclusions are the same, suggesting that the model is well structured.

6 Conclusion

The aim of this study is to analyze the impact of the process of privatization on capital structure decisions, while also analyzing the different industry characteristics and how capital structure varies from industry to industry. To do so, we tested five hypotheses on a sample with 574 observations from 10 industries and 18 European countries, for a period between 2006 and 2015. In order to catch the effects of privatization on capital structure over time, a differences-in-differences model was applied.

The findings in this study suggest that overall, there is no evidence for the effect of privatization to be significant on leverage ratios, unless there is a planned privatization program for several firms, as shown in the case of Poland. The result is not consistent with the hypothesis, as the literature suggests that there is a decrease of the leverage ratio. Furthermore, we did find evidence for an increase of leverage for Polish firms, after privatization. Additionally, no evidence was found to say that ownership structure is relevant to explain capital structure decisions after the process of privatization.

Regarding the influence of industry characteristics on capital structure, the results suggest that, following privatization, firms inserted in capital intensive industries tend to have more leverage against firms less dependent on fixed assets, after privatization. This outcome supports the literature (Talberg et al., 2008; Rampini and Viswanathan, 2013), based on the fact that firms more dependent on fixed assets have more leverage overall.

This paper makes a contribution to the literature, in the sense that our findings suggest that the political context in which a country is inserted regarding privatizations may be important to explain capital structure decisions on firms. Despite the contribution, further research can be made. One suggestion is to include the concept of market leverage and verify if the conclusions change. In order to have a human component on this analysis and given

that Patena and Błaszczyk (2016) suggested that managers' characteristics could explain leverage variations, after privatization, a behavioral variable such as the managers' influence on capital structure decisions could be interesting to include. The economic cycles were briefly approached in this paper. It could be interesting to study the effects of privatization on capital structure before and after the financial crisis.

7 References

Antonczyk, R. C., & Salzmann, A. J. (2014). Overconfidence and optimism: The effect of national culture on capital structure. *Research in International Business and Finance*, *31*(May), 132–151.

Arcas, M. J., & Bachiller, P. (2008). Performance and Capital Structure of Privatized Firms in Europe. *Global Economic Review*, *37*(1), 107–123.

Arsov, S., & Naumoski, A. (2016). Determinants of Capital Structure: an Empirical Study of Companies from Selected Post-Transition Economies. *Zbornik Radova Ekonomskog Fakulteta U Rijeci: Časopis Za Ekonomsku Teoriju I Praksu / Proceedings of Rijeka Faculty of Economics: Journal of Economics and Business*, *34*(1), 119–146.

Barbosa, C., Costa, C. M., & Funchal, B. (2012). The effects of privatization on the capital structure of Brazilian firms. *Applied Economics Letters*, *19*(12), 1189–1192.

Berger, A. N., & Bonaccorsi di Patti, E. (2006). Capital structure and firm performance: A new approach to testing agency theory and an application to the banking industry. *Journal of Banking and Finance*, *30*(4), 1065–1102.

Berger, P. G., Ofek, E., & Yermack, D. (1997). Managerial Entrenchment and Capital Structure. *The Journal of Finance*, 5*2*(4), 1411–1438.

Berman, J., & Pfleeger, J. (1997). Which industries are sensitive to business cycles? *Monthly Labor Review / U.S. Department of Labor, Bureau of Labor Statistics*, *120*(2), 19–25.

Boubakri, N., & Cosset, J.-C. (1998). The financial and operating performance of newly privatized firms: Evidence from developing countries. *Journal of Finance*, *53*(3), 1081–1110.

Boycko, M., Shleifer, A., & Vishny, R. W. (1996). A Theory of Privatisation. *The Economic Journal*, 106(March), 309-319

Bradley, M., Jarrell, G. A., & Kim, E. H. (1983). On the Existence of an Optimal Capital Structure: Theory and Evidence. *The Journal of Finance*, *39*(3), 857–878.

Carter, M. Z. (2013). Privatization : A Multi-Theory Perspective, *Journal of Management Policy and Practice*, *14*(2), 108-120.

Chahyadi, C. S. (2008). *What do we know about capital structure of privatized firms? A study of evolution and determinants of capital structure of privatized firms*. PhD diss., University of Oklahoma.

de Jong, A., Verbeek, M., & Verwijmeren, P. (2011). Firms' debt-equity decisions when the static tradeoff theory and the pecking order theory disagree. *Journal of Banking and Finance*, *35*(5), 1303–1314.

Degryse, H., de Goeij, P., & Kappert, P. (2012). The impact of firm and industry characteristics on small firms' capital structure. *Small Business Economics*, *38*(4), 431–447.

