Leverage at Entry and the Growth of Newly Incorporated Companies

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Abstract

The use of debt for financing new companies comes with screening and monitoring by lenders that help focusing on achieving long-term growth. Debt-induced governance further brings entrepreneurs to pursue growth opportunities. By contrast, as more debt is used and leverage increases, entrepreneurs are brought to adopt risk-averse strategies that lead to lower expected growth. Using a large sample of over 200,000 European newly incorporated companies we document an inverted-U shaped relationship between leverage at entry and long-term growth that is consistent with our hypothesis. We also find that more investor-friendly country-level systemic conditions make this relationship steeper.

JEL Codes: G32; L25; L26.

Keywords: Initial conditions; Capital structure; Entrepreneurial finance; Corporate growth.

1 Introduction

Modern economies grow largely by achieving higher productivity through a process of Schumpeterian creative destruction that continuously identifies and tries to exploit entrepreneurial opportunities (Aghion and Howitt, 1992). New companies bring innovation and competition (Gans, Hsu, and Stern, 2002), and create new product markets (Hellmann and Puri, 2000). Successful newcomers feed innovations to incumbents (Akcigit and Kerr, 2018), and force them to become more productive (Fritsch and Changoluisa, 2017), in some cases even displacing them (Acemoglu et al., 2018).

A small but growing literature has started examining different factors by documenting the importance of initial conditions and strategic choices for the growth of newly established companies. Recent studies have started documenting that certain initial conditions have a lasting effect on the growth of new companies (see, among others, Ayyagari, Demirgüç-Kunt and Maksimovic, 2017). We contribute to this literature by analyzing one specific initial condition, leverage at entry, for the growth of newly incorporated companies. This type of companies typically relies on external finance to fund their development, since the necessary investments exceed the wealth of the founders. Both debt and equity are used for funding entrepreneurial innovation (Robb and Robinson, 2014, Hall and Lerner (2010), Vanacker and Manigart, 2010), and each places different burdens and brings different benefits to new companies. We conjecture that the composition of funding sources constitutes a salient initial condition for new companies because it can lead to different long-term growth outcomes through the effect of these burdens and benefits, which we expect to have different intensity at different levels of leverage. Understanding the relationship between leverage at entry and long-term company growth can thus have important implications for strategy and for policy.

Our study is motivated by the consideration that these implications cannot be simply derived from established results about listed or otherwise mature companies, since entrepreneurial companies are fundamentally different from mature ones: they are more opaque, present stronger information asymmetries, and face stronger uncertainty (Cassar, 2004). This implies that access to debt is different, and the incentives and constraints that arise from debt financing are likely to be different than for mature companies.

Based on previous studies, we therefore examine two opposite views of the consequences of the choice of leverage at entry for the long-term performance of new companies. The first view points to the beneficial role of lenders' screening and monitoring of borrowers, and to the advantages of debt-induced governance. We call it the 'Lender Effect.' The second view stresses instead the fact that the additional bankruptcy risk that young companies are exposed to when they choose a higher level of leverage at entry should lead to more cautious and risk-averse strategies that favor survival over growth. We call it the 'Debt Risk Effect.' We discuss these views in detail in Section 2. Both have strong rationales, reflecting plausible economic mechanisms. We conjecture that the 'Lender Effect' might be stronger at low or intermediate levels of leverage, when the risk of bankruptcy is relatively low, but that above a certain threshold the 'Debt Risk Effect' becomes prevalent as bankruptcy becomes more likely. Whether this conjecture provides a good interpretation of the data is an empirical question, that we bring to the data.

To this purpose, we employ a large dataset that covers over 200,000 newly incorporated companies from 15 European countries. The sample excludes sole proprietorships and partnerships, which have different goals, structures, and access to funding than incorporated firms. We obtain accounting information on company characteristics at entry, and follow these companies over a decade. The data come from the Amadeus database published by the commercial provider Bureau van Dijk, which collects information from official records and harmonizes it, ensuring consistency and quality of the data. To our knowledge, this is a much larger and comprehensive sample of entering firms than previously analyzed in relation to the importance of initial conditions.

Our first set of results comes from univariate analysis. We still know very little about the capital structure of young unlisted companies, and our large sample documents interesting facts that complement those found by existing studies, which are based on smaller samples, such as those by Cassar (2004), Cosh, Cumming, and Hughes (2009), Hanssens, Deloof, Vanacker (2016), and Robb and Robinson (2014). We extend their results both by considering a variety of countries with different institutional settings, at a much larger sample, and by looking at the relation between leverage at entry and a company's long-term growth. The median company in our sample has 380,000 euros of total assets at entry, reflecting our choice to build a sample of companies that are large enough to reflect economically relevant growth potential. The median's company leverage, defined as non-current liabilities and loans divided by themselves plus total shareholders' funds, is about 37%. Both initial size and leverage at entry display substantial variation across companies in the sample, as one would naturally expect. We also find that leverage remains remarkably stable over time, in contrast to what happens in the case of mature firms listed on the stock market (DeAngelo and Roll, 2015).

In our cross-sectional regressions we employ a company growth model augmented with the addition of leverage at entry to examine the effect of leverage at entry on long-term growth, conditional on company survival. We find that the level of leverage at entry is significantly related to a company's ability to grow its assets over the following nine years. We test empirically our conjecture that the relationship between leverage at entry and long-run growth is a quadratic ('inverted U') relationship and find strong support for it. A variety of robustness tests confirms the validity of such quadratic relationship. We control for company-level characteristics like size, tangibility, and profitability, and include different combinations of industry, country, and year fixed effects that reassure us of the robustness against alternative mechanisms and against the possible endogeneity of leverage at entry. We also employ a Heckman selection procedure to deal with potential survivorship bias.

Since we want to employ a realistic change in leverage at entry, we estimate what could be the likely change induced by a shift in corporate taxation policy. These estimates are novel and of interest in themselves, as we are not aware of studies of the influence of corporate income taxation on the leverage of newly incorporated companies.

We further extend our analysis by considering that the relationship between leverage and long-run company growth might be affected by economy-wide systemic conditions. We believe this is important, since systemic conditions determine the incentives and constraints faced by lenders and borrowers in their interactions. We investigate the role of systemic conditions in regressions where we exploit cross-country variation employing two measures of systemic conditions: the strength of creditor rights and the degree of transparency of financial transactions. We find that the curvature of the inverted-U relationship between leverage and long-run growth is steeper with more investor-friendly systemic conditions.

Our results provide a bridge across recent research in entrepreneurship, finance, and economics, and contribute to the growing literature on the importance of initial conditions for the development of new companies (e.g., Geroski, Mata, and Portugal, 2010, Milanov and Fernhaber, 2009, Puri and Zarutskie, 2012), and to the literature on the effects of leverage and corporate financial policy more broadly, for company outcomes (e.g., Choi, Kumar, and Zambuto, 2016).

We additionally derive some implications of these results for both entrepreneurs and policy-makers. In terms of managerial implications we show that the initial choice of capital structure has far-reaching effects for future growth, and that these depend on initial firm size and on systemic conditions. In terms of policy implications, we discuss the positive role of debt financing at low and moderate values of leverage at entry, which point to the importance of policies that favor access to lending for new businesses. We also highlight the role of systemic conditions that are to a good extent set by policy choices.

The rest of the paper is organized as follows. Section 2 reviews the relevant literature and develops the hypotheses that guide our empirical analysis. Section 3 describes the sources of our data and how we build our sample and variables. Section 4 reports and discusses the descriptive evidence. Section 5 develops our empirical methodology, and Section 6 reports our multivariate analysis, including the robustness checks. Section 7 provides some concluding thoughts.

