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Do changes in tax regulation affect firms' capital structure?

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Dissertation written under the supervision of Professor Diana Bonfim

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Abstract

The aim of this dissertation is to assess how changing tax regulation may affect the capital structure of firms, in particular, how the introduction of a new tax provision – the Notional Interest Deduction (NID) – impacted firms' financing decisions in Italy. To perform this study, we gathered company data from 2005 to 2015 and we analysed a sample of 197 Italian public firms, separating them into two distinct groups: (i) Financial companies and (ii) Non-financial companies. While for Financial companies it seems that the NID implementation did not translate itself into statistically significant effects, results show that for Non-financial companies there is a slightly increase of 2% in leverage ratios, that is softened for more profitable firms. Results seem to be robust when changing the form of treatment regarding outliers and also when altering the time period of our analysis.

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Resumo

O objectivo desta tese é avaliar como alterações no regulamento fiscal podem afectar a estrutura de capital de empresas, em particular, como a introdução de uma nova provisão fiscal – o Notional Interest Deduction (NID) – impactou as decisões de financiamento das empresas em Itália. Para realizar este estudo, reunimos dados empresariais de 2005 até 2015 e analisámos uma amostra de 197 empresas públicas italianas, separando-as em dois grupos distintos: (i) empresas Financeiras e (ii) empresas Não-Financeiras. Enquanto para as empresas Financeiras o NID não aparenta reflectir-se em resultados estatisticamente significativos, os resultados demonstram que para as empresas Não-Financeiras há um pequeno aumento de 2% nos rácios de alavancagem, que é atenuado para empresas de maior rentabilidade. Os resultados evidenciam ser robustos quando alteramos o modo de tratamento respeitante a *outliers* e o período temporal da nossa análise.

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I – Introduction

Throughout the years, one of the main research topics in Empirical Finance has been the decision regarding a firm's optimal capital structure and the factors that condition this decision. Identifying the sources of capital structure variation and their practical relationship with the predominant theories that aim to provide an explanation for capital structure –trade-off and pecking order- is currently a source of motivation for many researchers (Graham, and Leary 2011). Within the trade-off theory there is, without a doubt, an agreed consensus regarding the tax advantages of debt and its positive contribute to firm value up to a certain level (Korteweg 2009). However, this optimal level of debt is still under great debate: some authors tend to view it as a trade-off between the benefits of debt and the negative incentives generated with suppliers (Hennessy, and Livdan 2009), but the general consensus seems to be that there is a cap to these positive effects of contracting debt.

With this in mind, and with the excess debt and consequent negative effects observed in firms during the 2008 financial crisis, the study of dual tax regimes and the implementation of tax policies that provide a fiscal incentive to equity increases has been incentivized (IMF, 2009). Trying to find a viable tax policy that not only provides firms with the established benefits of contracting debt but that also enables these fiscal incentives to financing through equity is, according to De Mooij (2011) and the IMF, a key aspect that could have many benefits.

This dissertation in mainly focused in analysing a concrete tax incentive -the Notional Interest Deduction (NID) – in order to verify whether this much needed recapitalization can be prompted in response to a more "equity-favourable" tax policy. The impacts of the introduction of the NID will be assessed through the analysis of the Italian case, where the NID was introduced in 2011. Italian firms are, according to both the European Commission (2008) and the IMF (2009) some of the more leveraged firms among European firms, making them highly exposed to default risk.

This high leverage seems alarming, especially when related to the high number of NPL's (Non-performing Loans) that is observed in Italy (see Appendix 1). It is evidenced that besides high leverage ratios, there is also a great potential for a part of this leverage to end up in a default situation on their respective loans. This problem still subsists as the high level of NPL's remains as one of the major concerns regarding Italian bank's balance sheets (IMF Country Report No. 16/222, July 2016).

Throughout this paper we will try to verify the existence of, and quantify the changes in the capital structure of Italian firms, resulting from the introduction of the NID in Italy. This study will also try to assess the source of those changes and its theoretical impact in the default risk of Italian firms.

I.1) Notional Interest Deduction (NID)

The NID, also referred to in Italy as ACE - "Aiuto alla Crescita Economica", meaning Aid to Economic Growth, is a tax incentive to firms' equity funding. It is commonly referred to by its English concept: ACE – Allowance for Corporate Equity, and it was introduced in Italy in 2011 (Italian Law Decree, 06 December 2011, n. 201). It is a tax incentive for firms to increase its capital and a possible solution for the existing debt bias when it comes to deciding amongst sources of funding.

While under most tax systems only interest expenses seem to be deductible, the NID tries to eliminate this bias: the NID implements a benefit for firms, which is calculated as a percentage of annual positive variations in equity. That percentage is defined as the imputation rate. Further detail regarding this concept and its application in Italy will be given in Section II.

I.2) Hypotheses/ Research Questions

Most of the existing literature relating tax policies and capital structures is done to assess the tax advantages of debt. As evidenced in the Literature Review section, there are also some studies that try to assess the impact of alternative tax regimes based on the idea of equity subsidies. However, those studies are either focused on similar, but nonetheless different tax regimes – like Dual Tax systems -, or focused in analysing the impact of the NID in other countries, as in the Belgian case (which also incorporates some differences when compared to the Italian NID).

In terms of similar studies on Dual Income Tax systems, we can highlight the study performed by Sørensen (2009) that was focused on Nordic countries and that will be mentioned throughout Section II – among others-. Also in Section II we will refer studies regarding the other applications of the NID itself that were conducted mainly for the Belgian case (see Zangari, 2014 and Panier et al., 2015), which included several differences mostly regarding the application base (non-incremental for the Belgian case) and specific anti-avoidance rules (which seem to be "tighter" for the Italian case).

This way, this thesis will focus on trying to answer two specific research questions: the first question is mainly focused at addressing the existing bias towards the fiscal benefits of debt and verifying if changing that bias materializes in a real impact among firms' capital structures, by analysing the Italian case of the NID application.

Research Question 1: Do changes in tax policies affect capital structure decisions?

The second question is more focused on assessing if this possible impact of changing tax regimes - that will be assessed by the first research question - is positive, or negative. By positive we mean that the impact generated will lead to a reduction in the leverage ratio of the analysed firms, whereas negative will increase that same ratio. When we use the term positive for lower leverage ratios we imply two distinct meanings: (1) if we are putting in practice a tax regime that aims at implementing higher capitalization among firms, it is only natural that we consider it as positive if it accomplishes the objective for which it was designed; and (2) if, as described before, we consider that the high level of debt among Italian firms is not only a considerable source of credit risk for those firms, but also a potential threat for the overall economic stability of the country (and even for the European Union) , then one must find the qualitative use of the word positive to describe a scenario in which that problem is being solved.

Therefore, the second research question can be defined as:

Research Question 2: Does the implementation of NID lead lower leverage ratios?

Considering the motivation for this study, we expect that the answer to both these questions is affirmative, and further detail regarding the methodology that was implemented in practice and the results obtained will be explained in consequent sections.

I.3) Contribution of present dissertation

Besides the personal motivation for the present Master Thesis, the aim of this dissertation was directed at two distinct areas of possible contribution: the first one concerns the existing financial literature regarding tax regimes that try to put an end to the fiscal bias of the benefits of debt. As mentioned before, and throughout the next section - Literature Review – there seems to be, to our best knowledge, a reduced amount of studies focused on assessing

how a tax regime that subsidizes equity can impact the capital structure of firms. Even though there are some studies in this area, it seems that (i) they could be further developed and (ii) they could be applied to other specific countries and samples of data for which this impact was not studied. Therefore, we decided to perform this analysis for the Italian case, which seemed to be value-adding: we will study the impact of the NID, including in our sample a period of 4 to 5 years before the NID implementation, and the same number of years after. To the best of our knowledge, this has not been done before and will allow us to have a more realistic measure of the impacts of the introduction of this tax policy, since we are basing ourselves on a significant amount of data posterior to the introduction of this specific effect. This effect will be studied also incorporating other firm-specific factors that influence firms' capital structure, and that will be explained throughout the paper.

The second area of contribution is related to the financial crisis of 2008: this dissertation can perhaps help materialize the belief that a reduction of firm's leverage, in this case in Italy, can lead to "healthier" capital structures, with lower default risk, without compromising financial results. As mentioned before, the IMF as voiced their concern regarding the high levels of debt and the excessive credit risk of Italian firms, and if we can show that a tax regime like the NID can indeed reduce the debt ratios of Italian firms, it could be a good starting point to try and implement the same regime in other European countries which have never experienced such policies. This would show that an optimal tax policy can shape the economic reality of business financing, leading to more capitalized and self-sustained companies, that will not create such an over-demand for credit and that will eventually take pressure off financial institutions ratios.

In short, this Master Thesis will be organized on the following order: in Section II we will present existing literature related to the topic we are analysing. Section III will focus on the sample and methodology used, while also describing and justifying the other firm-specific factors we used to explain Italian firms' capital structure. Section IV will present the results we got with our study, and sections V and VI will respectively refer the main conclusions and limitations that we could verify while performing this analysis.

