What are the Determinants of the Leverage of Entrepreneurial Companies?

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Tilburg School of Economics and Management
Department of Finance by

Nadejda Onofras
ANR 142917
Supervisor: Dr. Marco Da Rin

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| Title: | What are the Determinants of the Leverage of Entrepreneurial Companies? |
| Name: | Nadejda Onofras |
| ANR: | 142917 |
| Study: | Financial Management MSc. |
| Graduation date: | August 31st, 2012 |
| Faculty: | Economics and Business Administration (FEB) |
| Department of Finance | |
| Supervisors: | Dr. M. Da Rin |
| | Dr. M.F. Penas |
ABSTRACT

In this study the capital structure of entrepreneurial companies is analyzed on a sample of three European countries: Italy, Finland and Ireland. The determinants of leverage are observed for the period of 1998-2007. There are two empirical methods implemented to identify particular behavior of leverage of entrepreneurial companies: a panel data analysis and cross-sectional regressions. Panel data analysis is used to pull all observations, so that it is possible to notice how the foundation dummies differentiate across cohorts. Whereas cross-sectional approach is providing information regarding what determines the leverage of these five cohorts of entrepreneurial companies in their early years of operation activities. As a result the study finds evidence that entrepreneurial companies prefer moderate financing policy at the beginning of the activity, as more tangible the firm becomes less leverage it contracts; profitability and tangibility explains most among the traditional factors. The three factors added to this research: ROE, ROS and taxes do add little explanatory power to the previous equation of determinants of leverage, however they are statistically significant. Hence, entrepreneurial companies leverage is a different phenomenon that needs further research.
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1. INTRODUCTION

Capital structure is the composition of the capital at work in a business. In other words, capital structure defines what percentage of capital is composed of equity financing, and what percentage is allocated to debt financing. It is a crucial finance decision, because it influences the return a company produces for its shareholders and it is decisive if the company will survive in a scenario of financial distress. The question always is what the optimal capital structure of a corporation is, be it a start-up firm or a successful experienced company. The issue is how much of capital required running the business should be debt without too much business risk.

Figure 1: Composition of capital of an organisation
Modigliani and Miller (1958) argued that capital structure is irrelevant in an efficient capital market and firm value is not affected by the proportion of debt and equity it holds. This statement was rejected shortly by materialization of three theories along with research works of Rajan and Zingales (1995), Lemmon et al. (2008), Brav (2009). These theories are trade-off theory, pecking order and agency cost theory, and are described below:

**Trade-off theory** is based on the idea that there is bankruptcy cost that affects capital structure and makes the difference with MM theory. It is the tax shield saved while financing with debt, an advantage over equity financing. According to this theory companies would prefer debt financing up to a certain level where bankruptcy costs balance with the advantages it produces. It is a trade-off between tax benefits and financial distress costs so that the company can reach an optimal financial situation.

**Pecking order theory** is related to asymmetric cost of information. It states that funding sources with lowest asymmetric information would be chosen first by companies. Therefore, the inference of the theory is that the firm will first choose financing with internal generated funds, then with debt and as a last resort equity.

**Agency cost theory** affirms that capital structure matters mainly because of the prevalence of three agency costs. Assets substitution is related to the tendency of managers to undertake risky investments as the debt/equity ratio increases. In case the project is successful the benefit is transferred to shareholders and the distress cost is carried by debt holders. Otherwise the firm value is decreasing and the wealth is moved from shareholders to debt holders. Debt overhang is in case of risky debt, positive NPV projects might be rejected just because all the gain can be transferred to debt holders rather than shareholders. Free cash flow arguments that leverage disciplines the managers, so it is favorable to be undertaken.
To summarize, capital structure is very significant part of corporate finance. Although much research has been done in this area, there is still space for more argumentation and proof that managers can improve the performance of the firms by considering the factors contributing to an optimal leverage level. This study is taking the challenge to analyze and bring more light into explanation of the factors of leverage of entrepreneurial companies. Are these in line with previous empirical results or it is a different observable fact?