D'Souza, J., & Megginson, W. L. (1999). The Financial and Operating Performance of Privatized Firms during the 1990s. *Journal of Finance*, *54*(4), 1397–1438.

D'Souza, J., Megginson, W.L. & Nash, R. (2005). Effect of Institutional and Firm-Specific Characteristics on Post- Privatization Performance: Evidence from Developed Countries. *Journal of Corporate Finance*, 11 (5), 747–766.

Eaton, J. (1989). Bureaucratic, capitalist and populist privatization strategies. *International Review of Administrative Sciences*, *55*, 467–492.

Errunza, V. R., & Mazumdar, S. C. (2001). Privatization : a theoretical framework. *Journal of International Financial Markets, Institutions and Money*, *11*, 339–362.

Faulkender, M., & Petersen, M. A. (2006). Does the source of capital affect capital structure? *Review of Financial Studies*, *19*(1 SPEC. ISS.), 45–79.

Fauver, L., & McDonald, M. B. (2015). Culture, agency costs, and governance: International evidence on capital structure. *Pacific-Basin Finance Journal*, *34*, 1–23.

Ferreira, J. V. (2012). The performance of newly privatized firms: The case of Portugal. *Journal of Governance and Regulation*, *1*(2), 92-125.

Fosu, S. (2013). Capital structure, product market competition and firm performance-Evidence from South Africa. *The Quarterly Review of Economics and Finance*, *53*(13), 140–151.

Frydman, R., Gray, C., Hessel, M., & Rapaczynski, A. (1999). When Does Privatization Work? The Impact of Private Ownership on Corporate Performance in the Transition Economies. *The Quarterly Journal of Economics*, *114*(4), 1153–1191.

Gilroy, L., & Moore, A. (2013). Saving Fresno: The role of Privatization. *Reason Foundation, Policy Brief 104*.

Graham, J., & Harvey, C. (2002). How Do CFOs Make Capital Budgeting and Capital Structure Decisions? *Journal of Applied Corporate Finance*, *15*(1), 8–23.

Gupta, N. (2005). Partial Privatization and Firm Performance Partial Privatization and Firm Performance, *The Journal of Finance*, *60*(2), 987–1015.

Hall, G., Hutchinson, P., & Michaelas, N. (2000). Industry Effects on the Determinants of Unquoted SMEs' Capital Structure. *International Journal of the Economics of Business*, *7*(3), 297–312.

Hanousek, J. & Shamshur, A. (2011). A stubborn persistence: Is the stability of leverage ratios determined by the stability of the economy? *Journal of corporate finance, 17*, 1360–1376.

Harper, J. T. (2002). The performance of privatized firms in the Czech Republic. *Journal of Banking and Finance*, *26*(4), 621–649.

Harris, M., & Raviv, A. (2007). The Theory of Capital Structure. *The Journal of Finance*, *46*(1), 297–355.

Jordà, O., Schularick, M., & Taylor, A. M. (2012). When credit bites back. *Journal of Money, Credit and Banking*, *45*(2), 3–28.

Lemmon, M. L., Roberts, M. R., & Zender, J. F. (2008). Back to the Beginning : Persistence and the Cross-Section of Corporate Capital Structure. *The Journal of Finance*, *63*(4), 1575–1608.

Long, M. S., & Malitz, I. B. (1985). Investment Patterns and Financial Leverage. *Corporate Capital Structures in the United States*, *I*, 325–352.

López-Calva, L. F., & Sheshinski, E. (2003). Privatization and Its Benefits: Theory and Evidence. *CESifo Economic Studies*, *49*(3), 429–459.

MacKay, P., & Phillips, G. M. (2005). How Does Industry Affect Firm Financial Structure? *Review of Financial Studies*, *18*(4), 1433–1466.

Majluf, N. S., & Myers, S. C. (1984). Corporate Financing and Investment Decisions When Firms Have Information The Investors Do Not Have. *Journal of Financial Economics*, *13*, 187–221.

Megginson, W. L., Nash, R. C., Netter, J. M., & Poulsen, A. (2004). The Choice of Private versus Public Capital Markets : Evidence from Privatizations. *The Journal of Finance*, *59*(6), 2835–2870.

Modigliani, F., & Miller, M. H. (1963). Corporate Income Taxes and the Cost of Capital: A Correction. *The American Economic Review*, *53*(3), 433–443.

Modigliani, F., & Miller, M. H. (1958). The Cost of Capital, Corporation Finance and the Theory of Investment. *The American Economic Review*, *48*(3), 261–297.

Myers, S. C. (1984). The Capital Structure Puzzle. *The Journal of Finance*, *39*(3), 575–592.