II – Literature Review

In this section we will focus on existing papers and researches that can help achieve an objective and supported view of what is currently perceived regarding some concepts that are, without a doubt, intertwined with the objective of this dissertation. In order to fully comprehend the possible effect of changing tax policies in capital structure, one should first be acquainted with recent empirical finance researches regarding both capital structure and dual tax regimes that have been put in practice before, and that allow for a more realistic approach to tackle this problem.

II.1) Capital Structure

Since the ground-breaking research conducted by Modigliani and Miller (1958), the great focus in empirical finance studies has been the analysis and testing of the two mainstream theories regarding capital structure: the trade-off and the pecking order models. The trade-off model proposes that firms should be able to manage the benefits and the costs of contracting debt, and balance them to an optimum level where that relationship is maximized (Kraus, and Litzenberger 1973).

On the other hand, according to Myers and Majluf (1984), the pecking order theory establishes an order or hierarchy for firms' financing that is established on the basis of avoiding asymmetry of information problems. Since managers know more about the firm than outside stakeholders, the way firms are financed should be decided as to minimize the costs of security issuance (Myers, and Majluf 1984). Along this line of thought, when raising funds, priority should be given to internal funds, followed by external debt and lastly, by the issuance of new equity (Kraus, and Litzenberger 1973). When a firm is not able to fund itself internally, it should opt for debt, contracting it up to the theoretical optimum as established by the trade-off theory.

According to Graham, and Leary (2011) both these theories have been successful in explaining some of the factors that condition capital structures. However, Graham and Leary (2011) also state that both theories have failed in fully explaining the capitalization of firms. This failure to explain much of the variation in companies' debt policies can, according to these authors, be explained by several factors that include variables mis-measurements and other effects such as the ones generated by supply and non-financial stakeholders (among others).

In addition, both these theories also fail to incorporate the effect of tax regimes that subsidize equity, maybe because this kind of taxation has not been widely adopted around the world. However, recent studies have started to question the bias related to the tax advantages of debt over equity, and raised significant doubts regarding the principals for this bias, since it seems evident that a firm's leverage and riskiness would decrease if interest expenses were not tax deductible (Karpavičius et al, 2016).

Panier et al. (2015) conducted a study to assess the impact of taxes in the capital structure of Belgian firms, by analysing the effects of the implementation of the NID in Belgium. Based on their sample, they concluded that having a tax policy that subsidizes equity indeed increases the capitalization of firms. This was verified for both new and existing firms, but with a higher effect for new and large firms. It is also shown that the lower levels of leverage observed after the NID implementation in Belgium were in fact generated by higher levels of equity and not by reducing previous level of debt. This indeed proves that, under the NID, Belgian firms found the characteristics of equity financing to be more advantageous than the ones of debt financing.

II.2) Dual Tax Systems

The first fiscal policy that addressed the pending issue regarding the tax inconsistencies in the treatment of equity and debt sources of funding was the Dual Income Tax (DIT). This system was initially implemented in Europe, around 1990, in four Nordic countries. Later in that decade it started being adopted in other countries like Italy, Croatia, Austria and Belgium (Genser, 2006).

Early in the 21st century, the EU regarded the implementation of these dual tax systems as most important and believed it should be implemented widely across Europe (Cnossen, 2004).

Georg von Schanz, a German scholar, introduced the first notions of dual tax systems in the beginning of the 19th century. Later, around 1920-1930, Robert Haig and Henry Simmons contributed to the development of such ideas, which led to the naming of SHS (Schanz/Haig/Simmons) income.

According to SHS income tax definition, income should be separated into two different components: annual consumption and increases in asset value, which lead to a change in Net Worth ($I = C + \Delta NW$). In the SHS system, *"Personal income may be defined as "the algebraic sum of (1) the market value of rights exercised in consumption and (2) the*

change in the value of the store of property rights between the beginning and end of the period in question." (Simons, 1938)

This was the first tax system to actively include two different components in its calculation. It was on this basis of distinct components for tax calculations that the first dual income tax systems started being developed.

Dual income taxes seem to be based on the same underlying logic, but present some differences: income is separated as either ordinary or above-normal income. Sørensen (2009) refers that DIT *"…is a particular form of schedular income tax which combines progressive taxation of labor and transfer income with a low flat tax on all capital income"*. Sørensen (2009) adds that a wide base for the capital income tax is necessary in order to ensure tax neutrality.

II.2.1) Italy's Dual Income Tax

The Italian dual income tax was put in place from 1998 to 2003. Panteghini, Parisi, and Pighetti (2012) state that, as we have seen before, this tax system was applied on the basis of recognizing two separate components: ordinary and above-normal income. In the Italian case the ordinary income was taxed at a lower rate.

Also according to Panteghini, Parisi, and Pighetti (2012), the Government reform for a dual tax income applied the DIT benefit to new subscriptions and earnings retained after 1998. This benefit would initially be null and eventually grow as companies became more capitalized.

However, after the 2001 Italian elections, which lead to a change in government, it was observed that a shift in policies towards the DIT was at hand: the Italian Government stopped yielding any benefits to equity increases posterior to June 30th, 2001 and it also reduced the imputation rate by half. (Panteghini, 2012)

To assess the impact of the DIT, Bernasconi (2005) revealed in his studies that leverage ratios were reduced while the DIT had been in place. Based on his conclusions, Bernasconi actively asked that the elimination of these fiscal policies would be revised.

II.2.2) The Italian notional interest deduction (NID) – or ACE-

In 2011 the Italian Government decided to again take a step in the direction of dual tax systems, and it introduced the notional interest deduction (NID). This dissertation aims at studying the effects this particular incentive: even though it is similar to the DIT system that was put in practice in the past, under the NID, ordinary income is exempt.

According to Law Decree, 22 December 2011, n. 214 and Decree by the Ministry of Economy and Finance dated 14 March 2012 the NID only applies to changes in the level of capital. Positive elements will be capital increases like cash contributions or allocation of profits to reserves, whereas negative elements will result from equity decreases (e.g. distributing retained earnings).

In 2010, Griffith R., Hines J. and P.B. Sørensen recommended that the NID would be calculated on an incremental basis. This suggests that the NID would have to only benefit new wealth, meaning changes in the level of capital posterior to the enforcement of this tax policy, and not on previous wealth. Recent taxation papers from the European Commission (Ernesto Zangari, 2014) seem to provide consistency to Griffith (2010); even though there are cases of non-incremental NID application (e.g. Belgium), these papers seem to point out the Italian example as more able to fight tax planning, not only due to its incremental base, but by combining it with strict anti-avoidance rules. These rules aim at optimizing the NID by ensuring not only that "old equity" isn't converted into "new equity" but also by focusing on financial transactions between related parties.

III – Data and Methodology

In this section we will start by describing the data used, therefore presenting the sample that was gathered for the purpose of this thesis. Consequently, we will evidence the methodology that was put in place in order to assess the possible impact of the introduction of the NID in Italy: this will involve the description of the regression used, as well as the explanation for the both the dependent and independent variables incorporated in the model.

III.1) Sample

For the purpose of this study, data was gathered for 197 Italian public firms, starting from the end of 2005, up to the end of 2015 (11 years). The source of this data was Thomson's Datastream add-in, which enabled us to access the Worldscope database, directly through Microsoft Excel. In this database, there is information for publicly traded firms only (which somehow limited our analysis due to the fact that we initially also wanted to include private firms, and later realised we could not). All the firms included in our sample are therefore traded in the Milan Stock Exchange, and the currency involved is, consequently, the Euro.

To avoid the bias of just including firm that are still active nowadays, our criteria was to include every firm that was active in 2005: this means that for some firms, we might not get values (up to the end of 2015) for every variable retrieved, since they might have gone bankrupt. However, this represents a small amount of the total firms studied (only 6 out of the 169 Non-Financials firms went bankrupt), and we decided to keep those firms in our sample to avoid the bias of only comprising firms that "survived" the analysed time-span in our sample.

For the purpose of this study, we decided to separate the 197 firms in our sample into two groups. The criteria for each group were based on the operating industry of each firm (as labelled on the Worldscope database). The first group is constituted by "financial" companies and therefore it incorporates firms that fit in one of the four following industries: (i) Banks (ii) Equity Investment Instruments (iii) Financial Services and (iv) Non-Equity Investment Instruments. This group includes a total of 28 firms. We will refer to this group as the Financials Group.

The second group includes all the remaining firms, that seem to be linked to a different business reality, defined by being a part of wide set of industries (from the

manufacturing, to the aerospace or retail industry – among others –) that are considered as non-financial. This group comprises a bigger number of firms, accounting for a total of 169 firms. Throughout this study, we will refer to this group and the Non-Financials group.

The reason for separating this sample into these two groups is that Financial and Non-Financial firms seem to have very different capital structures and different determinants of leverage.

In total, for each of these 197 firms, we retrieved 7 different variables (for the previously mentioned period of 2005-2015), consequently generating panel data. These variables are (i) Total Assets, (ii) Total Debt, (iii) Other Tangible Assets, (iv) PPE – Power, Plant and Equipment, (v) Net Sales or Revenues, (vi) EBIT – Earnings before Interest and Taxes and (vii) Total Interest on Debt. We will explain the literary motivation for which these variables were obtained for in the next sub-section.