2 Literature review and hypothesis development

2.1 Relation to previous literature

Several studies have shown that the creation of new companies is a major source of economic growth and renewal (e.g., Aghion et al., 2009). However, most new ventures fail to survive and grow into larger companies (Bhide, 2003, Cabral and Mata, 2003, Puri and Zarutskie, 2012). A central question is therefore which factors are conducive to successful entry. This has been object of recurrent research in economics and entrepreneurship (Gilbert, McDougall, and Audretsch, 2006), which has built on various strands of theory to identify mechanisms through which initial conditions may influence growth and survival. For instance, Milanov and Fernhaber (2009) analyse the role of alliances formed by early stage ventures, finding that the identities of early alliance partners are good predictors of future network growth because high-quality partners help attract other high-quality partners. Sleuwaegen and Onkelinx (2014) study the international orientation of start-ups, and document that those that are 'born global' achieve higher export penetration, but are also more at risk of failing. The initial level of employment, which is a measure of firm size at entry, has been found to be related to future growth by Sedláček and Sterk (2018), and to future survival by Geroski, Mata, and Portugal (2010). A similar result is found by Ayyagari, Demirgüç-Kunt and Maksimovic (2017) for new companies in emerging economies.

A different approach is taken by the theoretical model of Geelen, Hajda, and Morellec (2022), who model debt in a Schumpeterian growth model, where debt favors entry, and the growth of newly created companies. This effect is the opposite of what predicted by the 'debt overhang' effect of Myers (1977).

Our study contributes to this literature by analyzing the role of financial strategy at the time of entry for the company's future growth, conditional on its survival. Funding is a key aspect of entrepreneurship, as new companies need outside financing to operate and make the investments necessary to achieve growth, whose cost typically exceeds the wealth of the founders (Kerr and Nanda, 2015). While several studies have documented the importance of access to fund-raising for new companies' viability (e.g., Berger and Udell, 2002, Cassar, 2004, Holtz-Eakin, Joulfaian, and Rosen, 1994, Puri and Zarutzkie, 2012), we look at the composition of fundraising between equity and debt, which has received less attention so far, and at its effect on long-term growth. Exploring the role, and consequences, of capital structure decisions for entrepreneurial companies is important because they often rely on debt (Robb and Robinson (2014)). Further evidence on the use of debt by these companies is provided by Hochberg, Serrano, and Ziedonis (2018) and Mann (2018) and Suh (2022): these studies document a widespread use of patents to obtain loans to finance entrepreneurial startups, even in early stages of development. Davis, Morse, and Wang (2020) further find that venture debt is often a complement to equity financing, with over 40% of all financing rounds including some amount of debt.

2.2 Leverage and long-term company growth

Both debt and equity are used for funding entrepreneurial innovation (Robb and Robinson, 2014, Vanacker and Manigart, 2010), and access to external funding has been found to be beneficial for investment and experimentation, whether it is achieved through debt (see, among others, Black and Strahan, 2002, Chava et al., 2013, Cornaggia et al., 2015) or through equity (see, among others, Davila, Foster, and Gupta, 2003, and Kerr and Nanda, 2015).

How the composition of external finance between debt and equity is related to the future growth of entrepreneurial companies is however a priori unclear, because each of these two forms of funding places different burdens and brings different benefits to new companies. Moreover, informational opaqueness and asymmetries make these companies different from established ones (Cassar, 2004), so that one cannot simply apply results about mature, often listed, companies.

From a conceptual point of view, debt and equity are expected to have different effects on the growth of young companies. Raising equity from external investors is often difficult for new companies because they are characterized by marked informational asymmetries vis-à-vis investors (Amit, Glosten, and Muller, 2000). More specifically, adverse selection makes it difficult for investors to separate promising from unattractive projects (Leland and Pyle, 1977); moral hazard considerations also deter equity investors, as entrepreneurs may take opportunistic actions that shift returns from investors to themselves (Jensen and Meckling, 1976). This brings equity investors to use strong management control rights to control the governance of the company (Davila and Foster, 2007). Equity, even when feasible, is then a costly source of funding that dilutes entrepreneurs and imposes strong governance rights to protect investors (de Bettignies and Brander, 2007). At the same time, equity does not require the company to pay back the capital contributed by investors, allowing it to adopt riskier strategies, which are expected to result in stronger growth (conditional on survival).

There are two opposite views that arise from these established results about what combination of debt and equity may be optimal for new companies. The first view points to the beneficial role of debt due to screening and monitoring borrowers (Best and Zhang, 1993, Diamond, 1984), and to providing an effective governance structure (Choi, Kumar, and Zambuto, 2016, Jensen and Meckling, 1976, Kochhar, 1996). We call this the 'Lender Effect' because it stresses the importance of information production and governance by lenders, which may have a positive effect on the growth of a newly created company. Accessing debt finance requires entrepreneurial companies to pass a screening filter that relies on soft information (Stein (2002) and is expected to be positively related to growth opportunities (Berger, Bouwman, and Kim, 2017). Screening is particularly important for newly incorporated companies, which lack a track record and are characterized by strong asymmetries of information, high uncertainty, and lack of track record. As shown by Diamond (1991) and by Degryse and Ongena (2005), these companies benefit from banks' ability to process soft information, and can reduce their financing costs by returning repeatedly to their lenders (Rajan, 1992). Epure and Guasch (2020) further provide evidence that the signalling role of debt is used also by equity investors, therefore easing constraints to equity access and further benefitting companies that pass banks' screening.

Lenders can favor growth also by exerting governance, as first argued by Williamson

(1988). Governance can be introduced through the use of loan covenants that deter misbehavior (Cetorelli and Gambera, 2001), or through the adoption of governance rights resembling those used by equity investors (Kochhar, 1996). These have been shown to be conducive to improved management practices (Bloom et al., 2012). In this perspective, access to debt reflects high firm quality and is therefore expected to be positively correlated with future performance (Cole and Sokolyk, 2018, and Robb and Robinson, 2014).

A second, opposite, view is based on the fact that debt is senior to equity in repayment, and therefore exposes the company to the risk of becoming financially distressed and possibly forced into bankruptcy (Myers (1977)). This risk is particularly high for young companies, whose sales are typically volatile. It is a well-documented fact that new companies are likely to face financial distress in their early years of life (e.g., Cetorelli, 2009 and Kerr, Nanda, and Rhodes-Kropf, 2014). This occurs for a variety of reasons, including the need for experimentation and the corresponding volatility of revenues and profits. Highly levered young firms are therefore exposed to an amplification of the negative real effects triggered by adverse firm-specific, industry-specific, and macroeconomic shocks, because of higher rollover risks and debt overhang, an argument going back to Gertler and Gilchrist (1994). Such fragility hampers firms' ability to consistently invest to achieve growth, and may bring them into bankruptcy (Amore, Schneider, and Žaldokas (2013)).

Bankruptcy is particularly damaging to entrepreneurs since it involves monetary, psychological, and reputational costs (Armour and Cumming, 2008, Lee et al., 2011). It therefore brings entrepreneurs to adopt more conservative strategies, pursuing safety at the cost of lower expected growth (Cerqueiro et al., 2017). Moreover, debt carries governance rules that result in a sudden change of control from entrepreneurs to lenders once the company crosses certain thresholds in financial or operational conditions, as pointed out by Williamson (1988). Fear of losing control also leads entrepreneurs to adopt risk-reducing strategies. We call this the 'Debt Risk Effect.' This view predicts a negative relationship between leverage at entry and the growth of young companies, conditional on their survival.

The 'Lender Effect' points to the beneficial role of lenders screening and monitoring borrowers, as well as of the governance attributes of debt. The 'Debt Risk Effect' stresses instead the additional risk that young companies are exposed to when they choose a higher level of leverage at entry and the incentives this creates for more conservative strategies.

Both effects have a strong rationale and potentially reflect mechanisms that are effectively at play. Which of them prevails is therefore an empirical question that we bring to the data.