Myers, S. C., & Shyam-Sunder, L. (1999). Testing static tradeoff against pecking order models of capital structure. *Journal of Financial Economics*, *51*, 219–244.

Opler, T., & Titman, S. (1994). Financial Distress and Corporate Performance. *The Journal of Finance*, *49*(3), 1015-1040.

Patena, W., & Błaszczyk, B. (2016). Post-privatization corporate performance: evidence from companies privatized in Poland in 2008–2011. *Studia Ekonomiczne*, (2), 199–221.

Rajan, R. G., & Zingales, L. (1995). What Do We Know about Capital Structure ? Some Evidence from International Data. *The Journal of Finance*, *50*(5), 1421–1460.

Rampini, A. A., & Viswanathan, S. (2013). Collateral and capital structure. *Journal of Financial Economics*, *109*(2), 466–492.

Sarmento, J. M., & Renneboog, L. (2016). Anatomy of public-private partnerships: their creation, financing and renegotiations. *International Journal of Managing Projects in Business*, *9*(1), 94–122.

Savas, E. S. (2000). *Privatization and Public-Private Partnerships* (2nd ed.). CQ Press.

Talberg, M., Winge, C., Frydenberg, S., & Westgaard, S. (2008). Capital Structure across Industries. *International Journal of the Economics of Business*, *15*(2), 181–200.

Titman S. & Wessels R. (1988). The Determinants of Capital Structure Choice. *The Journal of Finance*, *43*(1), 1–19.

Vickers, J. & Yarrow, C. (1988) *Privatisation and Economics Analysis* (Cambridge,MA: The MIT Press).