III.2) Methodology – Multiple Regression

In order to be able to assess the impact of the introduction of the NID in Italy, a multiple regression was estimated. This regression aims at assessing if there is a significant change on the leverage ratio of the firms in our sample after the introduction of the NID. However, the chosen regression also comprises other explanatory variables that are mostly based on firm-specific characteristics, which have proven, in previous literature, to have an impact on the leverage ratio of firms.

Most recent literature seems to be moving towards the direction of incorporating firm-specific, and even country-specific effects in their models to explain capital structure decisions (Abe de Jong et al. 2008). Along that line of thought, this present dissertation incorporates in its methodology six explanatory variables: one variable of interest, that will assess the impact of the NID introduction in Italy, and five control variables that try to incorporate these firm-specific effects.

Therefore, the multiple regression that was put in place is described below:

$$Lev_i = \beta_0 + \beta_1 Size_i + \beta_2 Profit._i + \beta_3 Growth_i + \beta_4 Tang._i + \beta_5 FinViab. + \beta_6 NID + \varepsilon_i$$

Further explanation about the variables incorporated in this regression is provided bellow.

III.3) Variables Explanation

III.3.1) Dependent Variable

Since the purpose of this study is to assess the impacts of changing tax policies in the capital structure of Italian firms, the dependent variable will obviously have to reflect the capital structure of these firms. Therefore, the dependent variable will be the leverage ratio of the firms included in our sample. This leverage ratio will be calculated as the ratio between Total Debt and Total Assets ($Lev_{\mathrm{i}} = \frac{Total\ Debt_{\mathrm{i}}}{Total\ Assets_{\mathrm{i}}}$), and $\mathrm{Lev_i}$ will represent the leverage ratio for firm i. It would have been also possible to use the long-term leverage ratio: instead of Total Debt we would have used Total Long-Term Debt to compute the ratio, but since we are interested in verifying if Italian firms decrease their overall levels of debt in the presence of the NID, it is best suited to check the impacts on a leverage ratio that incorporates all their debt.

III.3.2) Explanatory Variables

As far as explanatory variables are concerned, these will be separated in two distinct "categories": we will first define our variable of interest, following with a second category composed by control variables that try to account for the firm-specific effects.

III.3.2.1) Variable of Interest

NID - This is the variable on which we will be more focused, since it is the variable that will try to explain the effect of changing tax policies in the leverage ratio of Italian firms. At this point, expect the results to show that: (1) the included dummy variable for the effect of the NID to be statistically significant and (2) the coefficient associated with this variable to be negative, which would evidence that the NID not only affects the capital structure of firms, but also indeed contributes to a lower leverage ratio, and therefore, to a lower credit risk among Italian firms.

This variable will be a dummy variable, and consequently, will only take the value of either 0 or 1 (binary variable). When the firm-data gathered is in a period where the NID is put in practice (2011-2015), this variable will assume a value of 1. For the remaining years, this variable will always be equal to 0. However, since the NID was put only put in practice by the government in December 2011, we will also assume the value 0 for the year of 2011,

since the adjustment in not instantaneous.

III.3.2.2) Control Variables

Size – throughout recent literature, one can see that there seems to be an evident empirical relationship between firm size and leverage. It seems that as firms grow in size, they tend to get, not only an easier access to credit, but also better credit conditions, which culminates in higher leverage ratios for bigger firms. Krushev et al. (2015) point out that even though there seem to be exceptions – some smaller firms seem to choose higher leverage when refinancing, to compensate for their less frequent refinancing periods – there is mainly a positive relationship between firm size and leverage.

In our model, we will define Size as the natural logarithm of Total Assets ($Size_{\text{i}} = \ln(Total\ Assets_{\text{i}})$). We do this because our sample includes firms of different sizes, that can have big differences in terms of value and, therefore, by using the logarithm of the variable we reduce the absolute value of those differences, thus improving the model. We will expect that the coefficient associated with this variable is positive as per the reasons mentioned above.

Profitability – the second control variable we decided to include in our multiple regression is profitability. On one hand, one could think that more profitable firms could more easily get access to credit since they are ability to generate cash-flows is higher. However, the intuition behind the inclusion of this variable is the opposite, and may be related to the Pecking Order Theory: if one firm is very profitable, why should it incur in the costs of debt and its asymmetry of information, when it can fund itself internally? Frank et al. (2003) seem to corroborate this intuition. In their research regarding the relative importance of several factors in the leverage ratios of U.S firms, they show that profitability seems to negatively correlated with leverage, meaning that more profitable firms tend to have lower leverage ratios.

In our regression, we will define Profitability as EBIT – Earnings before Interest and Taxes, divided by Total Assets. We initially thought to define Profitability by using the variable ROA – Return on Assets –, but by using EBIT we are most likely to avoid high correlation with other variables in the model since EBIT it is not affected by the impact of taxes or interests on Debt. Therefore, Profitability can be defined by the expression:

($Profit._{\mathrm{i}} = \frac{EBIT_{\mathrm{i}}}{Total\ Assets_{\mathrm{i}}}$), and we will expect a negative coefficient associated to this variable.

Growth – when measuring the tax benefits of Debt, Graham (2000) was focused on assessing how much of a firm's value would be generated by the fiscal benefits of debt. However, Graham (2000) also seems to point out that during his research he found out evidence of other firm-specific factors, such as growth, to be associated with conservative debt policies (implying a negative relation between growth and leverage). More recently, Billett et al. (2007) conducted a research to specifically assess relationships between growth opportunities and leverage ratios, debt maturity and covenants. In this study, Billett et al. consistently observed this negative relationship between growth opportunities and leverage which, despite attenuated by the presence of covenant protections, was still evident.

With this in mind, we define our variable Growth as the variation rate in the level of Net Sales or Revenues, which is a commonly used approach. Therefore, Growth will be measured by the expression ($Growth_{\mathrm{i}} = \frac{Net\ Sales\ or\ Revenues\ (t)_{\mathrm{i}}}{Net\ Salesor\ Revenues\ (t-1)_{\mathrm{i}}} - 1$), as mentioned above, we will expect a negative coefficient associated with this variable.

Tangibility – this variable was one of the variables for which the decision to include it, or not, in the regression used was most difficult. Nowadays it seems that we can find more and more examples of firms which seem to have very few tangible assets within their asset structure, but that nonetheless present themselves as highly financed by debt (Lim et al. 2016). This seems to be the result of a "new-age" of businesses: these businesses appear to emerge out of the opportunities created by our society's technological advances. By using the internet, innumerable possibilities arose that enable companies to provide virtual services, without actually owning any physical assets. Therefore, most of their assets consist of intellectual property or softwares that seem to have no physical property. Even though Lim et al. (2016) show that there is a positive relationship between intangible assets and debt that is based on the fact that intangible assets can generate cash-flows as reliably as tangible ones, there are many studies that seem to evidence that there is a more significant relationship between asset tangibility and leverage (Hall, 2011). Hall (2011) seems to point out that companies with more tangible assets present themselves with higher leverage ratios. This is a consequence of the existing possibility for tangible assets, not only to generate reliable cash-flows, but also to be more easily used as collateral in debt contracts.

After careful thought, we decided to include tangibility in our regression for two reasons: (1) it seems that most Italian firms do not fit the profile of the "new age" businesses described above and (2) the conclusions revealed by Hall (2011), among others, seem to be solid and not driven by industry concentrations. We will define the variable Tangibility as the ratio between tangible assets and total assets ($Tang._{\mathrm{i}} = \frac{Tangible\ Assets_{\mathrm{i}}}{Total\ Assets_{\mathrm{i}}}$) and, as evidenced by Hall's conclusions (2011), we will expect a positive coefficient for the variable.

Financial Viability – regarding firm-specific factors included in our analysis, this is the last factor that we believed that it could be relevant to add. The intuition behind it is that a company's ability to pay its interests on outstanding debt, might not only condition its ability to contract further debt, but could also affect credit terms in case the firm can indeed engage in contracting new debt.

In our regression, we will define Financial Viability as the Interest Coverage ratio, which is equal to the EBIT – Earnings before Interest and Taxes –, divided by Interest Expenses on Debt. Therefore, the formula bellow is representative of this variable:

$$(FinViab._{\mathrm{i}} = \frac{EBIT_{\mathrm{i}}}{Total\ Interest\ on\ Debt_{\mathrm{i}}})$$

We will expect a negative coefficient for this variable, which is associated with the fact that firms that are more financially viable will have a lower need for debt. This goes in line with the logic for expecting a negative coefficient associated with profitability.

IV – Empirical Analysis & Results

We will initiate this section by providing detailed statistics of the variables included in our regression. Consequently, we will provide information regarding the correlations between those variables and follow up by showing our regression results. These results will be divided into three sub-sections. Finally, we conclude this section with a robustness test, to provide further significance to our results.

IV.1) Descriptive Statistics

In terms of working the sample used for the purpose of this study, the explanation for the treatment of outliers was the following: we decided to do something that seemed to fit a formal and literary approach: we winsorized every variable in our model (except the variable of interest – NID – since it is a dummy variable) by 5%. What this means is that we took the 5% extremes from both the upper and lower tails of the distribution of each variable, and moved them respectively to the values corresponding to the values of the percentiles 5 and 95. We handled outliers in the same way, for the two groups in our analysis.