Based on the arguments above, we conjecture that the Lender Effect largely occurs at lower values on the distribution of leverage at entry, while the Debt Risk Effect takes hold at higher values, giving rise to an inverted-U relationship between leverage at entry and long-term growth (conditional on survival). We call this the 'Inverted-U Curve Hypothesis.' To conceptualize our inverted U-shaped relationship we rely on the approach originally introduced in the management literature by Haans, Pieters and He (2016) and applied recently in the field of finance by Conyon et al. (2019) and Bertoni, Meoli, and Vismara (2022), and in entrepreneurial finance by Nguyen and Vo (2021), among others. This approach derives the inverted-U curve as the composition of two unobservable latent functions. In our case, we theorize that the inverted U-shaped relationship between long-run growth performance and initial leverage emerges by combining the Lender Effect, which is positively sloped, and the Debt Risk Effect, which is negatively sloped, under the maintained assumption that both effects are latent functions of leverage at entry.

Figure 1, where we measure leverage at entry on the horizontal axis and long-term growth on the vertical axis, presents graphically how the latent functions approach leads to our conjecture. While stylized, the figure aims to convey the intuition for our hypothesis. At low levels of leverage at entry, the Lender Effect on expected long-term growth is positive and increasing in leverage, while the Debt Risk Effect is flat, and it does not kick in yet. At some intermediate level, the Lender Effect peters out, and the Debt Risk Effect starts its increasingly negative influence on long-term growth.

2.3 The role of systemic conditions

After examining the consequences of the strategic choice of leverage at entry, we turn to examining how systemic conditions can affect the relationship between leverage at entry and long-term growth by altering the incentives and constraints faced by lenders and borrowers, therefore shaping their choices.

For this, we look at two different institutional dimensions that a priori reasoning and previous studies identify as possible determinants of the inverted-U relationship we document: the strength of creditor rights and the transparency of corporate transactions. This allows us to contribute to the literature on country-level institutional conditions and corporate growth (e.g., Cornaggia et al., 2015), also for newly incorporated companies (Demirgüç-Kunt, Love, and Maksimovic, 2006).

The first dimension we consider is the strength of creditor rights. Stronger creditor rights positively affect lenders' willingness to finance new companies (Armour et al., 2015). In particular, stronger creditor rights make lenders more willing to invest in costly certification of borrowers, i.e., screening and monitoring (Qian and Strahan, 2007), thereby enhancing the positive effect of debt on company growth. At the same time, Acharya, Amihud, and Litov (2011) find in a sample of listed US companies that stronger creditor rights lead companies to adopt risk-reducing strategies, an argument consistent with the findings of Manso (2011). We build on these results and conjecture that the combination of these two effects leads to a steeper slope of the inverted-U relationship between leverage at entry and long-term company growth in countries with stronger creditor rights. This is because our moderating variable, creditor rights, affects both the latent variables that give rise to the inverted-U curve, as shown by Haans, Pieters and He (2016). With stronger rights, lenders engage in more certification (Houston et al., 2010), an effect that is likely to be stronger at lower levels of leverage. At higher levels of leverage, it is instead borrowers who come into play and adopt relatively safer strategies, in anticipation that stronger creditor rights may expose them to bankruptcy more often. We call this the 'Creditor Rights Strength Hypothesis.'

The second dimension we look at is the degree of transparency of corporate transactions, which measures the extent to which financial exchanges occur in a way transparent to all parties. Previous research by Bushman and Smith (2001) hypothesizes that more transparency allows lenders to extend finance more efficiently to higher quality companies, and finds that this is the case for a sample of US listed companies. Consistent with this finding, Andrade, Bernile, and Hood (2014) find that more financial reporting and transaction transparency, induced by the SOX Act, reduced the cost of US listed companies, especially for those whose disclosures were more affected by the Act. Biddle, Hilary, and Verdi (2009) document a positive effect of transparency on investment for US listed companies that are likely to face some credit constraints. Finally, Johannesen and Larsen (2016) show that, by reducing the scope of tax elusion and tax evasion, transparency makes debt more attractive than equity for borrowers. Like these ones, several other studies have focussed on how regulation can induce listed companies to disclose more information to investors, also because there is more data availability on both transparency and its consequences for listed companies.[1] Our interest is however on teasing out implications of the broader set of rules that enhance corporate transparency also for the wider set of private companies, which includes entrepreneurial ones. Several studies have documented the importance of transparency for private companies' access to debt. Kausar, Shroff, and White (2016), for example, show that audits increase debt capacity, while Helman et al. (2018) document a positive effect of financial reporting on the cost of debt of private companies; De Meyere, Vander Bauwhede, and Van Cauwenberge (2018) further document that a positive effect of financial transparency on access to long-term debt is more pronounced for SMEs than larger private companies. For an overview of recent research on how transparency affects private companies' financing choices, see Beuselinck et al. (2023).

Based on these results, also building on the approach suggested by Haans, Pieters and He (2016), we posit that more corporate transparency is beneficial to entrepreneurial companies in overcoming credit constraints, therefore reinforcing the positive Lender Effect on corporate growth. We expect this result to be stronger at lower levels of leverage. As leverage increases, however, more transparency is likely to make the situation of the company more visible to lenders, making the Debt Risk Effect stronger. We therefore also expect to see a steeper curvature of the inverted-U relationship in countries with higher corporate transparency. We call this the 'Corporate Transparency Degree Hypothesis.'

3 Data and sample

3.1 Sample construction

Our main data source is the Amadeus database published by Bureau van Dijk. Amadeus contains accounting data, legal form, industry activity codes, and incorporation date for a large set of public and private companies in Europe. We include incorporated companies from 38 two-digit (NACE) industries in both manufacturing and industry-related services,[2] incorporated in fifteen European countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and the UK.

[1] Some recent contributions, among many, are: Akyol et al. (2014), Dambra, Casares Field, and Gustafson (2015), and Engelen et al. (2020).

[2] We include the following NACE rev. 1.1 industry codes: 15-36 (manufacturing), 40-41 (utilities), 45 (construction), and 50-52, 55, 60-64, 70-74 (services).

We consider companies that are incorporated, excluding sole proprietorships, which are a form of self-employment where business and personal finances are often intertwined, and partnerships, which are rare and often used for specific goals, including tax optimization purposes.

We include in our sample companies that incorporated in the years from 1998 to 2001, and follow them for nine years after incorporation. We evaluate the growth performance of these companies nine years later (2007-2010), conditional on survival. A nine year span allows for a proper evaluation of long-term growth. It also allows us to include the years of the global financial crisis started in 2007 and the subsequent Great Recession (2008-2010) as a negative shock to corporate growth, following the same approach taken by Sedláček and Sterk (2018).

Table 1 illustrates how we build our sample. We start with nearly 1.2 million newly incorporated firms, fairly evenly distributed across the four years of incorporation, with a slight increase over time. We then apply three restrictions. First, we require information on initial size, measured by total assets one year after entry; this more than halves the initial sample due to smaller companies often not being required to file complete financial accounts. Second, we include in our sample only companies with a level of total assets at entry above that of the sample median of their cohorts, which range between 109,00 and 122,000 euros, depending on year. By comparison, the average balance sheet size of the sample of new US companies in Robb and Robinson (2014) is very close at 109,000 dollars. Our sampling choice, which by construction further halves the sample, also reflects the finding that, for new companies, the intensive margin (growth conditional on survival) contributes disproportionately more to aggregate growth than the extensive margin (sheer entry), as documented by Adelino, Ma, and Robinson (2017) and by Haltiwanger, Jarmin, and Miranda (2013). Third, we require companies to have data on leverage at entry, which is our main explanatory variable of interest. This further reduces the sample by 18%. We end up with a sample of 205,618 companies, which are fairly evenly distributed across the four cohorts. Our sample is therefore built to include newly incorporated companies that are large enough to reflect economically relevant growth potential. By construction, this leads us to exclude half of the companies with available information. We therefore verify that our empirical results are not affected by these restrictions. In fact, when we estimate our equations in the full sample that includes also companies with entry size below their cohort's median, we obtain very similar coefficients and significance levels than in the reported regression.