1.1 PROBLEM DISCUSSION

There has been a lot of focus on the determinants of capital structure of corporate companies and a lot of research is done in this area, but less attention has been given to entrepreneurial companies. This fact makes the subject relevant and interesting to be analyzed. What are the determinants of capital structure of entrepreneurial companies besides the well known factors documented by Rajan and Zingales (1995) and Lemmon et al. (2008) such as tangibility, profitability, size and growth opportunities factors. To this view, this research is aimed at answering the following questions:

I. What are the Determinants of the Leverage of Entrepreneurial Companies?

1.2 DATA COLLECTION / ANALYSIS

For this purpose, the comprehensive Amadeus database was used. Financial statement data for companies from three countries: Italy, Ireland and Finland over the period 1998 – 2007 were analyzed. The countries were selected in order to have three different legal systems incorporated in a single market of the European Union.
To understand what the determinants of entrepreneurial companies are, first step is to identify the entrepreneurial companies out of the sample. To accomplish this companies which were incorporated in 1998 – 2002 were selected, companies born in each year form a cohort and evolution of leverage after 4 years of activity was analyzed. There were 5 cohorts of interest and in this paper the entrepreneurial companies basically means start up firms.

1.3 STRUCTURE OF THE THESIS

The remainder of this paper is organised as follows:

Section two reviews the literature and formulates the hypotheses. In this section first the previous research on entrepreneurship and entrepreneurial companies is discussed. Then the academic research on capital structure and determinants of leverage are discussed. Finally, the main determinants of leverage analysed in this research are discussed and hypothesis is formulated.

Section three analyses the data used in this research. The summary statistics of the data is provided and discussed. Any assumptions made in this study are also mentioned in this section. Then the econometric model applied in this research is discussed.

Section four provides the empirical results obtained from the analysis. Each hypothesis formulated in section two is revisited and the results obtained for each are discussed. The results which confirm the existing are presented, and for the ones which contrast the existing research a possible explanation is provided.

In the final section main conclusion of the study are drawn.
2. CURRENT STATE OF LITERATURE

2.1 ENTREPRENEURSHIP AND ENTREPRENEURIAL COMPANIES

There are many definitions for entrepreneurship and entrepreneurial companies, although the meaning is one: the company founded by an entrepreneur, who has the capacity and ability to undertake conception, formation and management of a productive venture with all related risks in order to make profit.

In economics, entrepreneurship is regarded as a factor of production together with land, labor, natural resources, and capital. Entrepreneurial spirit is characterized by innovation and risk-taking, and an essential component of a nation's ability to succeed in an ever changing and more competitive global marketplace\(^1\). An entrepreneurial company in this research paper is considered as a successful startup firm; that is a startup company in operation 5 years after incorporation.

There are few research papers analyzing the leverage of entrepreneurial companies, fact that makes the topic interesting but in the same time challenging. However, the few literature results available are presented.

Desai, Gompers and Lerner (2003) paper shows that country specific political, legal and regulatory variables affect entrepreneurial activity in Eastern European economies. They made the research on regime shift that took place between 1989 –1993 in Eastern European

\[1\] http://www.businessdictionary.com/definition/entrepreneurship.html
2.2 CAPITAL STRUCTURE AND DETERMINANTS OF LEVERAGE

Eduardo K. Kayo (2010) researched the influence of time, firm, industry and country – level determinants of leverage of firms from 40 countries. The main result of the paper shows that a significant part of the leverage variance (nearly 42%) explained by the intrinsic firm characteristics. Time – level is responsible for 36% of leverage; industry level – 12% and country level - 3% only.

Gungoraydinoglu and Oztekin (2011) analyzed the determinants of leverage across 37 countries and found out that firm – level covariates explain 2/3 of the variation of capital structure, and the remaining 1/3 only by country – level covariates. These results are consistent with both pecking – order and the trade – off theories. The strongest impact on leverage comes from firm and industry specific factors: industry leverage, liquidity, profitability, tangibility, and size which explains 63% of total variation in leverage. Frank and Goyal (2009) and Lemmon et al. (2008) identified similar results for corporate capital structure in the USA. Gungoraydinoglu and Oztekin (2011) documented as the most important country specific factors of leverage: the cost of bankruptcy outcome, creditor
rights, the enforcement of creditor rights, corporate transparency, ownership concentration and contract enforcement.

Brav (2009) researches the differences among leverage of private firms in comparison with public firms. He is conducting level and sensitivity analysis and finds out that leverage of private firms is more sensitive to operating performance, however less sensitive to trade-off theory determinants of capital structure such as: growth opportunities, CAPEX, tangibility, than public firms. Moreover, private firm debt ratios exhibit higher persistence and are slower to adjust to their mean. Brav (2009) defines private firms all the companies which are not listed on stock exchanges. The method of research is cross-sectional regressions as in Rajan and Zingales (1995), Fama and French (2002) applied to a subsample of firms in UK over 1993-2003 period using FAME database. The most relevant hypothesis for his paper is: private firms have higher debt ratios than public firms, private firms leverage illustrates more negative relationship with profitability than public ones and the last one is that leverage of private firms show evidence of stronger persistence and lower adjustment speed. He testifies the hypothesis that private firm count more on leverage than public firm in the following way: if the components parts of deficit rely on debt for financing more than public firms then the affirmation holds for the whole as well. The components parts of deficit are: dividends, investments, changes in working capital and profitability. So, Brav (2009) concludes that determinants of leverage are: size, tangibility, sales growth, profitability, debt maturity and firm age, most of these determinants are consistent with the findings of Rajan and Zingales(1995) and Lemmon et al.(2008).
2.3 THE DETERMINANTS OF LEVERAGE AND THE HYPOTHESES