Below, we provide three tables regarding information concerning these variables, after already handling the outliers. Table 1 shows the summary statistics of the dependent variable, for both groups previously described in our study. Tables 2 and 3 show the detailed statistics for the independent variables, respectively, for the Financials and Non-Financials groups.

Table 1 – Descriptive Statistics (Dependent Variable)

Dependent Variable - Leverage (Financials)					Dependent Variable - Leverage (Non-Financials)				
Percentiles		Smallest			Percentiles		Smallest		
1%	0	0			1%	.019499	.019499		
5%	0	0			5%	.019499	.019499		
10%	.0644524	0	Obs	305	10%	.0521221	.019499	Obs	1835
25%	.2301583	0	Sum of Wgt.	305	25%	.1585335	.019499	Sum of Wgt.	1835
50%	.3456197		Mean	.3213423	50%	.2963058		Mean	.297643
		Largest	Std. Dev.	.1570769			Largest	Std. Dev.	.1736537
75%	.4298907	.5748129			75%	.4151829	.6387459		
90%	.5219639	.5748129	Variance	.0246732	90%	.5523129	.6387459	Variance	.0301556
95%	.5748129	.5748129	Skewness	-.4540208	95%	.6387459	.6387459	Skewness	.1937331
99%	.5748129	.5748129	Kurtosis	2.484657	99%	.6387459	.6387459	Kurtosis	2.225974

Table 2 – Descriptive Statistics (Independent Variables): Financials

Independent Variable 1 - Size				
Percentiles		**Smallest**		
1%	10.31837	10.31837		
5%	10.31837	10.31837		
10%	11.93614	10.31837	**Obs**	306
25%	13.93895	10.31837	**Sum of Wgt.**	306
50%	16.00334		**Mean**	15.78766
		Largest	**Std. Dev.**	2.622044
75%	17.69721	20.26343		
90%	18.89978	20.26343	**Variance**	6.875113
95%	20.26343	20.26343	**Skewness**	-.3277057
99%	20.26343	20.26343	**Kurtosis**	2.430753

Independent Variable 2 - Profitability				
Percentiles		**Smallest**		
1%	-.120547	-.120547		
5%	-.120547	-.120547		
10%	-.0457306	-.120547	**Obs**	300
25%	.0011417	-.120547	**Sum of Wgt.**	300
50%	.0118434		**Mean**	.0038285
		Largest	**Std. Dev.**	.039218
75%	.0204789	.0610935		
90%	.0414739	.0610935	**Variance**	.001538
95%	.0610935	.0610935	**Skewness**	-1.777103
99%	.0610935	.0610935	**Kurtosis**	6.465634

Independent Variable 3 - Growth				
Percentiles		**Smallest**		
1%	-.6167281	-.616728		
5%	-.6167281	-.616728		
10%	-.2827576	-.616728	**Obs**	273
25%	-.1061282	-.616728	**Sum of Wgt.**	273
50%	.0166149		**Mean**	.0569547
		Largest	**Std. Dev.**	.3556879
75%	.1670518	1.110709		
90%	.4253964	1.110709	**Variance**	.1265139
95%	1.110709	1.110709	**Skewness**	1.101911
99%	1.110709	1.110709	**Kurtosis**	5.460781

Independent Variable 4 - Tangibility				
Percentiles		**Smallest**		
1%	.001128	.001128		
5%	.001128	.001128		
10%	.0063949	.001128	**Obs**	306
25%	.0199603	.001128	**Sum of Wgt.**	306
50%	.0310203		**Mean**	.0388705
		Largest	**Std. Dev.**	.0339618
75%	.0437962	.145939		
90%	.0783008	.145939	**Variance**	.0011534
95%	.145939	.145939	**Skewness**	1.901468
99%	.145939	.145939	**Kurtosis**	6.451296

Independent Variable 5 - Financial Viability				
Percentiles		**Smallest**		
1%	-44.6	-44.6		
5%	-44.6	-44.6		
10%	-8.142105	-44.6	**Obs**	289
25%	.4438033	-44.6	**Sum of Wgt.**	289
50%	1.850219		**Mean**	1.734067
		Largest	**Std. Dev.**	14.32217
75%	3.617325	31.46491		
90%	17.40631	31.46491	**Variance**	205.1245
95%	31.46491	31.46491	**Skewness**	-1.159743
99%	31.46491	31.46491	**Kurtosis**	7.106498

Independent Variable 6 - NID (Dummy)				
Percentiles		**Smallest**		
1%	0	0		
5%	0	0		
10%	0	0	**Obs**	308
25%	0	0	**Sum of Wgt.**	308
50%	0		**Mean**	.3636364
		Largest	**Std. Dev.**	.4818285
75%	1	1		
90%	1	1	**Variance**	.2321587
95%	1	1	**Skewness**	.5669467
99%	1	1	**Kurtosis**	1.321429

Table 3 – Descriptive Statistics (Independent Variables): Non-Financials

Independent Variable 1 - Size					Independent Variable 2 - Profitability				
Percentiles		Smallest			Percentiles		Smallest		
1%	10.54737	10.54737			1%	-.1423909	-.1423909		
5%	10.54737	10.54737			5%	-.1423909	-.1423909		
10%	10.98661	10.54737	Obs	1835	10%	-.0673193	-.1423909	Obs	1808
25%	11.92045	10.54737	Sum of Wgt.	1835	25%	.0003432	-.1423909	Sum of Wgt.	1808
50%	12.993		Mean	13.331	50%	.0397705		Mean	.0313563
		Largest	Std. Dev.	1.855307			Largest	Std. Dev.	.0704138
75%	14.59948	17.17213			75%	.0748413	.149969		
90%	16.07966	17.17213	Variance	3.442163	90%	.116733	.149969	Variance	.0049581
95%	17.17213	17.17213	Skewness	.4540068	95%	.149969	.149969	Skewness	-.6729476
99%	17.17213	17.17213	Kurtosis	2.280017	99%	.149969	.149969	Kurtosis	3.325458

Independent Variable 3 - Growth					Independent Variable 4 - Tangibility				
Percentiles		Smallest			Percentiles		Smallest		
1%	-.3871188	-.387118			1%	.0123968	.0123968		
5%	-.3871188	-.387118			5%	.0123968	.0123968		
10%	-.2141018	-.387118	Obs	1666	10%	.0249062	.0123968	Obs	1835
25%	-.0711818	-.387118	Sum of Wgt.	1666	25%	.0856907	.0123968	Sum of Wgt.	1835
50%	.0230367		Mean	.0285161	50%	.2040986		Mean	.2544357
		Largest	Std. Dev.	.1931599			Largest	Std. Dev.	.2009898
75%	.1223136	.4489812			75%	.3854673	.6953256		
90%	.288247	.4489812	Variance	.0373108	90%	.5638735	.6953256	Variance	.0403969
95%	.4489812	.4489812	Skewness	.0603463	95%	.6953256	.6953256	Skewness	.7025498
99%	.4489812	.4489812	Kurtosis	3.270309	99%	.6953256	.6953256	Kurtosis	2.429915

Independent Variable 5 - Financial Viability					Independent Variable 6 - NID (Dummy)				
Percentiles		Smallest			Percentiles		Smallest		
1%	-12.46917	-12.4691			1%	0	0		
5%	-12.46917	-12.4691			5%	0	0		
10%	-5.163688	-12.4691	Obs	1807	10%	0	0	Obs	1859
25%	.0006463	-12.4691	Sum of Wgt.	1807	25%	0	0	Sum of Wgt.	1859
50%	3.160747		Mean	6.679925	50%	0		Mean	.3636364
		Largest	Std. Dev.	13.85701			Largest	Std. Dev.	.4811751
75%	8.290769	50.16484			75%	1	1		
90%	23.55924	50.16484	Variance	192.0168	90%	1	1	Variance	.2315295
95%	50.16484	50.16484	Skewness	1.776922	95%	1	1	Skewness	.5669467
99%	50.16484	50.16484	Kurtosis	6.178076	99%	1	1	Kurtosis	1.321429

As we can see from the tables above, we seem to have a relatively well-balanced panel of companies for the two groups. In terms of firm size, we can detect firms with low and high

size, without much difference in the means for both groups. When looking at Profitability, we also have included profitable and non-profitable firms for both groups, but it is interesting to see that the average Profitability for the Financials group is almost ten times the value for Non-Financial firms. When looking at Growth, we can see that we have included firms that are growing as well as firms that have decreasing revenues, which seem to be in a more mature state (some even in a state of bankruptcy). It also seems evident that we incorporate firms that have both high and low levels of Tangibility, and, as expected, the level of Tangibility is much higher for the Non-Financials group. As far as Financial Viability is concerned, we can see that even though we winsorized our variables at 5%, there is still a great level of variance.

In principle, since the data seems to be well-balanced, all this evidence combined should allow for a good overall representativeness of the results we obtained.

IV.2) Correlations

When looking at the correlations between the dependent variable and the explanatory variables incorporated in our model, conclusions can be drawn regarding the relationship of these variables with the level of Leverage. We can also check for high correlations between explanatory variables, that can evidence multicollinearity problems.

Tables 4 and 5, presented below, show Pearson's correlation coefficients (which assumes a linear relationship between variables) for both groups in our analysis.