8 Appendix

Figure 1 - Debt ratio evolution on the sample firms, over time

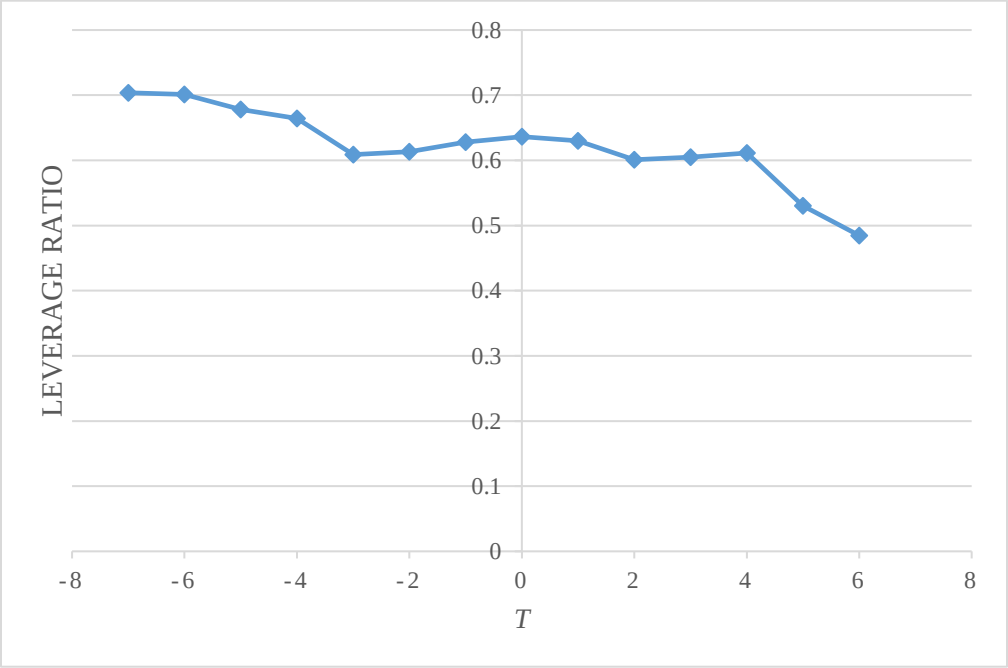

Figure 2 - Debt ratio evolution on the Polish sample firms, over time

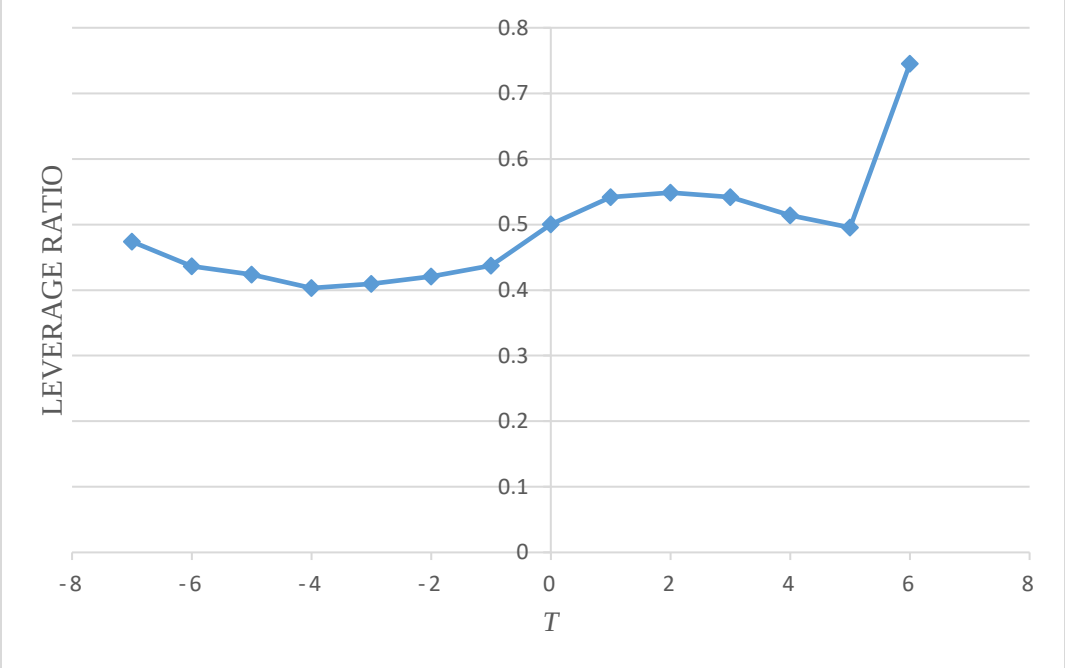

Table 1 – Countries and Industries present in the sample

Country	Observations	Percentage
Germany	37	6.45
Italy	91	15.85
Portugal	62	10.80
Sweden	70	12.20
United Kingdom	43	7.49
Belgium	27	4.70
France	39	6.79
Slovenia	10	1.74
Spain	46	8.01
Netherlands	25	4.36
Luxembourg	7	1.22
Ireland	10	1.74
Greece	46	8.01
Finland	19	3.31
Czech Republic	18	3.14
Estonia	8	1.39
Lithuania	6	1.05
Hungary	10	1.74
Total	574	100.00

Industry	Observations	Percentage
Finance	46	8.01
Real Estate	7	1.22
Utilities	133	23.17
Trade	15	2.61
Transportation	111	19.34
Services	124	21.60
Natural Resources	7	1.22
Telecommunications	27	4.70
Manufacturing	94	16.38
Construction	10	1.74
Total	574	100.00

Notes: The study follows the industry classification from http://www.privatizationbarometer.com

Table 2 - Variable Definition

Variable	Definition
LEVERAGE	Ratio of total debt over total assets.
EBITM	Ratio of EBIT to sales. Proxy for profitability.
LN ASSETS	Size of the firm, measured by the logarithm of total assets.
FIXED ASSETS	Ratio of fixed assets to total assets.
EFFICIENCY	Ratio of sales to assets. Proxy for efficiency.
GDP	Logarithm of GDP.
MONEY SUPPLY	Ratio of a country's money supply to the GDP.
MARKET CAPITALIZATION	Total value of all listed shares in a stock market as a percentage of GDP.
Privatization	Dummy variable equal to 1 from the year when a firm is privatized until the end of the sample (2013) and 0, otherwise.
Privatization_type	Interaction between *Privatization* and *TYPE_PRIVATIZATION*, which is a dummy variable equal to 1 if a firm is privatized through asset

	sale and 0 if it is privatized through share issue.
Privatization_partial	Interaction between *Privatization* and the dummy partial, which is equal to 1 if the privatization is partial and is equal to 0 if the firm is fully privatized.
Privatization_partial_perc	Interaction between *Privatization*, partial and partial_percentage, which is a variable that describes the percentage of privatization for each firm.
Privatization_industry	Interaction between *Privatization* and each industry present in the sample.
Privatization_industry_fa	Interaction between the dummy *Privatization*, the different industries and *FIXED ASSETS*.
i	Firm.
z	Industry in which the firm is inserted.
c	Country in which the firm is based.
t	Year of data.