In this study are considered relevant determinants for the analysis of leverage of entrepreneurial companies: profitability, firm size, growth opportunities and tangibility as the four main proxies. The three additional factors relevant for the study are considered return on equity, return on sales and taxes impact. Leverage here is calculated as the sum of short term debt and long term debt divided by total assets.

**Profitability** is a documented determinant of leverage. According to Jensen (1986) free cash flow theory states that the firm is going to have higher leverage level as it becomes more profitable, in order to reduce the free rider resources in hands of managers. On the other side pecking order theory argues that as the firm is more profitable it can use its internal generated funds for operations so that they can avoid increasing leverage and in the same time the cost of capital and risk associated with it. Therefore:

**H1: Profitability has inverse relationship with leverage of entrepreneurial companies.**

**Firm Size** usually is in direct relationship with leverage, according to the principle “too big to fail” means that as the size is higher the firm is going to have more leverage as it will be easier for it to borrow. Hence, the trade-off theory together with pecking order theory assumes positive relationship between leverage and size (measured as log of sales). Positive relationship is documented by Degryse (2009), Fama and French (2002), Hall (2004), Lemmon (2008). Hence:

**H2: Firm size is positively correlated with leverage.**
**Growth opportunities** is argued by Rajan and Zingales (1995) to be a measure for growth companies, which could cope with high costs of financial distress and would be expected to borrow less. The same argument is valid for trade-off theory that states that leverage and growth opportunities have a negative relationship. On the other side, the pecking order theory advocates for a positive relationship between growth and leverage. The reason behind is that firms which have growth opportunities need more likely to raise new funds to finance its growth projects than firms without growth prospects. In case of startup companies it is assumed that if the firms do not exit (in the early years) they will grow, so it is more likely to follow the pecking order theory predictions. Therefore:

**H3: Growth opportunities exhibit positive relationship with leverage**

**Tangibility** is a general accepted genuine determinant of leverage. Trade-off theory, Rajan and Zingales(1995), Lemmon(2008) agree on the same fact that companies with safe and tangible assets are having usually high levels of leverage. These assets serve as the collateral for lender, reducing the risk and agency costs of debt. As a result it is expected even for entrepreneurial companies:

**H4: Positive relationship between tangibility and leverage**

**Return on Equity** is a measure of earnings to common shareholders earned during a period relative to book value of net assets put in place at the beginning of the period. It presents a ratio of interest to see how much explanatory power does this has in explaining the leverage of startup companies. Since shareholder are paid after the debt holders, increasing the leverage increases the risk that there might not be enough EBIT remaining to pay the shareholders. Thus ROE and leverage should be positively related to each other:
**H5: Return on equity is positively correlated with leverage.**

**Return on Sales** measures profitability of each euro of sales. At the beginning of the activity the main concern of companies are sales, it is the main driver for survival and growth. It is of interest to check this ratio influence on leverage the company is going to use in four years time span. Therefore,

**H6: Return on Sales exhibits as profitability a negative relation with leverage.**

**Taxes** are an important proxy for leverage of entrepreneurial companies. Miller and Modigliani (1963) support the idea that firms prefer debt financing because of the tax shield income they can save. However, according to this statement firms are encouraged to increase leverage as much as possible, fact that is very risky and advised by trade-off theory to have a moderate level of leverage in accordance with the type of business and type of assets the company disposes. The advantage of taxes is valid as long as the firm is generating enough profit to pay the interest, thing that cannot be guaranteed in a longer time prospect. Therefore, the opposite arguments appear from Jordon et al. (1998), Michaelas et al. (1999), Fama and French (2002) related to negative relationship between taxes and debt because taxes lower retained earnings and also because of conservative financial policy of big companies. Nevertheless:

**H7: Taxes exhibits positive relationship with leverage.**
3. DATA DESCRIPTION

The empirical research is based on the information provided by Amadeus database containing financial information for companies across Europe. Among the wide range of 41 countries available, three representative countries were selected: Italy, Ireland and Finland. The reason behind this selection is that the three countries represent the three different legal systems: Civil law, Common law and Scandinavian legal system. The sample period of the research constitutes 1998-2007.