Table 4 – Pearson Coefficients (Financials group)

Pearson's Correlation Coefficients							
	Leverage	**Size**	**Profitability**	**Growth**	**Tangibility**	**Fin.Viability**	**NID**
Leverage	1.0000						
Size	0.5542	1.0000					
Profitability	0.1918	0.4238	1.0000				
Growth	-0.0322	-0.0113	0.1832	1.0000			
Tangibility	0.0243	-0.2602	-0.4390	-0.0634	1.0000		
Fin.Viability	0.0841	0.1969	0.7169	0.1972	-0.3045	1.0000	
NID	-0.0045	0.0464	-0.1363	-0.0249	-0.0775	-0.1088	1.0000

When looking at the correlation coefficients for the Financials group, one can see that the apparent existing high correlations all come from the variables Size and Profitability. Size

is the only variable that shows significant correlation with the dependent variable (around 50%), while Profitability shows significant correlation with other explanatory variables (namely Size, Tangibility and Financial Viability).

Another interesting aspect that we can observe from this Table is that for this group our variable of interest (NID) seems to be negatively correlated to our dependent variable (Leverage) and to the majority of the explanatory variables, except for Size. This could perhaps be an indicator, for future analyses, that Financial firms might verify an increase in Size, when in the presence of the NID (please note that correlation does not imply causality. It is simply an indicator of a possible positive relationship).

Table 5 – Pearson Coefficients (Non-Financials group)

Pearson's Correlation Coefficients							
	Leverage	**Size**	**Profitability**	**Growth**	**Tangibility**	**Fin.Viability**	**NID**
Leverage	1.0000						
Size	0.0356	1.0000					
Profitability	-0.3012	0.2561	1.0000				
Growth	-0.1219	0.0713	0.3119	1.0000			
Tangibility	0.2558	0.1057	-0.0361	-0.0189	1.0000		
Fin.Viability	-0.4936	0.0353	0.6598	0.1822	-0.1336	1.0000	
NID	0.0573	0.0119	-0.1256	-0.1511	-0.0294	-0.0677	1.0000

Focusing on the Pearson coefficients for correlations in respect to the Non-Financials group, we can see some major differences when comparing to the Financials group: first of all, the variable that seems to have more correlation with the other in the Financials group (Size) is no longer highly correlated neither with our dependent variable, neither with Tangibility. It seems that the only relatively high correlation it maintained is with the variable Profitability. When considering this different group in our sample (Non-Financials), Profitability is still highly correlated with other explanatory variables, but in this case, mostly with Growth and Financial Viability. Another important difference, that goes against our initial intuition is that the NID is slightly positively correlated to Leverage. We will address this issue in the next sub-section.

IV.3) Regression Results

IV.3.1) Fixed vs Random-effects

Before running our regressions for the two distinct groups, we had to decide either to

use a Fixed-effects or a Random-effects regression for each of these groups. This decision was made based on the results of the Hausman test. Under this test, the null hypothesis is that a Random-effects regression is best suited for the data we are using, while the alternative hypothesis is that a Fixed-effects regression is better. We performed the Hausman test for the two groups in our study, and we evidenced that both for the Financials, and the Non-Financials groups, we would reject the null hypothesis and conclude that the Fixed-effects regression was best suited.

Below, we can see Tables 6 and 7 that show the results of the Hausman test, respectively for the Financial and Non-Financials group.

Table 6 – Hausman test results (Financials group)

	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
Size	.08883	.0397915	.0490385	.015555
Profitability	.2352153	.124364	.1108512	.
Growth	-.0014599	.0033852	-.0048451	.
Tangibility	.4306515	.6584391	-.2277876	.0288514
Fin.Viability	.000042	.0003349	-.0002928	.0000454
NID	-.007111	-.0023015	-.0048095	.

Test: Ho: difference in coefficients not systematic

chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)

= 15.09 Prob>chi2 = 0.0196

(V_b-V_B is not positive definite)

As we can see, for a significance level of 5%, and with a Probabilitity>chi2 equal to 1.96%, we have to reject the null hypothesis that a Random-effects model is more appropriate, and therefore, the suited regression for the Financials group is, the Fixed-effects one. Table 7 will show the same results for the Non-Financials group.

Table 7 – Hausman test results (Non-Financials group)

	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
Size	.0421669	.0169075	.0252594	.0057236
Profitability	-.4395955	-.3937209	-.0458746	.0023662
Growth	-.0019152	.0017696	-.0036848	.
Tangibility	.073604	.0904754	-.0168714	.007927
Fin.Viability	-.0008	-.0014923	.0006924	.0000668
NID	.0077866	.0075165	.0002701	.

Test: Ho: difference in coefficients not systematic

chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)

= 69.26 Prob>chi2 = 0.0000

(V_b-V_B is not positive definite)

When looking at the Non-Financials group, it seems that for a significance level of 5%, we also have to reject the null hypothesis, and as a consequence, the Fixed-effects regression is, again, the most appropriate one.

Therefore, the regression outputs in the next sub-section were generated having these results into consideration.

IV.3.2) Regression Outputs

When looking at the first results obtained, they seem to be quite different for the two groups in our analysis. Below, in tables 8 and 9, we have the STATA outputs of the initial regressions we ran for both groups.

Table 8 - Initial Regression Output (Financials)

Fixed-effects (within) regression			Number of obs =		257
Group variable:	CompanyCode		Number of groups =		28
R-sq:	within =	0.1729	Obs per group:	min =	5
	between =	0.3667		avg =	9.2
	overall =	0.3310		max =	10
			F(6,223) =		7.77
corr(u_i, Xb) = -0.8178			Prob > F =		0.0000

Leverage	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Size	.08883	.0167697	5.30	0.000	.0557827	.1218773
Profitability	.2352153	.2465845	0.95	0.341	-.2507187	.7211492
Growth	-.0014599	.0147607	-0.10	0.921	-.0305483	.0276285
Tangibility	.4306515	.2061464	2.09	0.038	.0244073	.8368957
Fin.Viability	.000042	.000596	0.07	0.944	-.0011326	.0012166
NID	-.007111	.0107481	-0.66	0.509	-.0282919	.0140699
_cons	-1.104122	.264036	-4.18	0.000	-1.624447	-.583797

Looking at Table 8, we can see from the initial results regarding the financials group, that there are several relevant aspects to evidence: (i) Regarding the control variables, and as expected, the coefficients associated with the variables Size and Tangibility are positive. This goes in line with previous literature mentioned in Section 3. We also verify that the coefficients associated with the variables Growth, Profitability and Financial Viability are not significant, which makes it impossible for us to draw any conclusions since we cannot infer that they are statistically different from zero. This may derive from the small sample of firms that we have in the Financials group. (ii) In respect to the variable of interest, NID, we can also state that the associated coefficient associated to this variable is not statistically different from zero. Even if this coefficient is negative in the first column of Table 8, we can see from the 95% confidence interval in the last two columns that it belongs to a range that includes both positive and negative values. Therefore, based on Table 8, we can make no conclusions regarding the impact of the NID in the leverage ratio of Financial firms. (iii) finally, even though the R squared of the model is not high (around 33%), we can see that overall significance of the model is attested for a 5% significance level, since the Probability > F = 0.0000.

In the next sub-section (Regression Adaptations) we will perform some adjustments to this initial regression, to check if we can improve our results, since it seems that we have some variables with extremely high P values, which can be dropped from our initial regression.

Table 9 - Initial Regression Output (Non-Financials)

Fixed-effects (within) regression			Number of obs =	1639	
Group variable:	CompanyCode		Number of groups =	169	
R-sq:	within =	0.1199	Obs per group:	min =	5
	between =	0.0508		avg =	9.7
	overall =	0.0610		max =	10
			F(6,1464) =	33.25	
corr(u_i, X)= -0.2545			Prob > F =	0.0000	

Leverage	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Size	.0421669	.0070966	5.94	0.000	.0282463	.0560875
Profitability	-.4395955	.0585621	-7.51	0.000	-.55447	-.3247209
Growth	-.0019152	.0119588	-0.16	0.873	-.0253735	.0215431
Tangibility	.073604	.0224239	3.28	0.001	.0296176	.1175904
Fin.Viability	-.0008	.0003389	-2.36	0.018	-.0014648	-.0001351
NID	.0077866	.0043414	1.79	0.073	-.0007295	.0163026
_cons	-.2647891	.0954851	-2.77	0.006	-.4520914	-.0774868

When we look at Table 9, there are some immediate differences one can detect when comparing with the results from the Financials group. (i) It seems that for the Non-Financials group, the coefficient associated with Profitability is negative, which goes in line to what we expected. Also, the coefficient associated with Financial Viability changed, and is now negative, which again seems to go in line with existing literature and consequently, to what we expected beforehand. (ii) the coefficients associated with Size and Tangibility and did not change, and remain in line to what we were initially hoping to get. However, the coefficient associated to the variable Growth is not statistically different from zero, just like in Table 8. (iii) The coefficient associated with the variable of interest, NID, is positive, which is something that contradicts its intended effect and that we were not expecting to obtain. However, this is only true for a significance level of 10%. (iv) Finally, when considering a 5% significance level, all variables in the model seem to be significant, apart from Growth and our variable of interest – NID –. However, our variable of interest is significant when considering a 10% significance level, whereas Growth would imply a significance level above 80% to be significant. Again, in the next sub-section (Regression Adaptions) we will address these issues.