Table 3 – Descriptive Statistics

Panel A: Regression Variables

Variable	N	Mean	Std. Deviation	Min	1st Quantile	Median	3rd Quantile	Max
Dependent Variable								
Leverage	574	0.6235	0.2717	0.0075	0.4681	0.6342	0.7722	2.6622
Controls								
LnAssets	574	19.7436	2.9566	13.1056	17.5476	19.4255	21.8345	27.2972
FixedAssets	574	0.4990	0.2670	0.0007	0.2815	0.5006	0.6944	0.9937
EBITm	574	0.0873	0.2436	-1.3223	0.0065	0.0646	0.1731	1.5705
Efficiency	574	0.8031	0.7532	0.0004	0.2414	0.5843	1.2117	4.9370
GDP	574	27.0135	1.2260	23.3727	25.9328	26.8259	28.1209	28.7405
MoneySupply	574	0.9286	0.3397	0.3962	0.7158	0.8912	1.0504	3.9911
MktCapGDP	574	0.6154	0.3646	0.0847	0.2949	0.5124	0.8817	2.2467

Notes: This table presents the descriptive statistics for the variables that were applied in this study.

- **Special Cases**

Variable	N	Mean	Std. Deviation	Min	1st Quantile	Median	3rd Quantile	Max
Dependent Variable								
Leverage, if type = SIP	174	0.6381	0.194	0.0541	0.5296	0.6892	0.7553	0.9635
Leverage, if type = Asset Sale	400	0.6184	0.2993	0.0075	0.4213	0.6051	0.8029	2.6622
Leverage, if Full	261	0.6128	0.2152	0.1179	0.4715	0.6109	0.7603	1.6922
Leverage, if Partial	313	0.634	0.3111	0.0075	0.4623	0.6503	0.7997	2.6622

Panel B: Debt Ratios before and after Privatization

- **T-test for the mean differences**

Before	After	Diff.	T-Statistic
0.6400	0.6093	0.0307	(1.36)

- **Debt Ratios before and after Privatization, by country**

Country	Before		After	
	N	Mean	N	Mean
Germany	17	0.7119	20	0.6376
Italy	46	0.6965	45	0.6707
Portugal	35	0.6783	27	0.7309
Sweden	36	0.6117	34	0.5109
United Kingdom	20	0.6139	23	0.611
Belgium	18	0.5903	9	0.6296
France	15	0.8215	26	0.7241
Slovenia	4	0.4843	6	0.6157
Spain	27	0.5389	19	0.5817
Netherlands	7	0.7718	18	0.6848
Luxembourg	3	0.4057	4	0.2618
Ireland	5	1.0079	5	1.0203
Greece	21	0.7987	24	0.5844
Finland	8	0.6138	11	0.6154
Czech Republic	7	0.2318	11	0.1271
Estonia	2	0.1304	6	0.3581
Lithuania	4	0.1142	2	0.2106
Hungary	7	0.455	3	0.4098

Notes: This table presents the average debt ratios of the sample firms before and after privatization, separated by country.

Table 4 – Pearson Correlation Matrix

	Leverage	*Fixed Assets*	*EBITm*	*Partial*	*Ln Assets*	*Efficiency*	*Industry*	*Privatization Type*	*Privatization*	*GDP*	*Money Supply*	*Market Capitalization*
Leverage	1											
Fixed Assets	-0.139***	1										
EBITm	-0.0848*	0.176***	1									
Partial	0.0370	-0.0185	-0.151***	1								
Ln Assets	0.233***	0.0202	0.350***	0.0894*	1							
Efficiency	-0.0603	-0.246***	-0.131**	-0.339***	-0.266***	1						
Industry	0.0808	-0.104*	-0.315***	0.0694	-0.181***	0.214***	1					
Privatization Type	-0.0305	0.0996*	-0.306***	-0.0471	-0.610***	0.317***	0.293***	1				
Privatization	-0.0515	-0.00761	-0.0318	-0.0328	-0.0190	-0.0306	-0.0312	0.0836*	1			
GDP	0.197***	-0.103*	0.0970*	0.0243	-0.0224	0.156***	-0.0586	0.107*	0.0473	1		
Money Supply	0.0592	-0.0396	-0.0479	-0.170***	-0.0167	0.227***	0.0675	0.111**	0.0496	0.0920*	1	
Market Capitalization	-0.0256	-0.00415	0.00620	-0.205***	-0.0302	0.161***	-0.0934*	0.169***	-0.0564	0.219***	0.325***	1

Table 5 – Effect of Privatization on Capital Structure

	(1) *Leverage*
Privatization	-0.037
	(0.043)
EBITm	-0.003***
	(0.001)
Ln Assets	0.014***
	(0.004)
Fixed Assets	-0.064
	(0.051)
Efficiency	-0.060***
	(0.018)
GDP	0.338*
	(0.174)
Money Supply	0.083
	(0.160)
Market Capitalization	-0.095
	(0.107)
Time Effects	YES
Industry Effects	YES
Country Effects	YES
Constant	-9.028*
	(4.959)
Observations	568
R^2	0.382
Adjusted R^2	0.331