In order to analyze the leverage of startup firms, companies which were incorporated between 1998 and 2002 were selected. Hence, 5 groups of companies were produced in the following way:

A dummy variable was created for all companies incorporated in year 1998, called born98, which takes value 1 if firm is incorporated in 1998 and zero otherwise. Exactly the same way are composed the variables born99, born00, born01, born02, which are firms incorporated in 2002 and regressed up to 2006. The purpose of this variable construction is that these groups of startup companies constitute the topic of the thesis, how leverage of these cohorts behaves and which are the main determinants of it.

Table I presents descriptive statistics for 5 groups of firms incorporated at interval of one year. All observations were dropped, that have leverage above one or below zero. Moreover, the first and last percentiles are trimmed at the upper and lower one percentile for the variables: profitability, tangibility, size, growth, tax, return on equity and return on sales, in order to eliminate the outliers and make data more accurate and the results more reliable.

Number of observation is very different for the five cohorts ranging between 4729 - 1289 observations for leverage. The smallest number of observations is available for growth
opportunities factor, only 454 observations for this factor in year 2002. In general, the number of observations for each factor are increasing from 1998 to 1999, and decreasing thereafter.

The mean values of leverage for the 5 different groups are quite similar 0.65 for companies born in 1998 to 0.64 for companies born in 2002. There is convergence for the mean values of all the other variables under analysis, only growth opportunities fluctuate significantly. Standard deviation is high for all variables and especially for growth.

In Lemmon et al. (2008) the mean values of leverage are fairly similar for all firms (respectively 0.27). In the current sample however, there exists a larger difference between the mean leverage (respectively 0.65). Tangibility has decreased when compared to the sample of Lemmon et al. (2008) from 0.34 to 0.20. This means that firms, in this sample are less capital intensive, this can be due to the boom in the IT industry in late 90’s as the sample of startup firms is likely to have higher concentration of less capital intensive IT firms.
Table 1: Descriptive statistics

The sample consists of all firms from Italy, Finland and Ireland over 1998-2007 period of time. The table presents the variable mean, median, standard deviation, maximum, minimum values and number of observations for all firms. Variable definitions are provided in the Appendix A.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
<th>Born 98</th>
<th>Born 99</th>
<th>Born 00</th>
<th>Born 01</th>
<th>Born 02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leverage</td>
<td>0.65</td>
<td>0.24</td>
<td>0</td>
<td>1</td>
<td>4508</td>
<td>4729</td>
<td>4664</td>
<td>4054</td>
<td>1438</td>
</tr>
<tr>
<td>Profit</td>
<td>0.13</td>
<td>0.17</td>
<td>-1.49719</td>
<td>2.432</td>
<td>1502</td>
<td>3177</td>
<td>3048</td>
<td>3166</td>
<td>1147</td>
</tr>
<tr>
<td>ROE</td>
<td>0.22</td>
<td>1.52</td>
<td>-24.2671</td>
<td>49</td>
<td>2294</td>
<td>4326</td>
<td>4292</td>
<td>3811</td>
<td>1380</td>
</tr>
<tr>
<td>Size</td>
<td>6.74</td>
<td>1.60</td>
<td>-16.47</td>
<td>2687</td>
<td>4729</td>
<td>4664</td>
<td>4054</td>
<td>1438</td>
<td></td>
</tr>
<tr>
<td>ROS</td>
<td>0.00</td>
<td>0.84</td>
<td>-35.711</td>
<td>3.225</td>
<td>2203</td>
<td>4236</td>
<td>4189</td>
<td>3702</td>
<td>1289</td>
</tr>
<tr>
<td>Growth</td>
<td>1.50</td>
<td>11.6</td>
<td>-2</td>
<td>189.6</td>
<td>799</td>
<td>1164</td>
<td>1799</td>
<td>1408</td>
<td>454</td>
</tr>
<tr>
<td>Tangibility</td>
<td>0.23</td>
<td>0.26</td>
<td>-0.05918</td>
<td>1</td>
<td>2687</td>
<td>4729</td>
<td>4664</td>
<td>4054</td>
<td>1438</td>
</tr>
<tr>
<td>Taxes</td>
<td>0.54</td>
<td>2.38</td>
<td>0</td>
<td>82</td>
<td>2244</td>
<td>4273</td>
<td>4243</td>
<td>4054</td>
<td>1350</td>
</tr>
</tbody>
</table>