Table 2 reports the country composition of the sample. The first two columns report the number and distribution of all entrants, nearly 1.2 million companies. The five largest EU economies account for a large fraction (77.74%) of our sample, with the UK being the largest (25.86%) followed by Spain (16.67%), Germany (12.89%), Italy (11.93%) and France (10.39%). The last two columns show the geographical distribution of our sample. The total share of the five large economies remains virtually unaltered (77.73%). However, we observe a large decline for Italy (6.44% versus 11.93%) and especially for Germany (0.36% versus 12.89%). Symmetrically, we observe an increase for the other three large economies: France (19.83% versus 10.39%), Spain (23.25% versus 16.67%), and UK (28.45% versus 25.86%). This result is mainly due to the fact that, because of lighter reporting rules for young private companies, German and Italian entrants are not required to report balance sheet data in the first few years after birth.

3.2 Variables

We build a number of firm-level variables for our empirical analysis. Appendix Table A1 provides summary variable definitions.

The dependent variable in our analysis is firm growth, which we measure by comparing size after nine years ($Size_{t+9}$) from incorporation to initial size ($Size_{t+1}$). We measure Size as total assets (in logarithm) for two reasons. First, and more importantly, it is exactly the growth in assets which is more likely to be directly hampered by the presence of financing constraints (Cabral and Mata, 2003, Myers, 1977). Second, alternative size measures such as employment and sales are less satisfactory, either because their coverage in the Amadeus database is incomplete, as for employment, or because they are not a reliable measure of initial size, as for sales one year after incorporation.

We measure our independent variables at entry in the year after incorporation. We employ data from the year after incorporation in order to obtain a meaningful measure, since it may take the company some time to structure its balance sheet over the first few months of operations. Including the year of incorporation would buy us one additional year for computing long-term company growth, but would introduce the risk of employing values that correspond to a transitional period when, for instance, the company may still be finalizing a loan or equity fund-raising.

The main independent variable is leverage at entry ($FinLev_{t+1}$), which we compute as:

$$\text{FinLev} = \frac{(\text{Non Current Liabilities} + \text{Loans})}{(\text{Non Current Liabilities} + \text{Loans} + \text{Total Shareholders' Funds})}$$

This is the standard measure used in the literature on capital structure (Frank and Goyal, 2009).

We also use three firm-level variables as controls throughout the analysis. First, we use initial size ($Size_{t+1}$), computed as total assets (in logarithm). Second, we include two key firm characteristics: profitability and tangibility. Profitability at entry ($Profitability_{t+1}$) is measured by the ratio of operating profits (losses) to total assets. We interpret profitability as a control for firm quality at entry. Tangibility at entry ($Tangibility_{t+1}$) is measured by the ratio of tangible fixed assets to total assets. We interpret tangibility as a control for the extent to which a company relies on tangible (as opposed to intangible assets).

We then build a variable that we use as exclusion restriction in our growth equation. The Accounting Inactive Ratio (AIR_{t+9}) is an aggregate inverse measure of the probability of "accounting survival" of a company in the Amadeus database, conditional on its country and on its year of incorporation. This variable can be computed since Amadeus reports the legal status of a company, which is "active" if the company is not bankrupt, dissolved or in liquidation. We compute AIR_{t+9} as the ratio between the number of companies incorporated in country j and year t that have active legal status, but no accounting data for $Size_{t+9}$, and the number of *all* companies incorporated in country j and year t that have active legal status.

For our analysis of systemic conditions, we test the Creditor Rights Strength Hypothesis using the binary variable Strong Creditor Rights. This variable is based on the creditor rights index by Djankov, McLiesh, and Shleifer (2007), which varies between 0 and 4, with higher values corresponding to stronger creditor rights. Strong Creditor Rights equals 1 if the index takes a value equal to 3 or 4 in a firm's country in the year before incorporation, and 0 otherwise. Countries with strong creditor rights are: Austria, Germany, Luxembourg, Netherlands and UK.

We then test the Corporate Transparency Degree Hypothesis using the binary variable High Transparency. This variable is based on the Transparency index by Francis et al. (2009). The index aims to capture the availability of firm-specific information to those outside a company in a given country. It is built by considering a number of disclosure, information acquisition, and dissemination factors that include financial accounting disclosures, auditing activity, financial analyst coverage, insider trading enforcement, and media coverage. The index ranges between 1 and 37 and a higher index indicates higher transparency. High Transparency equals 1 if a country's Transparency index is larger than its median value in our sample, and 0 otherwise. Countries with high transparency are: Finland, France, Germany, Netherlands, Sweden and UK. We notice that there is some overlap of countries with strong creditor rights and high transparency, namely Germany, Netherlands, and UK. Therefore, we expect our results to pick up a set of traits common to these countries, that makes their institutions conducive to better conditions for investors.

4 Descriptive evidence

We start our analysis by providing descriptive evidence on the initial leverage choice made by a large sample of newly incorporated firms and on its dynamics in the nine years after incorporation. These findings contribute to the literature on the corporate financial strategy of new companies, which is based on smaller samples. They also provide guidance for our multivariate analysis.

Table 3 reports summary statistics for our variables. We see that $Size_{t+1}$ shows substantial variation and an asymmetric distribution with a thin right-tail of (relatively) large companies. Its median value of 383,350 euros reflect our sampling strategy. After nine years, the median firm increases its size by nearly 50%; the average firm grows only slightly less. Firms in the first quartile grow much less, and those in the third quartile slightly more. Note that the distribution of $Size_{t+9}$ is based on a smaller sample, since it excludes over a third of companies for which we do not observe total assets after nine years from incorporation. This can occur for economic reason (bankruptcy) or for reporting delay reasons; we discuss both in Section 5.

Among independent variables, $FinLev_{t+1}$ has similar mean (0.41) and median (0.37) values and exhibits substantial variation, with at least a quarter of the sample firms reporting zero leverage. $Tangibility_{t+1}$ exhibits substantial variation and skewness, as it is natural when looking at a sample that includes a wide variety of industries, spanning both manufacturing and services. Its mean (0.26) is twice the median (0.12), and the level remains below 0.5 up to the third quartile. Also $Profitability_{t+1}$ exhibits substantial dispersion, with a mean value (0.09) almost twice as large as the median value (0.05). Notice that we measure profitability from operating profits, which are a higher level measure than EBIT or net income, which explains the observed positive values across its distribution. $Profitability_{t+1}$ is available for only 75% of the sample due to missing data for value added or total labor costs. AIR_{t+9} shows that, on average, 27.9% of companies do not report their total assets nine years after incorporation, despite of their active legal status at the same date.

We provide additional evidence on the distribution of leverage at entry from two different perspectives. The first perspective compares leverage at entry across the four cohorts. In Table 4 we look at differences in leverage at entry and find that it is evenly distributed across cohorts at all points of the distribution. This also reflects stable conditions in credit availability during the sample period.

Tables 3 and 4 allow us to compare leverage at entry ($FinLev_{t+1}$) in our sample to results from previous studies. The closest comparison is with the data on US start-ups gathered by the Kaufman Foundation Survey and reported by Robb and Robinson (2014). They report mean leverage at entry of around 0.47, slightly higher than in our sample. Asker, Farre-Mensa, and Ljungqvist (2011) report financial data for a sample of 88,000 US private companies (mostly mature incumbents); these have a mean (median) leverage of 0.31 (0.16). Our sample exhibits leverage values that are intermediate between those of these two samples. Our results also provide a more comprehensive perspective than the study by Hanssens, Deloof, and Vanacker (2016), who examine a Belgian sample of nearly 5,000 new companies and finds a somewhat higher level of leverage at entry (mean value: 0.62).