We can also see that the overall regression has a low value in terms of the R squared

(around 8%), but the general significance of the model is attested by looking at the Probability > F which is 0.0000.

IV.3.3) Regression Adaptations

IV.3.3.1) Adaptations: Non-Financials group

After analysing the outputs from the initial regressions, the major issue we found was the positive coefficient associated with the NID variable, for the Non-Financials group. This would mean that, in the presence of the NID, firms would become more leveraged, which for us did not make sense given the theoretical framework we discussed before. Therefore, we decided to run regressions containing interaction terms of the control variables, multiplied by the variable of interest. In these regressions, we decided not to drop the variable Growth, since by doing so, we would not be able to assess whether the source of our changes in results would come from adding the interaction term, or from dropping the variable. Since the variable Growth was not significant, we decided not run any regressions including an interaction term with that variable. The different regressions we ran, for the Non-Financials group, are the following:

(i)$Lev_i = \beta_0 + \beta_1 Size_i + \beta_2 Profit._i + \beta_3 Growth_i + \beta_4 Tang._i + \beta_5 FinViab._i + \beta_6 NID + \beta_7 Size*NID + \varepsilon_i$

(ii)$Lev_i = \beta_0 + \beta_1 Size_i + \beta_2 Profit._i + \beta_3 Growth_i + \beta_4 Tang._i + \beta_5 FinViab._i + \beta_6 NID + \beta_7 Profit.*NID + \varepsilon_i$

(iii)$Lev_i = \beta_0 + \beta_1 Size_i + \beta_2 Profit._i + \beta_3 Growth_i + \beta_4 Tang._i + \beta_5 FinViab._i + \beta_6 NID + \beta_7 Tang.*NID + \varepsilon_i$

(iv)$Lev_i = \beta_0 + \beta_1 Size_i + \beta_2 Profit._i + \beta_3 Growth_i + \beta_4 Tang._i + \beta_5 FinViab._i + \beta_6 NID + \beta_7 FinViab.*NID + \varepsilon_i$

What we intended with these regressions was to check if we could identify at least one interaction variable with a negative coefficient associated, meaning that the NID would only

lead lower leverage ratios for firms with specific characteristics. Since the coefficient associated with the NID variable for the Financials group was already negative, there was no need to run these regressions for that particular group.

In our analysis, we will not show the outputs of regressions (iii) and (iv) since the coefficients associated with the interaction variable in all those regressions were still positive, and therefore, there seemed to be no need in evidencing them. However, Tables 10 and 11, presented below, show the output of regressions (i) and (ii), which seemed to provide interesting results, that go in line with the intended effect of the NID introduction (especially regression ii).

Table 10 - Adapted Regression (i) (Non-Financials)

Fixed-effects (within) regression			Number of obs =	1639	
Group variable:	CompanyCode		Number of groups =	169	
R-sq:	within =	0.1253	Obs per group:	min =	5
	between =	0.0467		avg =	9.7
	overall =	0.0578		max =	10
			F(7,1463) =	29.94	
corr(u_i, X) = -0.2824			Prob > F =	0.0000	

Leverage	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Size	.0470935	.0072654	6.48	0.000	.0328418	.0613452
Profitability	-.4462395	.0584448	-7.64	0.000	-.5608841	-.331595
Growth	-.003227	.0119343	-0.27	0.787	-.0266372	.0201832
Tangibility	.0718734	.0223704	3.21	0.001	.027992	.1157548
Fin.Viability	-.000778	.0003381	-2.30	0.022	-.0014413	-.0001148
NID	.09988	.0310063	3.22	0.001	.0390584	.1607017
sizeNID	-.0068945	.0022985	-3.00	0.003	-.0114032	-.0023857
_cons	-.3300289	.0976777	-3.38	0.001	-.5216323	-.1384256

For this regression, where we include an interaction variable equal to Size*NID (referred to as sizeNID in Table 10) we can see that even though the coefficients associated with the variables Size and NID by themselves are positive, the result of the interaction term between these two variables has a negative coefficient associated to it (with a P value of 0.000, which makes it significant). This means that the observed impact of the NID (for Non-Financial firms) in increasing Italian firms' leverage ratios is smaller for larger firms. In that case, for larger size firms, the NID would lead to an increase in leverage ratios that is lower

than for smaller size firms. We can also see that the P value for the NID variable decreased to 0.001, and that the majority of the P values observed for the control variables makes them significant for a 5% significance level.

Table 11 - Adapted Regression (ii) (Non-Financials)

Fixed-effects (within) regression			Number of obs =	1639	
Group variable: CompanyCode			Number of groups =	169	
R-sq:	within =	0.1356	Obs per group:	min =	5
	between =	0.0307		avg =	9.7
	overall =	0.0416		max =	10
			F(7,1463) =	32.78	
corr(u_i, X) = -0.4062			Prob > F =	0.0000	

Leverage	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Size	.0546544	.0074421	7.34	0.000	.040056	.0692528
Profitability	-.3177284	.0627009	-5.07	0.000	-.4407215	-.1947352
Growth	-.0057848	.0118799	-0.49	0.626	-.0290882	.0175186
Tangibility	.0690194	.022249	3.10	0.002	.025376	.1126627
Fin.Viability	-.0007925	.000336	-2.36	0.018	-.0014517	-.0001333
NID	.0166597	.0046365	3.59	0.000	.0075648	.0257546
profitNID	-.3503235	.0680613	-5.15	0.000	-.4838316	-.2168154
_cons	-.4347139	.1002558	-4.34	0.000	-.6313744	-.2380534

As far as Non-Financials are concerned, this seems to be our best regression in terms of results: not only are all coefficients associated with our variables significant (except for Growth), but we can see that, even though the NID seems to lead to an increase close to 2% in leverage ratios, for more profitable firms there is a high decrease in that effect (evidenced by the coefficient associated with our interaction term equal to around 35%). This is indeed more in line to what we initially hoped to achieve. We will later interpret this result in section IV.

From this point on, we will consider our Adapted Regression (ii) (for the Non-Financials group) as our Final Regression for this group, since it seems to be the most relevant.

IV.3.3.2) Adaptations: Financials group

The second set of adaptations to our initial regressions was done to the Financials group. Even though we had decided to avoid as much as possible to remove any variables

from our initial regressions, it seemed that due to the extremely high P value observed regarding the variables Growth and Financial Viability, we decided we had to run a regression where we would exclude these variables. There were other variables that had coefficients with relatively high P values, but we decided to keep them for the theoretical reasons mentioned above and due to the fact that, despite not significant at a 5%-10% level, their inclusion contributed to the overall significance for the model. The adapted regression ran was, therefore, the following:

(i) $Lev_i = \beta_0 + \beta_1 Size_i + \beta_2 Profit._i + \beta_3 Tang._i + \beta_4 NID + \varepsilon_i$

Below, in Table 12, we can see the results of that regression, which was mainly intended at increasing the significance of the negative coefficient associated with the NID variable (meaning: decreasing its P value).

Table 12 - Adapted Regression (i) (Financials)

Fixed-effects (within) regression			Number of obs =	299	
Group variable: CompanyCode			Number of groups =	28	
R-sq:	within =	0.1543	Obs per group:	min =	9
	between =	0.4040		avg =	10.7
	overall =	0.3208		max =	11
			F(4,267) =	12.18	
corr(u_i, X) = -0.7400			Prob > F =	0.0000	

Leverage	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Size	.0779012	.0131714	5.91	0.000	.0519681	.1038342
Profitability	.1920912	.1996191	0.96	0.337	-.2009366	.585119
Tangibility	.464106	.1876835	2.47	0.014	.094578	.833634
NID	-.011799	.0107536	-1.10	0.274	-.0329716	.0093736
_cons	-.9218063	.205866	-4.48	0.000	-1.327133	-.516479

As evidenced from the results above, we can see that after excluding the variables Growth and Financial Viability from our model, the significance of the coefficient associated with our variable of interest also improved (P value decreased to around half of its value in the initial regression). Also, even though we cannot state that the coefficient associated to our variable of interest is significantly different from zero, we can observe that its P value decreased to almost half of its initial value.