Additionally, Table II presents the correlation coefficients between the variables included in the model. Even though the results include only average pair wise correlation coefficients, unsuitable to get a dynamic image, it can be seen that practically all values for selected determinants are negative and statistically significant suggesting the presence of explanatory power of these variables. As expected the strength of the relation of leverage is stronger with tangibility, then followed by profitability, taxes and size. However, return on equity, return on sale and growth opportunities are weaker, the correlation is significant and worth to be analyzed.
Table 2: Pair wise Correlation matrix

<table>
<thead>
<tr>
<th></th>
<th>Leverage</th>
<th>Profitability</th>
<th>ROE</th>
<th>Size</th>
<th>ROS</th>
<th>Growth</th>
<th>Tangibility</th>
<th>Taxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leverage</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profitability</td>
<td>-0.0361*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROE</td>
<td>-0.0037*</td>
<td>0.1026*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>0.0600*</td>
<td>-0.0292*</td>
<td>-0.0018*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROS</td>
<td>-0.0026*</td>
<td>0.0031*</td>
<td>0.0016*</td>
<td>0.0047*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth</td>
<td>-0.0051*</td>
<td>-0.0023</td>
<td>0.0002</td>
<td>0.0276*</td>
<td>0.0140*</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tangibility</td>
<td>-0.1586*</td>
<td>0.0127*</td>
<td>-0.0015*</td>
<td>0.0649*</td>
<td>-0.0015*</td>
<td>-0.0014</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Taxes</td>
<td>0.0323*</td>
<td>0.0024*</td>
<td>0.0014*</td>
<td>0.0648*</td>
<td>-0.0001</td>
<td>-0.002</td>
<td>-0.0218*</td>
<td>1</td>
</tr>
</tbody>
</table>

Notes: (*) corresponds to the p-value equal to 0.05 or lower
p-values are shown in the row under main indicators
3.1 DESCRIPTION OF METHODOLOGICAL PROCEDURES REGARDING DATA AND EMPIRICAL MODELS

The empirical research was conducted based on Panel Data analysis and cross-sectional study. The dependent variable is leverage of the entrepreneurial companies and the independent explanatory variables: profitability, tangibility, growth, size, ROE, ROS, and taxes. These variables are calculated from financial statements: balance sheet, income statements, cash flow and common equity statement extracted from Amadeus data base.

Cross-section multiple regressions are presented in Table III:

\[
\text{Leverage}_{it} = \alpha + \beta \text{X}_{it-1} + \varepsilon_{it}
\]

\( \text{X}_{it-1} \) – profitability, tangibility, growth, size, ROE, ROS, and taxes
\( \varepsilon_{it} \) - error term
\( \alpha \) – the constant
\( \beta \) – the slope

The regression estimates the results for the impact of five groups of companies incorporated in consecutive years and their effect on leverage over four years. For instance, it is calculated the ratio of leverage over four years of activity in 2002 and it is used as dependent variable regressed with independent variables at t-1: profitability of 2001, tangibility of 2001, and all other determinants of this equation. This type of regression is used in order to test the differences across the groups of startup companies.

Panel data analysis is applied in order to pull all observations into one regression, to leave the foundation year dummy to differentiate across cohorts. The results are presented in Table IV. Data over years 1998-2007 is included in this regression; however the year dummy is controlled, because the interest of the study presents the cohort dummies.
The general panel regression model is the following:

\[ y_{it} = \beta_0 + \sum \beta x_{it} + \varepsilon_{it}, \quad i = 1, \ldots, N \text{ and } t = 1, \ldots, T, \]

\( y_{it} \) - Leverage of entrepreneurial companies

\( x_{it} \) – profitability, tangibility, growth, size, ROE, ROS, and taxes

\( \varepsilon_{it} \) – error term

\( \beta_0 \) and \( \beta \) – are identical for all firms and time periods.
4. EMPIRICAL RESULTS

Table III displays regression results for the leverage of the five cohorts of entrepreneurial companies. The dependent variable is leverage ratio calculated 4 years later from incorporation year and independent variables at t-1 respectively at year 3. The number of observation per cohorts is increasing for firms founded in 1998 and 1999 afterwards decreasing for those incorporated in 2000 to 2002.