Notes: This table presents estimated coefficients for $LEVERAGE = c + \beta_1 PRIVATIZATION + \beta_2 EBITM + \beta_3 LN\ ASSETS + \beta_4 FIXED\ ASSETS + \beta_5 EFFICIENCY + \beta_6 GDP + \beta_7 MONEY\ SUPPLY + \beta_8 MARKET\ CAPITALIZATION + \sum_{t=1}^{10} \delta_t + \sum_{z=1}^{12} \varphi_z + \sum_{c=1}^{18} \gamma_c + \varepsilon_{itzc}$
The dependent variable is the ratio of total debt to total assets. Robust standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6 – Effect of the Privatization Type and the Ownership Stucture on Capital Structure, after Privatization

	(1) *Leverage*	(2) *Leverage*
Privatization_type	-0.033	
	(0.032)	
Privatization_partial		-0.003
		(0.047)
Privatization_partial_perc		0.058
		(0.139)
Privatization	-0.013	-0.048
	(0.046)	(0.041)
EBITm	-0.003***	-0.003***
	(0.001)	(0.001)
Ln Assets	0.013***	0.015***
	(0.004)	(0.006)
Fixed Assets	-0.061	-0.062
	(0.052)	(0.052)
Efficiency	-0.060***	-0.057***
	(0.018)	(0.020)
GDP	0.330*	0.333*
	(0.174)	(0.175)
Money Supply	0.085	0.078
	(0.160)	(0.163)
Market Capitalization	-0.098	-0.089
	(0.108)	(0.110)
Time Effects	YES	YES
Industry Effects	YES	YES
Country Effects	YES	YES
Constant	-8.787*	-8.926*
	(4.982)	(4.985)
Observations	568	568
R^2	0.383	0.383
Adjusted R^2	0.331	0.330

Notes: Equation (1) presents estimated coefficients for $LEVERAGE = c + \beta_1 D\_PRIVATIZATION\_TYPE + \beta_2 D\_PRIVATIZATION + CONTROLS + \varepsilon_{ticz,}$. Equation (2) presents estimated coefficients for $LEVERAGE = c + \beta_1 PRIVATIZATION\_PARTIAL + \beta_2 PRIVATIZATION\_PARTIAL\_PERC + \beta_3 PRIVATIZATION + CONTROLS + \varepsilon_{ticz,}$ The control variables used in the first equation are also used in the subsequent equations. The dependent variable is the ratio of total debt to total assets. Robust standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7 – Industry Influence on Capital Structure after Privatization

	(1)	(2)	(3)	(4)	(5)
	Leverage	*Leverage*	*Leverage*	*Leverage*	*Leverage*
Privatization	-0.028	-0.037	-0.028	-0.037	-0.058
	(0.044)	(0.043)	(0.047)	(0.043)	(0.043)
Privatization_finance	-0.102**				
	(0.048)				
Privatization_realestate		-0.008			
		(0.087)			
Privatization_utilities			-0.036		
			(0.046)		
Privatization_trade				0.004	
				(0.182)	
Privatization_transport					0.099***
					(0.037)
EBITm	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Ln Assets	0.014***	0.014***	0.015***	0.014***	0.014***
	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)
Fixed Assets	-0.057	-0.064	-0.063	-0.064	-0.058
	(0.051)	(0.051)	(0.051)	(0.051)	(0.051)
Efficiency	-0.059***	-0.060***	-0.059***	-0.060***	-0.061***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
GDP	0.365**	0.338*	0.336*	0.337*	0.354**
	(0.175)	(0.174)	(0.175)	(0.173)	(0.173)
Money Supply	0.069	0.084	0.086	0.083	0.052
	(0.159)	(0.160)	(0.160)	(0.160)	(0.159)
Market Capitalization	-0.078	-0.095	-0.105	-0.096	-0.081
	(0.107)	(0.108)	(0.108)	(0.103)	(0.107)
Time Effects	YES	YES	YES	YES	YES
Industry Effects	YES	YES	YES	YES	YES
Country Effects	YES	YES	YES	YES	YES
Constant	-9.737*	-9.047*	-8.988*	-9.019*	-9.482*
	(4.983)	(4.971)	(4.987)	(4.950)	(4.951)
Observations	568	568	568	568	568
R^2	0.384	0.382	0.382	0.382	0.387
Adjusted R^2	0.332	0.330	0.330	0.330	0.335

Table 7 – Industry Influence on Capital Structure after Privatization (cont.)