The second perspective looks into the dynamics of leverage at entry from two different angles. First, Figure 2 shows how leverage changes over the nine years after incorporation for the subsample of companies that report leverage for all nine years. Figure 2 plots the distribution over time of leverage, and is based on 85,740 companies, which are slightly over 40% of those for which we have data on leverage at entry. We see that leverage tends to decline over time at all quartiles except the first one, which remains very close to zero. As a consequence, there is a reduction of the inter-quartile range over time which points to a 'converge from above only' pattern.

A second angle to look at dynamics is through persistence. Table 5 reports the number of firms that remain below the sample median of our leverage variables over the nine years from incorporation, and their proportion of the initial number. About two thirds (65.3%)

of the firms with leverage at entry ($FinLev_{t+1}$) below the sample median (0.37) still report leverage below that sample median nine years after incorporation. This pattern of strong persistence of leverage at entry is consistent with the findings of Hanssens, Deloof, and Vanacker (2016) for their sample of Belgian companies, and is sharply different from the pattern exhibited by US listed companies, less than half of which exhibit the same pattern over a ten-year span (see table 5 of DeAngelo and Roll, 2015).

Overall, the descriptive evidence we have uncovered implies that leverage at entry is strongly correlated to leverage in future years. This initial choice does not appear easily reversible and therefore might be expected to affect long-run company growth. We take this insight into account in the design of our empirical strategy.

5 Empirical strategy

We now turn to studying how leverage at entry affects the long-run growth of newly incorporated companies, and how this effect changes with systemic conditions at the level of the economy. Furthermore, we also provide an analysis of what are the determinants of leverage at entry.

5.1 Growth equation

To investigate the role of the initial choice of leverage on long-run corporate growth we follow the sample of entrants over time and estimate the following relationship, which is an augmented growth equation:

$$\begin{aligned} Size_{icjt+9} = \alpha FinLev_{icjt+1} + \beta Finlev - SQ_{icjt+1} + \mathbf{x}'_{icjt+1}\boldsymbol{\zeta} + \\ + (\boldsymbol{DC}_c \times \boldsymbol{DI}_j \times \boldsymbol{DIY}_t)'\boldsymbol{\lambda} + \varepsilon_{icjt+9} \end{aligned} \quad (1)$$

where company size nine years after incorporation for firm i in country c and industry j ($Size_{icjt+9}$) is explained by leverage at entry ($FinLev_{icjt+1}$) in quadratic form, and by a set of control variables contained in the vector $\mathbf{x}_{icjt+1}$, all computed in the first year after incorporation: size, tangibility, and profitability. We include size because firms that manage to reach a critical size tend to remain more resilient over time (Zingales, 1998). We also include tangibility and profitability because they can be taken as proxies for firm quality at entry, thus contributing to addressing the endogeneity problem stemming from the omission of relevant unobservable variables affecting both leverage at entry ($FinLev_{t+1}$)

and size ($Size_{t+9}$). Equation (1) can then be seen as an investigation on whether firm initial conditions predict long-term growth.[3]

We also include fixed effects for each country ($\mathbf{DC}_c$), industry ($\mathbf{DI}_j$) and incorporation year ($\mathbf{DIY}_t$). In the specifications where all explanatory variables vary at the firm level, we are able to substitute these fixed effects with their triple interaction (country, industry, incorporation year). Such interaction allows us to control for any industry-country specific shocks facing each cohort of firms. This is a very powerful approach, which allows us to rule out many possible alternative interpretations of the data, as it controls for a large set of potentially unobserved factors at a very granular level. This could be due, for instance, to factors that influence growth of companies incorporated in the same year, country, and industry like industry-specific regulations, changes in technology, or the level of product market competition. Standard errors are clustered at country-industry level.

The Inverted-U Curve Hypothesis implies that we expect the estimate of α to be positive, and that of β to be negative. A negative and significant β is however a necessary but not a sufficient condition to establish a quadratic relationship. For this reason in the empirical section we employ the so-called three step procedure introduced by Lind and Mehlum (2010). This testing approach requires not only β to be significant and of the expected sign but also the slope of the function to be sufficiently steep at both extremes of the data range for initial leverage and the turning point to be located well within the data range. We also expect the coefficients of size, tangibility, and profitability at entry to be positive, as these variables proxy for firm resilience and quality.

We estimate equation (1) with OLS in our baseline regressions. However, two problems could affect the consistent estimation of the parameters of interest in equation (1): sample selection and unobserved heterogeneity capturing firm quality. Sample selection issues may arise because of survivorship bias. In fact, we are able to observe accounting data nine years after incorporation for about two thirds of our initial sample of entrants. There may be different reasons for this: companies may go bankrupt, dissolve, liquidate, or they can fall below the reporting threshold; there can also be delays in reporting more recent accounting data. According to the data on legal status in the Amadeus database, about 89% of the original sample of entrants are still active at the end of 2009. We therefore

[3] This approach builds on Bloom et al. (2013), who look at management quality as initial condition, and on Maksimovic, Phillips, and Yang (2013), who look at initial size and productivity as initial conditions in the growth of established companies.

conjecture that the unreported data on size at nine years after incorporation are partially explained by delays in reporting accounting information.[4]

We account for the selection issues created by the fact that we observe company growth nine years after incorporation only conditional on economic or accounting survival by estimating a two-step Heckman selection model. This model allows for dependence between the survival and the growth processes.

More precisely, the selection equation (2) models the selection mechanism, i.e., the variable of interest size nine years after incorporation ($Size_{icjt+9}$) is only observed if the selection indicator $SELECT_{icjt+9}$ is equal to one:

$$\begin{aligned} SELECT_{icjt+9} = \mathbf{\Phi}(&\gamma FinLev_{icjt+1} + \delta Finlev - SQ_{icjt+1} + \mathbf{x}'_{icjt+1}\boldsymbol{\mu} + \nu AIR_{ct+9} \\ &+ (\boldsymbol{DC}_c)'\boldsymbol{\pi}_1 + (\boldsymbol{DI}_j \times \boldsymbol{DIY}_t)'\boldsymbol{\pi}_2) \end{aligned} \tag{2}$$

where $SELECT_{icjt+9}$ is a binary variable indicating whether firm i has accounting data nine years after incorporation and $\mathbf{x}_{icjt+1}$ is the usual vector of control variables. In equation (2) the Accounting Inactive Ratio variable (AIR_{ct+9}) measures the share of active companies with no accounting data over the total number of active companies in a particular country-year couple. AIR_{ct+9} ensures the validity of the exclusion restriction, and therefore appears only in the selection equation. Our assumption is that the AIR_{ct+9} reflects exclusively exogenous country-year idiosyncrasies in the updating of the database and is not therefore a proxy for unobservable factors affecting firm growth. We therefore expect AIR_{ct+9} to affect the probability of observing $Size_{icjt+9}$ at the firm level (the selection equation), but not $Size_{icjt+9}$ conditional on observability (the outcome equation). We additionally control for country fixed effects, and for the interaction of industry and year of incorporation fixed effects.

As in the growth equation, also in the selection equation we allow the effect of leverage to be flexible. We expect the estimates of ν to be negative, reflecting our conjecture that a higher AIR is associated with a lower likelihood of observing accounting information. We also expect the coefficients of size, tangibility, and profitability at entry to be positive, as these variables proxy for firm resilience and quality.