This is an evidence of dotcom crash. The number of companies incorporated in 1998 and 1999 are boosting in a “new economy” marked by new information technologies, web, networking and high expectation of investors in taking the risk to start up firms as long as an idea appears without critical financial analysis. Hence, the number of firms founded in 2000 reach the peak of 1207 in this sample of analysis, after that it slightly decreases following the recession of 2000s in 2001 to 1078. The steep decline follows only after 2001 market crash that it is represented in Table III is 344 firms founded in that year. Although, the crisis happened mainly in US, due to the contagion effect over Europe, the sample of firms of 3 countries Finland, Italy and Ireland get affected greatly by tech bubble.

It can be noticed that the main variables explaining the leverage are tangibility and profitability in case of all the five cohorts. The two variables profitability and tangibility have an average coefficient of -0.48 and -0.19 respectively, and the results are highly significant at 1% value.

The results for the all the hypothesis are presented below:
**H1: Profitability has inverse relationship with leverage of entrepreneurial companies**

Profitability shows an inverse relationship to leverage as predicted, and conforms to the results of the previous studies. The results are also very significant at 1% level of significance.

**H2: Firm size is positively correlated with leverage.**

Firm’s size is usually in direct relationship with leverage according to previous researches; however this study shows a negative relationship between size and leverage. But the coefficients of regressions are very small and significant only in 2003 (for companies born in 1999). One explanation that might justify this behaviour can be that for small start-up firm it might be easy to get debt as they require less capital to operate and thus banks might be willing to lend small amount of money even if it is risky.

**H3: Growth opportunities exhibit positive relationship with leverage**

Growth opportunities show a positive relationship to leverage as predicted, and conform to the results of the previous studies as per pecking order theory. The results are also very significant at 1% level of significance. However the coefficients are explaining very little in case of entrepreneurial companies leverage and are not statistically significant, so this variable can be even excluded from regression.

**H4: Positive relationship between tangibility and leverage**

Tangibility shows an inverse relationship to leverage as which is in contrast to the predicted results, and in contrast to the results of the previous studies. The results are also very significant at 1% level of significance. The reason behind such behaviour can be linked to
the fact that the analysis focuses on the years just after the market crash. Thus can be argued that in few years after the market crash firm might have financed their financial needs partly by taking more debt and partly by disposing of some assets (as it is difficult to get debt post market crash). Thus, showing a negative relationship between tangibility and leverage.

**H5: Return on equity is positively correlated with leverage.**

Return on Equity shows a positive relationship to leverage as predicted. The results are also significant at 10% level of significance, except for 2004 (for companies in incorporated in 2000). The coefficients are however small and explain a small part of leverage.

**H6: Return on Sales exhibits as profitability a negative relation with leverage.**

Return on sales shows an inverse relationship to leverage as predicted. However, ROS is statistically significant only in 2005 and 2006 (for companies in incorporated in 2001 and 2002), with the coefficients -0.37 and -0.52 respectively.

**H7: Taxes exhibits positive relationship with leverage.**

Taxes show a positive relationship to leverage as predicted. However, the coefficients are small and significant only in 2002 and 2004 (for companies in incorporated in 1998 and 2000).
Table IV displays the regression results with all observations, leaving the foundation year dummy to differentiate across cohorts. The purpose of it consists in identifying the differences across cohorts. This fact is confirmed by very high t-statistic for all the 5 groups of dummy variables.

In order to check for multicollinearity two steps were undertaken: the correlation matrix low values and highly significant confirm there is no problem and the coefficients can be reliably estimated. The second step is calculation of variance inflation factor for the dummies of foundation and all values are 1.01 to 1.04 far less than 10, meaning absence of collinearity.

The coefficients of interest in this regression constitute the dummies of foundation year, which measure the importance of time of incorporation of firms on determining the level of leverage. For instance, for firms born in 99, 0.007 is the expected difference in leverage between units belonging to the two groups corresponding to the levels of born99, 1 for those incorporated in 1999 and 0 otherwise. Companies incorporated in 1998 represented by born98 dummy are omitted by regression, eliminating the mutually exclusive collinearity. The difference in leverage is decreasing to 0.002 in case of firms founded in 2000; that is explained by technology bubble and crash afterwards, the foundation year dummy captures the special effect of the event and it is of interest to observe that the market is recovering and is increasing the value to 0.0123 in 2001 and 0.0295 in 2002.
Table 3: The Effect of Startup Companies on Leverage over 5 years

The sample consists of financial data extracted from Amadeus database from 1998 to 2006. The table presents the coefficients for book leverage at t_n, coefficients measured at t_{n-1} and dummy variable for year of incorporation at t_0. Adjusted $R^2$ can be found at the bottom of the table. Variable definitions are provided in the Appendix A.