	(1) *Leverage*	(2) *Leverage*	(3) *Leverage*	(4) *Leverage*	(5) *Leverage*
Privatization	-0.039	-0.035	-0.043	-0.025	-0.038
	(0.040)	(0.043)	(0.043)	(0.042)	(0.043)
Privatization_services	0.013				
	(0.056)				
Privatization_natresces		-0.091			
		(0.130)			
Privatization_telecom			0.158***		
			(0.059)		
Privatization_manufac				-0.083*	
				(0.050)	
Privatization_construct					0.071*
					(0.040)
EBITm	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Ln Assets	0.014***	0.014***	0.014***	0.014***	0.014***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Fixed Assets	-0.063	-0.064	-0.064	-0.064	-0.064
	(0.051)	(0.051)	(0.051)	(0.051)	(0.051)
Efficiency	-0.059***	-0.060***	-0.061***	-0.059***	-0.060***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
GDP	0.339**	0.339*	0.345**	0.330*	0.337*
	(0.173)	(0.174)	(0.172)	(0.173)	(0.174)
Money Supply	0.088	0.085	0.066	0.063	0.079
	(0.160)	(0.160)	(0.157)	(0.160)	(0.161)
Market Capitalization	-0.098	-0.096	-0.098	-0.107	-0.097
	(0.107)	(0.107)	(0.107)	(0.108)	(0.108)
Time Effects	YES	YES	YES	YES	YES
Industry Effects	YES	YES	YES	YES	YES
Country Effects	YES	YES	YES	YES	YES
Constant	-9.078*	-9.080*	-9.237*	-8.798*	-9.016*
	(4.932)	(4.961)	(4.919)	(4.943)	(4.960)
Observations	568	568	568	568	568
R^2	0.382	0.382	0.385	0.385	0.382
Adjusted R^2	0.330	0.330	0.333	0.333	0.330

Notes: This table presents estimated coefficients for $LEVERAGE = c + \beta_1 PRIVATIZATION + \beta_2 PRIVATIZATION\_INDUSTRY_{itz} + CONTROLS + \varepsilon_{ticz}$, in which the control variables used in the first equation are also used in the subsequent equations. The dependent variable is the ratio of total debt to total assets. Robust standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8 – Capital Intensive Industries and Capital Structure, after Privatization

	(1)	(2)	(3)	(4)	(5)
	Leverage	*Leverage*	*Leverage*	*Leverage*	*Leverage*
Privatization	-0.030	-0.037	-0.040	-0.036	-0.063
	(0.044)	(0.043)	(0.046)	(0.043)	(0.043)
Privatization_finance_industry_fa	-0.183**				
	(0.078)				
Privatization_realestate_industry_fa		-0.008			
		(0.089)			
Privatization_utilities_industry_fa			0.020		
			(0.064)		
Privatization_trade_industry_fa				-0.047	
				(0.228)	
Privatization_transport_industry_fa					0.265***
					(0.053)
EBITm	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Ln Assets	0.013***	0.014***	0.014***	0.014***	0.013***
	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)
Fixed Assets	-0.042	-0.064	-0.065	-0.064	-0.094*
	(0.053)	(0.051)	(0.052)	(0.051)	(0.051)
Efficiency	-0.057***	-0.060***	-0.060***	-0.060***	-0.063***
	(0.019)	(0.018)	(0.018)	(0.018)	(0.018)
GDP	0.348**	0.338*	0.338*	0.342**	0.360**
	(0.173)	(0.174)	(0.173)	(0.173)	(0.172)
Money Supply	0.086	0.084	0.082	0.087	0.038
	(0.159)	(0.160)	(0.161)	(0.159)	(0.157)
Market Capitalization	-0.088	-0.095	-0.093	-0.091	-0.091
	(0.106)	(0.108)	(0.108)	(0.103)	(0.107)
Time Effects	YES	YES	YES	YES	YES
Industry Effects	YES	YES	YES	YES	YES
Country Effects	YES	YES	YES	YES	YES
Constant	-9.294*	-9.048*	-9.045*	-9.151*	-9.591*
	(4.930)	(4.971)	(4.952)	(4.941)	(4.912)
Observations	568	568	568	568	568
R^2	0.384	0.382	0.382	0.382	0.392
Adjusted R^2	0.333	0.330	0.330	0.330	0.341

Table 8 – Capital Intensive Industries and Capital Structure, after Privatization

(cont.)