Due to the results we obtained in the adapted regressions, for the Non-Financials group, we decided to check if the inclusion of the interaction terms Size*NID and Profitability*NID would lead to the same conclusions regarding the Financials group. Therefore, we ran two additional regressions, that incorporated the removal of the variables Growth and Financial Viability (as before), and also an interaction term. The two extra regressions we ran are the following:

(ii) $Lev_i = \beta_0 + \beta_1 Size_i + \beta_2 Profit._i + \beta_3 Tang._i + \beta_4 NID + \beta_5 SizeNID + \varepsilon_i$

(iii) $Lev_i = \beta_0 + \beta_1 Size_i + \beta_2 Profit._i + \beta_3 Tang._i + \beta_4 NID + \beta_5 Profit.NID + \varepsilon_i$

However, after looking at the outputs we got from these regressions, we verified that the results are not at all similar to the Non-Financials group. The interaction term Profitability*NID has now a positive coefficient associated that is not significant and therefore, we have no need to display its results since it will not affect our conclusions. (see Appendix 2). However, the inclusion of the interaction term Size*NID does have a negative coefficient, but at the same time it makes the coefficient of the NID variable positive, and makes it significant for a 10% significance level. Results can be seen in Table 13, displayed below:

Table 13 - Adapted Regression (ii) (Financials)

Fixed-effects (within) regression			Number of obs =	299	
Group variable:	CompanyCode		Number of groups =	28	
R-sq:	within =	0.1661	Obs per group:	min =	9
	between =	0.4047		avg =	10.7
	overall =	0.3236		max =	11
			F(5,266) =	10.60	
corr(u_i, X) = -0.7371			Prob > F =	0.0000	

Leverage	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Size	.0801518	.0131557	6.09	0.000	.0542493	.1060544
Profitability	.2088761	.1987899	1.05	0.294	-.1825257	.600278
Tangibility	.4972889	.1875115	2.65	0.008	.1280934	.8664844
NID	.102638	.0600901	1.71	0.089	-.0156748	.2209508
sizeNID	-.0071759	.0037078	-1.94	0.054	-.0144764	.0001245
_cons	-.9586263	.2056973	-4.66	0.000	-1.363628	-.5536242

Since our objective is to be able to apply our results to a wider set of companies as possible, we will consider our Adapted Regression (i) (for the Financials group), as our Final Regression, since it does not limit the impact of the NID to a specific group of firms, within the Financials group.

IV.4) Additional Robustness Tests

When checking the results obtained for robustness we decided to proceed in two different ways: the first one will be handling the outliers in our sample in a similar, but different way. The second approach we decided to implement when assessing for the robustness of our results was to limit the time span of our analysis.

Consequently, we applied these two approaches to our altered regressions, not to the initial ones since, after the changes, we improved our results. Results from these two approaches are presented below.

IV.4.1) Different handling of outliers

Regarding the different way of handling the outliers in our sample, we decided to check if by winsorizing them at 1% (meaning moving the lower and upper 1% extremes respectively to the values corresponding to percentiles 1 and 99, our results would hold.

Table 14 and 15, presented below, show the results of our adapted regressions, with the variables winsorized at 1%, for the Financial group. Table 14 shows the results of our Adapted Regression (i), which excludes the Growth and Financial Viability variables, while Table 15 not only excludes these variables, but also incorporates the interaction term Size*NID (which corresponds to our Adapted Regression (ii)). However, we are now winsorizing all variables at 1%, while before they were winsorized at 5%.

Table 14 - Adapted Regression (i): Financials – 1% Winsorized

Fixed-effects (within) regression			Number of obs =	299	
Group variable:	CompanyCode		Number of groups =	28	
R-sq:	within =	0.0868	Obs per group:	min =	9
	between =	0.3493		avg =	10.7
	overall =	0.2713		max =	11
			F(4,267) =	6.34	
corr(u_i, X) = -0.4208			Prob > F =	0.0001	

Leverage	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Size	.0527611	.0137788	3.83	0.000	.0256323	.07989
Profitability	-.0195078	.1134029	-0.17	0.864	-.2427856	.2037699
Tangibility	.3037629	.117731	2.58	0.010	.0719636	.5355621
NID	-.0152616	.0118213	-1.29	0.198	-.0385364	.0080132
_cons	-.5097546	.2156505	-2.36	0.019	-.9343464	-.0851628

As we can see from this table, results from our adapted regression (i), when winsorizing the variables at 1%, do not seem to variate much from what we could verify in the adapted regression we initially put in place: the first thing just jumps to mind is that the P value associated with the Profitability variable to be higher. The coefficient associated with Profitability is also the only coefficient associated with the explanatory variables in our model that changes in terms of signal (goes from positive to negative), but since we cannot give statistical significance to that coefficient, this is not conclusive. Finally, in terms of absolute value we can see that the impact of the NID is a bit higher (1,5%), but still similar to the 1,1% impact in the leverage ratios of Financial firms, verified before.

Table 15 - Adapted Regression (ii): Financials – 1% Winsorized

Fixed-effects (within) regression			Number of obs =	299	
Group variable: CompanyCode			Number of groups =	28	
R-sq:	within =	0.1001	Obs per group:	min =	9
	between =	0.3476		avg =	10.7
	overall =	0.2728		max =	11
			F(5,266) =	5.92	
corr(u_i, X) = -0.4507			Prob > F =	0.0000	

Leverage	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Size	.0569549	.013866	4.11	0.000	.0296539	.0842559
Profitability	.0306474	.1155866	0.27	0.791	-.1969335	.2582284
Tangibility	.3185634	.1173274	2.72	0.007	.0875548	.5495721
NID	.1113695	.0649321	1.72	0.087	-.0164768	.2392158
sizeNID	-.0079434	.0040058	-1.98	0.048	-.0158304	-.0000563
_cons	-.5764731	.217099	-2.66	0.008	-1.003924	-.149022

Again, when looking at Table 15, we can see that for the adapted regression (ii) concerning the Financials group, none of the coefficients changes its signal, and also none of

them change significantly in absolute terms, which means that for this group, results seem robust when changing the handling of outliers.

When checking for robustness regarding the treatment of outliers for the Non-Financials group, results are shown below in Tables 16 and 17. Table 16 includes the interaction Size*NID, and therefore reflects our Adapted Regression (i) for the Non-Financials group, when variables are winsorized at 1%.

Table 16 - Adapted Regression (i): Non-Financials – 1% Winsorized

Fixed-effects (within) regression			Number of obs =	1639	
Group variable:	CompanyCode		Number of groups =	169	
R-sq:	within =	0.1388	Obs per group:	min =	5
	between =	0.0796		avg =	9.7
	overall =	0.0949		max =	10
			F(7,1436) =	33.68	
corr(u_i, X) = -0.0436			Prob > F =	0.0000	

Leverage	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Size	.0288911	.0078219	3.69	0.000	.0135478	.0442344
Profitability	-.4932448	.0386873	-12.75	0.000	-.5691333	-.4173563
Growth	.0052887	.0079096	0.67	0.504	-.0102268	.0208041
Tangibility	.1002925	.0235479	4.26	0.000	.0541012	.1464838
Fin.Viability	.0000666	.0001291	0.52	0.606	-.0001865	.0003198
NID	.0955054	.0333012	2.87	0.004	.0301822	.1608286
sizeNID	-.006322	.0024568	-2.57	0.010	-.0111413	-.0015028
_cons	-.0972789	.1053871	-0.92	0.356	-.3040048	.1094471

Table 17 includes the interaction term Profitability*NID, therefore reflecting our Adapted Regression (ii), but now winsorizing the variables at 1%, instead of the previous winsorizing at 5%.

Table 17 - Adapted Regression (ii): Non-Financials – 1% Winsorized

Fixed-effects (within) regression			Number of obs =	1639	
Group variable:	CompanyCode		Number of groups =	169	
R-sq:	within =	0.1432	Obs per group:	min =	5
	between =	0.0592		avg =	9.7
	overall =	0.0777		max =	10
			F(7,1463) =	34.92	
corr(u_i, X) = -0.1220			Prob > F =	0.0000	

Leverage	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Size	.0316947	.0078273	4.05	0.000	.0163409	.0470486
Profitability	-.3919743	.0469763	-8.34	0.000	-.4841224	-.2998262
Growth	.0039043	.0079051	0.49	0.621	-.0116024	.0194109
Tangibility	.0995174	.0234892	4.24	0.000	.0534414	.1455935
Fin.Viability	.0000137	.0001293	0.11	0.916	-.00024	.0002673
NID	.0152115	.0050803	2.99	0.003	.005246	.0251769
profitNID	-.2094168	.0556338	-3.76	0.000	-.3185474	-.1002863
_cons	-.1371707	.1056365	-1.30	0.194	-.344386	.0700445

As we can see from Tables 16 and 17, the major difference seems to be that the P value for the coefficient associated with the variable Financial Viability greatly increases. We can also see that there are no coefficients whose effect changes in terms of signal (+ or -), so the effects remain the same. The only relevant change, in absolute terms, respects the interaction term Profitability*NID which decreases from 35% to 21%, but it still remains as a very high and significant value.

We can therefore conclude that results for both groups are robust when handling outliers in a different way.

IV.4.2) Limiting time span

When limiting the time span, we thought it would be appropriate to use, instead of 11 years of sample (from 2005 to 2015), a period of only 6 years. Therefore, considering the NID implementation in 2012, the period comprised will be from 2009 to 2014. We expect, beforehand, that the significance of all coefficients will be reduced due to a decreased set of observations for each firm in our sample (for both groups). We also expect that results do not change significantly, so that we can attest for the robustness of our study.

In conclusion, we present the results of the Final regressions for both groups, for a 6-

year period, below (in tables 18 and 19).