The second issue that may arise in the estimation of equation (1) is the potential

[4] Our conjecture is supported by the fact that the amount of missing data increases in more recent years. Only 11% of the missing data for size refers to the year 2007, while 43% of the missing data for size is for the year 2010.

endogeneity of leverage at entry ($FinLev_{icjt+1}$). The literature which investigates the role of initial conditions on firm's future performance relies on the observation that the error term in equation (1) is dated at time $t + 9$, that is nine years after firm's initial conditions are set (see Ayyagari, Demirgüç-Kunt, and Makimovic, 2017, and Sedláček and Sterk, 2018, among others). Unobservable factors at entry are therefore allowed to be correlated with observable initial conditions under the assumption that these factors are transitory in the long run. This condition would not apply however to unobservable factors—including firm quality—which could be viewed as permanent or at least very persistent. To address this issue we include two additional observable variables in equation (1), profitability and tangibility, under the maintained assumption that, once we control for them, the error term in (1) does not depend on initial leverage. This assumption cannot be tested and its plausibility hinges on the adequacy of the included control variables to hold constant unobserved firm quality in the equation.

5.2 Robustness

We develop a set of additional regressions that address a variety of potential concerns with our growth equation.

First, we address the concern that taking as end-point the years of the Great Recession, which created a negative shock to the growth of new companies, might lead to overestimate the effect of leverage at entry. We therefore study the effects of leverage at entry on growth at shorter horizons, from t+5 to t+8. This also allows us to evaluate whether our results might be sensitive to business cycle conditions.

Second, since the growth of companies belonging to the first cohort is evaluated at the end of 2007 whereas growth for companies in the last cohort is evaluated at the end of 2010, one might argue that recent cohorts were more exposed to the negative macroeconomic shock for two reasons. First, they were exposed to the recession for a longer period. Second, they faced the shock at a younger age, when they were likely to be less resilient to adverse conditions. Figure 3 shows that in the four years in which the companies in our sample were incorporated, European economies were growing at a relative healthy rate: the dotted line marks the average growth rate in the sample period, equal to 1.7%. This implies that the initial leverage choice for all four cohorts of firms was made in an expansionary period characterized by strong credit availability. Figure 3 also shows the growth rate of the EU–15 countries took a dive starting in 2008 which persisted until 2010. These years were characterized by a sharp, and arguably unexpected, contraction in economic growth. We therefore deal with these potential effects by estimating an extended model where $FinLev_{t+1}$ and its square are interacted with cohort dummies, therefore allowing differential effects across cohorts.

Third, we consider the possibility that, even within a country, the curvature of the relationship between leverage at entry and size nine years after incorporation might differ depending on initial company size. This may be due to the role size at entry plays in determining the likelihood of financing (Hadlock and Pierce, 2010), or to the fact that companies with larger size at entry are more resilient and able to grow over time (Zingales, 1998). We therefore include the interaction of the linear and quadratic terms of leverage at entry ($Finlev_{t+1}$ and $Finlev_{t+1} - SQ$) with initial size ($Size_{t+1}$). This extension is an application of the so-called moderation analysis in inverted-U relationships (Haans, Pieters and He (2016)). More specifically, moderation can occur in two different ways: it can shift the turning point of the curve left or right and it can flatten or steepen the curve. In the empirical section we report separate tests of the two moderation types and connect them to the way the moderator manifests itself in the observed relationship between long-run growth performance and initial leverage through its effect on the two latent forces.

Fourth, we verify whether the results of Cole and Sokolyk (2018) also obtain in our sample. For this, we replace $FinLev_{t+1}$ with the binary variable they use in their study to measure credit access, so as to make the results directly comparable with those they find. We therefore define $CredAcc_{t+1}$, to be equal to 1 if a firm obtained financial credit at entry (i.e., in the year after incorporation), and 0 otherwise.

5.3 The role of systemic conditions

Our growth equation posits that corporate strategic choices respond to incentives and constraints, whose strength varies across the distribution of leverage at entry. These incentives and constraints depend, in turn, on country-level institutional factors that define at a systemic level the conditions under which lenders and borrowers operate. We therefore further push our *moderation* analysis to analyze how systemic conditions affect the relationship between leverage at entry and long-term company growth.

Our reduced form equation (1) does not model these conditions explicitly, but allows us to explore their importance by exploiting the cross-country dimension of our data. We therefore extend our study by exploring the additional hypothesis that this functional form may apply differently to new companies depending on their country's institutional setting. We estimate additional specifications of equation (1) where $Finlev_{t+1}$ and $Finlev_{t+1} - SQ$ are interacted with two country-level measures of institutional quality, the strength of creditor rights and the degree of corporate transparency.

5.4 Leverage equation

To properly understand the economic significance of the results from the growth equation, we need to have a realistic change in leverage at entry. Such a benchmark is not obvious, so we develop a 'leverage' equation to produce a sensible estimate by looking at a variable that previous literature shows to affect leverage, i.e., corporate income taxation. Our estimates provide a benchmark of what variation in the initial leverage of a newly incorporated firm could be realistically generated by a change in corporate income taxation. Beyond supporting the interpretation of the estimates from the growth equation, the leverage equation estimates are novel and of interest in themselves, as we are not aware of studies focussing on how corporate income taxation affects the leverage of newly incorporated companies. Measuring the effective tax rate for newly incorporated companies is far from trivial. Explaining our choice requires a fairly technical discussion, which we put in the Appendix for the interested readers. We denote with $EATR_{t-1}$ the Effective Average Tax Rate, computed in the year before incorporation, that we employ as our measure.

Since leverage is a "fractional" variable taking values between zero and one, we estimate the following fractional Probit model (Papke and Wooldrige, 1996) :

$$E(FinLev_{icjt+1}) = \mathbf{\Phi}(\beta EATR_{cjt-1} + \mathbf{x}'_{icjt+1}\boldsymbol{\gamma} + \\ + (\boldsymbol{DC}_c \times \boldsymbol{DIY}_t)'\mathbf{a}_1 + (\boldsymbol{DI}_j \times \boldsymbol{DIY}_t)'\mathbf{a}_2) \quad (3)$$

where the expected value of leverage at entry ($E(FinLev_{icjt+1})$) for firm i in country c, industry j is a function of the logarithm of our taxation measure in country c and industry j one year before incorporation ($EATR_{cjt-1}$), and of three explanatory variables, contained in the vector $\mathbf{x}_{icjt+1}$, that have been identified by the literature as being relevant determinants of capital structure (e.g., Frank and Goyal, 2009, among others): initial size, profitability, and tangibility, all computed in the first year after incorporation. Additionally, we include two sets of fixed effects that interact, for each firm i, the year of incorporation dummy ($\mathbf{DIY}_t$) with the country dummy ($\mathbf{DC}_c$) and with the industry dummy ($\mathbf{DI}_j$). These fixed effects account for any possible systematic differences in leverage across year and country combinations, and across year and industry combinations. Standard errors are clustered at industry-country level.

The interactions of country and year of incorporation dummies control for differences in institutional aspects that may affect leverage, also across cohorts, such as the structure of the financial system, reporting requirements, and the quality of accounting practices. The interactions of industry and year of incorporation dummies capture several factors that have been shown in the literature to be relevant for the choice of leverage (see Mackay and Phillips, 2005), again also across cohorts. First, industries themselves are important determinants of leverage. Second, since we look at the initial leverage choice of newly incorporated firms, we cannot use the market-to-book ratio as a proxy for investment opportunities. Similarly, we cannot use past firm-level variables like sales growth or profit variability, which proxy for expected growth and for risk, respectively.

We let the $EATR$ enter either linearly or quadratically in equation (3). The quadratic form allows for the marginal effects to change sign over the distribution of $EATR$, providing a more flexible structure than the linear specification, which imposes a constant sign over the whole distribution.