<table>
<thead>
<tr>
<th>Variable</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profitability</td>
<td>-0.50***</td>
<td>-0.47***</td>
<td>-0.56***</td>
<td>-0.46***</td>
<td>-0.41***</td>
</tr>
<tr>
<td></td>
<td>(0.1164)</td>
<td>(0.0802)</td>
<td>(0.0689)</td>
<td>(0.0726)</td>
<td>(0.1601)</td>
</tr>
<tr>
<td>ROE</td>
<td>0.03*</td>
<td>0.04**</td>
<td>0.002</td>
<td>0.04*</td>
<td>0.08*</td>
</tr>
<tr>
<td></td>
<td>(0.0195)</td>
<td>(0.0185)</td>
<td>(0.0103)</td>
<td>(0.0199)</td>
<td>(0.0495)</td>
</tr>
<tr>
<td>Size</td>
<td>-0.01</td>
<td>-0.03***</td>
<td>-0.01</td>
<td>-0.003</td>
<td>0.014</td>
</tr>
<tr>
<td></td>
<td>(0.0093)</td>
<td>(0.0084)</td>
<td>(0.0061)</td>
<td>(0.0063)</td>
<td>(0.0104)</td>
</tr>
<tr>
<td>ROS</td>
<td>-0.29</td>
<td>-0.20</td>
<td>0.02</td>
<td>-0.37***</td>
<td>-0.52**</td>
</tr>
<tr>
<td></td>
<td>(0.1930)</td>
<td>(0.1627)</td>
<td>(0.1252)</td>
<td>(0.1529)</td>
<td>(0.2371)</td>
</tr>
<tr>
<td>Growth</td>
<td>0.0002</td>
<td>0.0022</td>
<td>0.0014</td>
<td>-0.01</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>(0.0028)</td>
<td>(0.0029)</td>
<td>(0.0023)</td>
<td>(0.0039)</td>
<td>(0.0050)</td>
</tr>
<tr>
<td>Tangibility</td>
<td>-0.29***</td>
<td>-0.18***</td>
<td>-0.17***</td>
<td>-0.15***</td>
<td>-0.15***</td>
</tr>
<tr>
<td></td>
<td>(0.0633)</td>
<td>(0.0564)</td>
<td>(0.0405)</td>
<td>(0.0496)</td>
<td>(0.0729)</td>
</tr>
<tr>
<td>Taxes</td>
<td>0.02*</td>
<td>-0.01</td>
<td>0.01*</td>
<td>0.01</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>(0.0101)</td>
<td>(0.0099)</td>
<td>(0.006)</td>
<td>(0.0095)</td>
<td>(0.0210)</td>
</tr>
<tr>
<td>Constant</td>
<td>1.01***</td>
<td>0.90***</td>
<td>0.71***</td>
<td>0.52***</td>
<td>0.87***</td>
</tr>
<tr>
<td></td>
<td>(0.1085)</td>
<td>(0.2553)</td>
<td>(0.0012)</td>
<td>(0.0787)</td>
<td>(0.1508)</td>
</tr>
</tbody>
</table>

Adjusted $R^2$: 0.2990, 0.2553, 0.2175, 0.2088, 0.2967

Observations: 544, 777, 1207, 1078, 344

Notes: * Significant at the 10% level
** Significant at the 5% level
*** Significant at the 1% level
Table 4: Five year Leverage

The sample consists of financial data extracted from Amadeus database from 1998 to 2007. The table presents the coefficients for book leverage pooling all the observations, leaving the incorporation year dummy to differentiate across cohorts, controlling for year dummy, industry dummy and country dummy. Adjusted R² can be found at the bottom of the table. Variable definitions are provided in the Appendix A