	(1) *Leverage*	(2) *Leverage*	(3) *Leverage*	(4) *Leverage*	(5) *Leverage*
Privatization	-0.039	-0.035	-0.044	-0.027	-0.038
	(0.039)	(0.043)	(0.043)	(0.042)	(0.043)
Privatization_services_industry_fa	0.021				
	(0.105)				
Privatization_natresces_industry_fa		-0.179			
		(0.281)			
Privatization_telecom_industry_fa			0.328***		
			(0.102)		
Privatization_manufac_industry_fa				-0.162	
				(0.109)	
Privatization_construct_industry_fa					0.191
					(0.126)
EBITm	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Ln Assets	0.014***	0.014***	0.014***	0.014***	0.014***
	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)
Fixed Assets	-0.067	-0.064	-0.068	-0.063	-0.064
	(0.046)	(0.051)	(0.051)	(0.051)	(0.051)
Efficiency	-0.059***	-0.060***	-0.061***	-0.059***	-0.060***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
GDP	0.340**	0.339*	0.369**	0.329*	0.338*
	(0.173)	(0.174)	(0.173)	(0.173)	(0.174)
Money Supply	0.086	0.085	0.073	0.064	0.081
	(0.160)	(0.160)	(0.156)	(0.160)	(0.161)
Market Capitalization	-0.095	-0.096	-0.090	-0.105	-0.096
	(0.108)	(0.107)	(0.106)	(0.108)	(0.107)
Time Effects	YES	YES	YES	YES	YES
Industry Effects	YES	YES	YES	YES	YES
Country Effects	YES	YES	YES	YES	YES
Constant	-9.105*	-9.080*	-9.927**	-8.777*	-9.021*
	(4.931)	(4.962)	(4.928)	(4.949)	(4.960)
Observations	568	568	568	568	568
R^2	0.382	0.382	0.387	0.384	0.382
Adjusted R^2	0.330	0.330	0.335	0.332	0.330

Notes: This table presents estimated coefficients for $LEVERAGE = c + \beta_1 PRIVATIZATION + \beta_2 PRIVATIZATION\_INDUSTRY\_FA_i + CONTROLS + \varepsilon_{ticz}$, in which the control variables used in the first equation are also used in the subsequent equations. The dependent variable is the ratio of total debt to total assets. Robust standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 9 – Polish Case Study

	(1) *Leverage*	(2) *Leverage*	(3) *Leverage*
Privatization	0.125***	-0.067	0.183***
	(0.039)	(0.043)	(0.053)
Privatization_type		0.269***	
		(0.044)	
Privatization_partial			-0.061
			(0.069)
Privatization_partial_perc			-0.018
			(0.089)
EBITm	-0.003**	-0.003**	-0.003**
	(0.002)	(0.002)	(0.002)
Ln Assets	0.010	0.020***	0.009
	(0.008)	(0.008)	(0.008)
Fixed Assets	0.179***	0.191***	0.177***
	(0.058)	(0.057)	(0.059)
Efficiency	0.047**	0.050**	0.044**
	(0.021)	(0.021)	(0.022)
GDP	0.960	0.979	0.962
	(2.049)	(2.017)	(1.996)
Money Supply	-2.747	-2.966	-2.749
	(5.344)	(5.262)	(5.208)
Market Capitalization	-0.144	-0.331	-0.142
	(0.695)	(0.690)	(0.690)
Time Effects	YES	YES	YES
Industry Effects	YES	YES	YES
Country Effects	NO	NO	NO
Constant	-23.567	-24.036	-23.616
	(51.500)	(50.703)	(50.167)
Observations	634	634	634
R^2	0.217	0.257	0.220
Adjusted R^2	0.184	0.225	0.186

Notes: This table presents estimated coefficients from the equations relative to H1, H2 and H3, for the sample of polish firms. The dependent variable is the ratio of total debt to total assets. Robust standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 10 – Time Span Analysis (H1) – Robustness Check

	Non Polish Firms	Polish Firms
	Leverage	*Leverage*
Privatization	-0.034	0.138***
	(0.051)	(0.042)
EBITm	-0.005***	-0.004
	(0.002)	(0.003)
Ln Assets	0.018**	0.011
	(0.007)	(0.010)
Fixed Assets	0.036	0.151*
	(0.094)	(0.083)
Efficiency	-0.022	0.025
	(0.036)	(0.021)
GDP	0.317	-2.942
	(0.275)	(4.089)
Money Supply	0.286	2.985
	(0.275)	(6.440)
Market Capitalization	-0.148	-2.892
	(0.140)	(2.303)
Time Effects	YES	YES
Industry Effects	YES	YES
Country Effects	YES	YES
Constant	-8.819	78.201
	(7.828)	(106.150)
Observations	313	333
R^2	0.399	0.223
Adjusted R^2	0.303	0.163

Notes: This table presents estimated coefficients for $LEVERAGE = c + \beta_1 PRIVATIZATION + CONTROLS + \varepsilon_{ticz}$, in which the control variables used in the first equation are also used in the subsequent equations. The dependent variable is the ratio of total debt to total assets. Robust standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$