The function $\mathbf{\Phi}(.)$ is chosen to be a standard normal cumulative distribution function, so as to ensure that the predicted values from equation (3) lie in the unit interval, matching the nature of the data. The estimation of equation (3) could be problematic in case policy-makers were to anticipate a country-industry increase (decrease) in leverage and adjust the effective tax rate accordingly (one year before incorporation). In this case the corporate tax rate ($EATR$) and leverage may be simultaneously determined and $EATR$ should be considered endogenous. Under this scenario—unlikely as it might be—we would underestimate β, so that our estimates should be considered as lower bounds of the true effect. Also, contrary to linear models, consistent estimates of the marginal effects for the $EATR$ in the fractional Probit require all other control variables to be exogenous. This assumption holds if the size and the composition of assets (i.e. tangibility) are pre-determined with respect to the composition of liabilities (i.e. leverage).

6 Results

6.1 Growth equation

6.1.1 Main model

Table 6 reports the results from our estimates of equations (1) and (2) that we discuss in section 5.1. In columns (i) and (ii) we report our OLS estimates from equation (1), where we cluster standard errors at the industry-country level and control for any industry-country-cohort specific shock through interaction fixed effects. In columns (iii) and (iv) we report results from a Heckman two-step model corresponding to equations (1) and (2), where standard errors are bootstrapped. To achieve convergence in these latter specifications we control only for country fixed effects and for industry-year of incorporation specific fixed effects. Columns (ii) and (iv) include profitability and tangibility at entry as control variables. The inclusion of these two variables reduces the sample size considerably, by about 38,000 observations, due to missing accounting information.[5]

To properly test for the presence of an inverted U relationship in our data, we follow the procedure suggested by Lind and Mehlum (2010). Firstly, we find that the coefficients on the linear ($Finlev_{t+1}$) and on the quadratic terms ($Finlev_{t+1} - SQ$) are respectively positively and negatively signed in all columns. Also, they are both significantly different from zero at conventional statistical levels. Secondly, at the bottom of Table 6, we show that the slope of the curve is positively signed at the left extreme of the data range ($Finlev_{t+1} = 0$) and negatively signed at the right ($Finlev_{t+1} = 1$). Thirdly, turning points, i.e. the points at which the estimated curves attain their maximum, are located at 0.36 in columns (i) and (iii) and at 0.29 in columns (ii) and (iv). These thresholds are between 5% and 30% lower than the median (0.37) and the mean (0.41) levels of $FinLev_{t+1}$, depending on which comparison is made. This points to a relatively early switch from the Lender Effect to the Debt Risk Effect. Furthermore, 95% confidence intervals of the turning points are located within the range $[0, 1]$ of initial leverage.

All conditions required by the testing approach introduced by Lind and Mehlum (2010) are therefore satisfied and this overall result provides very strong support for the existence of an inverted U-shaped relationship between long-run growth performance and leverage at

[5]Comfortingly, the median initial size for this sub-sample of firms (374,000 euros) is only marginally smaller compared to the median size of the sub-sample of firms for which information on tangibility and profitability is available (393,000 euros).

entry.[6] From a quantitative point of view these results also imply that the estimated effect on corporate growth of a ten percentage point increase in leverage at entry, computed from the sample mean initial leverage, ranges from -1.8% in column (i), to -2.1% for column (ii); the estimated effect from the sample median ranges from -1.0% in column (i) to -1.6% in column (ii). This effect has to be compared and contrasted with the average growth rate of 13.7% that we observe for those firms which survive over the entire period. The ensuing reduction is therefore sizeable, between 11% and 15% of the average growth of newly incorporated companies.[7]

The additional control variables, size, profitability, and tangibility (all at entry) in columns (ii) and (iv), enter with the expected positive sign. This implies that both initial profitability and initial tangibility have some predictive power for future company growth. As to initial size, the estimated coefficient is smaller than one. This confirms the well-known fact that larger companies tend to grow (comparatively) less than smaller companies (Adelino, Ma, and Robinson, 2017, and Haltiwanger, Jarmin, and Miranda, 2013).

In columns (iii) and (iv) we also control for potential selection biases by estimating a Heckman two-step model. The purpose of this exercise is to check whether our initial results are robust to the modelling of a non-random surviving process in our sample. In the selection equations we find that the Accounting Inactive Ratio (AIR_{t+9}) enters with the expected negative sign, which is statistically significant in both specifications. In both columns $FinLev_{t+1}$ and $FinLev_{t+1} - SQ$ have a significant effect on the probability of observing $Size_{t+9}$. When evaluated jointly we find that the overall effect is initially positive and turns negative above a leverage level equal to 0.45 in column (iii) and 0.4 in column (iv). Taken at face value this would point to an inverted-U relationship between the probability of surviving and initial leverage. However, since the observability of assets nine years after incorporation is expected to depend also on accounting rules we refrain

[6] We also conduct some additional robustness checks to confirm that the relationship is indeed quadratic. Firstly, we add a cubic term, which is never statistically significant at conventional levels. Secondly, we split the data into two sub-samples according to the turning points computed in Table 6. We then estimate two separate equations for data above and below the turning points. Consistently with our findings, we obtain that the relationship between growth and leverage is positive below the turning point and negative above the turning point. Thirdly, we winsorize the main explanatory variable ($Finlev_{t+1}$) at different percentiles (5, 10, 20, 25, 30) and re-estimate the equations with this new transformed variable. Also in this case all main findings are confirmed.

[7] We compute the growth rate as the log-difference in size as measured by total assets between ten years after incorporation and one year after it.

from giving these marginal effects an economic interpretation.

6.1.2 Robustness

In Table 7 we report additional estimates that address a variety of concerns with our growth equation that we discuss in Section 5.2. First, it might be argued that our results so far might not be robust to alternative time horizons for our growth measure. To address this issue we re-estimate our models by evaluating final size from five to eight years after incorporation. In columns (i) and (ii) we report estimates where final size is evaluated five years after incorporation. Not only the results confirm the existence of an inverted-U relationship but they are also similar in size compared to those reported in columns (i) and (ii) of Table 6. Substantially equal (unreported) results are achieved also when looking at horizons of six, seven, and eight years after incorporation.

Second, in columns (iii) and (iv) we report the results of an extended model where leverage at entry and its square are interacted with cohort dummies. We indicate incorporation year dummies with $IY1999$, $IY2000$, and $IY2001$, thus using 1998 as our baseline year. By doing so we allow both the turning point and the curvature to differ across cohorts of firms. All interaction terms are found to be statistically insignificant. We also cannot reject the hypothesis that they are jointly equal to zero. Overall we cannot therefore reject the null hypotheses that the four cohorts have the same turning point as well as the same curvature. We conclude that using aggregate macroeconomic conditions to identify differential effects across cohorts is not very powerful in our application, confirming the validity of our baseline approach in equation (1).

Third, in columns (v) and (vi) we include the interaction of leverage at entry and its square with initial size ($Size_{t+1}$), with and without the inclusion of profitability and tangibility at entry as control variables. Size can therefore be interpreted as a moderator in the relationship between long-run growth performance and initial leverage. All coefficients in columns (v) and (vi) are statistically significant. Following Haans, Pieters and He (2016) we conduct two separate tests to illustrate how the moderator variable affects the quadratic relationship. First, we check whether there is a shift in the turning point for different values of initial size. We find that there is no significant shift in the turning point. We then check whether the moderator affects the shape of the inverted U, flattening or steepening the curvature. We find that initial size significantly steepens the inverted U relationship as the coefficient of the interacted term $Finlev_{t+1} - SQ \times Size_{t+1}$ is negative and significant.