<table>
<thead>
<tr>
<th>Variable</th>
<th>Leverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profitability</td>
<td>-0.4405***</td>
</tr>
<tr>
<td></td>
<td>(0.0083)</td>
</tr>
<tr>
<td>ROE</td>
<td>0.0092***</td>
</tr>
<tr>
<td></td>
<td>(0.0015)</td>
</tr>
<tr>
<td>Size</td>
<td>0.0208***</td>
</tr>
<tr>
<td></td>
<td>(0.0008)</td>
</tr>
<tr>
<td>ROS</td>
<td>-0.0061</td>
</tr>
<tr>
<td></td>
<td>(0.0071)</td>
</tr>
<tr>
<td>Growth</td>
<td>-0.0026***</td>
</tr>
<tr>
<td></td>
<td>(0.0003)</td>
</tr>
<tr>
<td>Tangibility</td>
<td>-0.1349***</td>
</tr>
<tr>
<td></td>
<td>(0.0051)</td>
</tr>
<tr>
<td>Tax</td>
<td>0.0178***</td>
</tr>
<tr>
<td></td>
<td>(0.0011)</td>
</tr>
<tr>
<td>Const</td>
<td>0.5263***</td>
</tr>
<tr>
<td></td>
<td>(0.0416)</td>
</tr>
<tr>
<td>Born99</td>
<td>0.007***</td>
</tr>
<tr>
<td></td>
<td>(0.0026)</td>
</tr>
<tr>
<td>Born00</td>
<td>0.0020</td>
</tr>
<tr>
<td></td>
<td>(0.0026)</td>
</tr>
<tr>
<td>Born01</td>
<td>0.0123***</td>
</tr>
<tr>
<td></td>
<td>(0.0027)</td>
</tr>
<tr>
<td>Born02</td>
<td>0.0295***</td>
</tr>
<tr>
<td></td>
<td>(0.0031)</td>
</tr>
</tbody>
</table>

Adjusted R²: 0.1356
Observations: 73873

* Significant at the 10% level
** Significant at the 5% level
*** Significant at the 1% level
5. CONCLUSION

Determinants of leverage of entrepreneurial companies are analyzed in this study using data of three countries: Italy, Finland and Ireland over the period from 1998 to 2007. Entrepreneurial companies are considered to be start up firms, that are investigated 5 years since incorporation. Therefore the behaviour of leverage and its determinants is researched on these companies. The determinants investigated are profitability, tangibility, size, and growth as documented by capital structure theory, plus 3 additional proxies: taxes, return on sales and return on equity. In order to disclose the determinants of leverage of these companies two approaches were undertaken. First it is a cross-sectional regression that reveals the determinants of leverage calculated at time t and regressed against the dependent variables at time t-1 for each cohort separately. The second approach is a panel analysis that pulls all observations into one regression that uses the foundation dummy to differentiate across cohorts. Implementing these empirical models the following findings were revealed.

Firstly, the main determinants of leverage of entrepreneurial companies included in this study that have significant explanatory power are profitability and tangibility for all five cohorts of companies, the result is consistent for the years 2002 to 2006.

Secondly, there is evidence of the dotcom market crash of 2000 - 2002 spill over effect over entrepreneurial companies from Europe. There are a peak number of companies founded in 2000 that is 1207 and suddenly shrink to 344 in 2002. These results are captured also by the panel analysis regression, the special effects of foundation year dummy are 0.007 in 1999 and it decreases to 0.002 in 2000. This foundation year dummy effect then increases again in 2001 (0.013) and 2002 (0.029)
Thirdly, this empirical research provides evidence that tangibility displays negative relationship with leverage; the explanation behind such behaviour can be linked to the fact that the analysis focuses on the years just after the market crash, thus the firms might have used a combination of debt and selling some fixed assets to meet financial obligations. Thus decreasing tangibility and increasing leverage showing a negative relation.

Growth opportunities are explaining very little, so that this variable can be even excluded from regression, it is not statistically significant for none of the cohorts. This fact contradicts previous research literature.

The three additional factors included in the research: ROE, ROS and taxes do add little explanatory power to the previous equation of determinants of leverage, however they are statistically significant.

In conclusion it is must be admitted that entrepreneurial companies leverage is a different phenomenon than documented corporate capital structure theory, that needs to be investigated. A suggestion for further research would be to include in the leverage equation new determinants such as entrepreneur skills, cost of capital the company is exposed to, the estate of the economy, and also the asymmetric costs of capital.
6. REFERENCES


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Liu, Laura (2005), Do firms have target leverage ratios? Evidence from historical market-to-book and past returns, Working paper, Hong Kong University of Science and Technology.


Appendix A

This appendix displays the variables construction used in this analysis of Amadeus sample of entrepreneurial companies.

Leverage = (Short term debt + Long term debt) / Book assets

Profitability = EBITDA/Assets

ROE = Profit/loss per period / Total owner’s equity

ROS = Profit/loss per period / Sales

Assets = Fixed assets + Current assets

Size = log of assets

Growth = (Financial revenue year t/Financial revenue year t-1)-1

Tangibility = Fixed assets / Total Assets

Born98 is a dummy variable that is equal to 1 if the company was incorporated in 1998, otherwise it is zero.

The same logic for Born99, Born00: the company incorporated in 2000; Born01: company incorporated in 2001 and Born02: incorporated in 2002.