Table 18 - Final Regression (Financials); 2009-2014

Fixed-effects (within) regression			Number of obs =	164	
Group variable:	CompanyCode		Number of groups =	28	
R-sq:	within =	0.3492	Obs per group:	min =	9
	between =	0.4099		avg =	10.7
	overall =	0.3406		max =	11
			F(4,132) =	17.71	
corr(u_i, X) = -0.9412			Prob > F =	0.0000	

Leverage	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Size	.1435389	.0265292	5.41	0.000	.0910615	.1960162
Profitability	1.165952	.357619	3.26	0.001	.4585468	1.873358
Tangibility	.5604186	.2333023	2.40	0.018	.0989237	1.021914
NID	-.0006448	.0127038	-0.05	0.960	-.0257742	.0244846
_cons	-1.966991	.4184426	-4.70	0.000	-2.794712	-1.13927

Table 19 – Final Regression (Non-Financials); 2009-2014

Fixed-effects (within) regression			Number of obs =	984	
Group variable:	CompanyCode		Number of groups =	169	
R-sq:	within =	0.0962	Obs per group:	min =	3
	between =	0.0384		avg =	5.8
	overall =	0.0465		max =	6
			F(7,808) =	12.29	
corr(u_i, X) = -0.1655			Prob > F =	0.0000	

Leverage	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Size	.0335761	.0124907	2.69	0.007	.0090579	.0580942
Profitability	-.3202824	.0868254	-3.69	0.000	-.4907124	-.1498524
Growth	.0009611	.0140944	0.07	0.946	-.0267048	.028627
Tangibility	.0441882	.0320683	1.38	0.169	-.0187589	.1071353
Fin.Viability	-.0005356	.0004597	-1.17	0.244	-.001438	.0003668
NID	.0053219	.0049992	1.06	0.287	-.0044911	.0151348
profitNID	-.2431274	.0774416	-3.14	0.002	-.3951379	-.0911169
_cons	-.1366704	.1681047	-0.81	0.416	-.4666439	.193303

From the analysis of the two tables above we can again verify that our results indeed seem to be robust. However, the P value of our variable of interest (in the case of the Financials group) greatly increased. This happened because we greatly reduced the total number of observations, for an already small sample group. We can also verify that the sign associated to the interaction term profit*NID (in table 19) did not change, and even though its absolute value was reduced, it still remained very high (24%). Finally, from tables 18 and 19 we can even observe that none of the signals associated with the coefficients of the explanatory variables changes, when comparing to the Final Regressions for both groups, which means that (for the variables that are significantly different from zero) the effects of each explanatory variables are indeed robust when reducing the time span of our analysis.

V – Conclusion & Limitations

In this final section we will start by presenting the main results we got, relating those findings to what we initially expected to evidence. We will also discuss a possible theoretical framework that can help explain these results. Finally, we will conclude by presenting the main limitations we identified throughout this study and that we believe could have influenced our general results.

First of all, in answer to our first research question, our results allow us to conclude that, based on our sample: (i) changes in tax policies do not seem to affect the capital structure of Financial firms and (ii) changes in tax policies do affect the capital structure of firms of Non-Financial firms. From our Final Regressions we can see that the coefficients associated with our variable of interest (i) are not significant for the Financials group and (ii) are significant for a significance level of 5% for the Non-Financials group. We believe that, possibly, with a larger number of firms included in our Financials group, we could have reached statistically significant results for the effect of the NID in Financial firms leverage ratios. This way, the answer to our first research question, with a 95% confidence level is, based on the Italian case, yes; tax policies do affect the capital structure of Non-Financial firms, but not the capital structure of Financial firms.

Regarding the second research question, we wanted to verify if the implementation on the NID would decrease the leverage ratio of firms. This question can be answered by looking at the output of our Final Regressions for both groups: results point out that (i) among Financial firms, since we cannot state that the NID impacted their leverage ratios, we consequently cannot say that the NID decreased those same leverage ratios. (ii) For the Non-Financials group, the NID lead to a 2% increase in leverage ratios, but that increase is greatly reduced for more profitable firms. Even though we could not prove, as initially intended, that the NID reduced the leverage ratio of all Non-Financial firms in our analysis, we could at least verify that for profitable firms, the NID did seem to have a less negative impact, which is closer to its desired impact. Consequently, one can answer our second research question negatively, but with some considerations: no, the NID did not lead to lower leverage ratios, among firms in our sample, but it seems that the increases in leverage ratios of Non-Financials firms were attenuated for more profitable firms.

After conducting Robustness tests, these results we just evidenced seem to remain valid when handling outliers in a more "permissive" approach and also when limiting the initial time-span of our analysis (11 years) to a shorter period (6years). However, we were expecting a wider impact of the NID in reducing leverage ratios. We believe that, despite the fact that for more profitable firms (among the Non-Financials group) leverage ratio increases were highly softened, we were expecting concrete evidence for the impact of the NID in reducing leverage ratios for both the Financials and the Non-Financials group. Hence the limitations we will now start to refer:

First we were only able to conduct our analysis for public firms, since those were the firms available in the Worldscope database. Since the NID was designed to be implemented and affect all companies, and not just public companies this surely affects our results. When compared to private firms, public firms might usually in better conditions to contract debt, and seem to get loans under better terms, since there is a lower asymmetry of information from the banks' perspective. This could eventually mean that the NID impact, in lowering leverage ratios, for private firms would be more meaningful, which would translate in somehow more evident results. Further research could perhaps try to include a sample with both public and private firms.

Another limitation is that we could only prove the increase in leverage ratios of Non-Financial firms was softened for more profitable firms. This could have a possible simple explanation, related to our final limitation in the following paragraph: profitable firms are the ones that do have the ability to fund themselves internally, therefore capitalizing on the possible benefits given by the NID. It could be an interesting point for the future, to separate the sample into groups based on their level of profitability.

Finally, one other limitation for the low impact we verified could be the recession in Italy. Our sample comprises a time period which includes the financial crisis of 2008, and as we know, its effects lasted for consequent years. Considering more recent years, we can still verify the turmoil in the EU economy (2009 Sovereign Debt crisis), which means that after the financial crisis of 2008, there were still other negative impacts for businesses resulting from the global economy. This may have translated in an impossibility for firms to invest their own capital into their respective businesses, which is reflected in an inability to capitalize on the NID benefits. The effects of these crisis were not incorporated in our regressions, and could perhaps be a point for improvement in the future.

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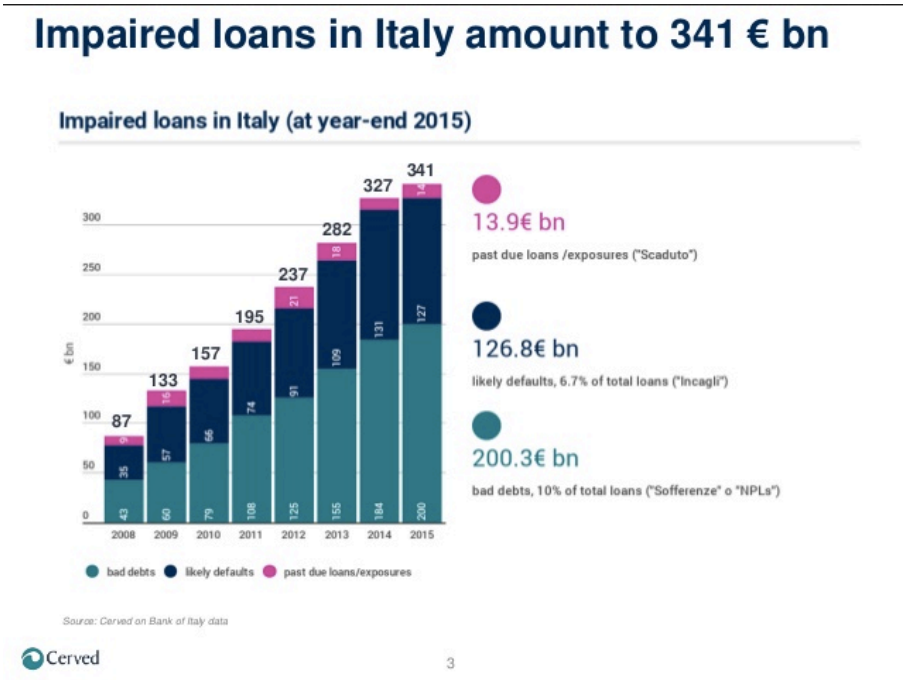
VII –Appendices

Appendix 1: High number of Impaired Loans in Italy



Appendix 2: Adapted Regression (iii) (Financials) – output from STATA

```
. xtreg leverage size profitability tangibility NID profitNID, fe

Fixed-effects (within) regression               Number of obs      =       299
Group variable: CompanyCode                     Number of groups   =        28

R-sq:  within  = 0.1557                         Obs per group: min =         9
       between = 0.4027                                        avg =      10.7
       overall = 0.3208                                        max =        11

                                                F(5,266)           =      9.81
corr(u_i, Xb)  = -0.7196                        Prob > F           =    0.0000
```

leverage	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
size	.075138	.0138437	5.43	0.000	.0478809	.1023952
profitability	.1436004	.2131013	0.67	0.501	-.2759794	.5631803
tangibility	.4523897	.1887338	2.40	0.017	.0807875	.8239918
NID	-.011025	.0108297	-1.02	0.310	-.0323479	.010298
profitNID	.177704	.2712615	0.66	0.513	-.3563888	.7117968
_cons	-.8775489	.2168771	-4.05	0.000	-1.304563	-.4505348
sigma_u	.15236246					
sigma_e	.08033452					
rho	.78247118	(fraction of variance due to u_i)				