Since the introduction of the double interactions makes the interpretation of the estimated functional forms somehow cumbersome, we also take a visual approach and use Figure 4 to show the estimated quadratic relationships associated with the coefficient estimates of column (v). The graph shows the predicted values of $Size_{t+9}$ computed as the average of the predicted values over all sample firms, where we set both leverage at entry and initial size at fixed levels, keeping all other covariates at their observed value.[8] A flattening or steepening occurs when the moderator affects the latent mechanisms in such a way that the overall shape of the observed relationship changes even if the turning point of the relationship does not change. From this perspective Figure 4 seems to suggest that our two latent effects are stronger in the sub-sample of larger firms and this is especially the case for the Lender Effect. We take this result into consideration in sub-section 6.3 and allow the role of systemic conditions to depend on the initial firm size.

Finally, in columns (vii) and (viii) we substitute $FinLev_{t+1}$ with $CredAcc_{t+1}$. Cole and Sokolyk (2018) find a positive effect of access to credit on growth and interpret it as evidence in favor of the role that credit access at entry can have through quality certification and monitoring. We do not find instead such a positive statistical association as the estimated coefficients are statistically insignificant. This might be the case because, at least in our sample of firms, the binary variable approach is too rough to disentangle the two competing effects since it includes in the same category firms with very different levels of initial leverage.

Overall we conclude that the inverted-U curve we documented in Table 6, is robust to several alternative estimation variations.

6.1.3 The role of systemic conditions

In this Section, we further investigate the moderation of the curvilinear relationship between leverage at entry and long-term company growth. While accounting for the moderating role of initial size, as in columns (v) and (vi) of Table 7, we also consider the role of systemic conditions. Table 8 thus reports the results of additional specifications of equa-

[8] We set $FinLev_{t+1}$at eleven different values from 0 to 1 (stepping by 0.1), and we set $Size_{t+1}$ at its first quartile, median and third quartile. We thus obtain 11x3=33 different levels, where the predicted $Size_{t+9}$ is computed for each firm. The figure shows the average predicted $Size_{t+9}$ averaged over all firms, for each different level of $FinLev_{t+1}$.

tion (1) where $FinLev_{t+1}$ and $FinLev_{t+1} - SQ$ are interacted with initial size ($Size_{t+1}$) and country-level measures of systemic conditions, which we discuss in Section 5.3.

In columns (ii) and (iv) we add $Profitability_{t+1}$ and $Tangibility_{t+1}$ as control variables. In columns (i) and (ii) of Table 8 we include the interaction of $Finlev_{t+1}$ and $Finlev_{t+1} - SQ$ with the dummy variable Strong Creditor Rights, the first systemic condition we focus on. All interaction terms are significantly different from zero, except the one between initial size and creditor rights.

To provide a more intuitive interpretation of our results, given the presence of two moderators affecting the inverted U relationship, Figure 5 graphically presents the estimated quadratic relationships associated with column (i) of Table 8. We observe that the curvature of the inverted-U curve is more pronounced in the right panel, i.e. for countries with stronger creditor rights. This supports the Creditor Rights Strength Hypothesis. Consistent with the findings of Figure 4, the curvature becomes steeper with initial company size. Moreover, the difference in curvature between countries with high and low creditor rights is found at all levels of initial company size. Looking at the left panel, we are also able to confirm that the Lender Effect appears to be barely effective for companies with initial size below the median.

In columns (iii) and (iv) of Table 8 we move to our second systemic condition, and include the interaction of $Finlev_{t+1}$ and $Finlev_{t+1} - SQ$ with the dummy variable High Transparency. The results are very similar to those we obtain for creditor rights, with all interactions significant, and with the expected sign, except the one between initial size and transparency. In Figure 6 we allow the relationships between leverage at entry and long-term corporate growth to vary with the degree of transparency. Our results are similar to those in Figure 5. The curvature of the inverted-U curve is more pronounced for countries with more corporate transparency. This supports the Corporate Transparency Hypothesis. As for Figure 4, the curvature tends to increase with initial company size, and the difference in curvature between countries with high and low transparency is found at all levels of initial company size. Looking at the left panel, we once again observe that the Lender Effect appears to be barely effective for companies with initial size below the median.

The results of Table 8 and their graphic representation in Figures 5 and 6 further support the existence of an inverted-U curve between leverage at entry and long-term company growth. They also indicate that systemic conditions affect the shape of this relationship. In particular, systemic conditions that are more favorable to investors, such as stronger creditor rights or more corporate transparency, are associated with somewhat steeper inverted-U curves and therefore with a more powerful role for both the Lender Effect and the Debt Risk Effect.[9]

6.2 Leverage equation

Table 9 reports the results from estimating equation (3) with $FinLev_{t+1}$ as dependent variable. Our variable of interest, $EATR_{t-1}$, enters linearly in columns (i) and (ii), and quadratically in columns (iii) and (iv). Columns (i) and (iii) include only initial size as control variable, whereas in columns (ii) and (iv) we also include the company's tangibility and profitability. As we discuss in Section 5.4, in non-linear models, unlike in linear models, the endogeneity of the control variables would bias the estimator for the coefficient of $EATR_{t-1}$. For this reason, in the last row of Table 9 we also report the (constant) marginal effects based on a linearized version of equation (3) estimated with OLS.

In the linear specifications of columns (i) and (ii) the coefficient of $EATR_{t-1}$ is positive, and significantly so. In the lower part of the Table we report the marginal effects, whose mean value equals 0.030 and 0.027, respectively. The estimates of the quadratic specifications in $EATR_{t-1}$ reported in columns (iii) and (iv) reject the hypothesis of a linear relationship between the corporate tax rate and leverage at entry, since in both columns the coefficients on the quadratic term are significantly different from zero. The mean marginal effects retain their positive sign but become smaller—0.018 in column (iii) and 0.014 in column (iv), where the full set of control variables is included.[10]

Coming to the control variables, in all four equations their coefficients are significantly different from zero at conventional significance levels. $Size_{t+1}$ and $Tangibility_{t+1}$ enter

[9] It might also be argued that our relationship of interest varies according to industry characteristics including the level of regulation and the degree of competition. Even if our data are not ideal for dealing with this issue in depth, we provide a test of the stability of our results by replicating the first two columns of Table 6 for the two sub-samples of manufacturing and non-manufacturing firms. Around 90% of firms in our sample belong to non-manufacturing industries, so estimation results for this group of companies are (unsurprisingly) very similar to those found for the full sample. For manufacturing firms, the inverted U relationship is also confirmed, even if it is less precisely estimated and flatter in its curvature. These additional results are reported in Table A2.

[10] The estimated mean marginal effects for the linearized version of the model estimated with OLS are slightly larger than those based on the Papke and Woolridge (1996) estimator in all columns.

with a positive sign and $Profitability_{t+1}$ enters with a negative sign in all columns where they are included. In the empirical literature on the determinants of leverage, the positive relationship between leverage and tangibility is explained by the fact that tangible assets can be used as collateral in lending agreements. This, in turn, makes access to credit easier or less costly, an effect that is arguably stronger for small and young firms. The negative relationship between leverage and profitability–taken as a proxy for the availability of internal funds– is instead commonly associated to the pecking-order theory, which predicts substitutability between cash flow and debt (Myers and Majluf, 1984). The fact that this relationship also holds for firms in their initial stage of operations is novel to the literature.

What do these results imply for our search of a sensible benchmark for a change in leverage at entry? Based on our estimates, in our preferred specification of column (iv) of Table 9, a ten percentage point decrease in $EATR_{t-1}$ leads to a mean (median) decrease in initial financial leverage of 14.0 percentage points (9.3 p.p.). The same would naturally happen reversing the sign of the change, i.e., with a similar increase of $EATR_{t-1}$. This result gives credibility to our baseline simulation which is based on a ten percentage point decrease in leverage. According to our estimates this change is feasible and realistic, since it is associated to a (approximately) ten percentage point decrease in $EATR_{t-1}$.

7 Conclusion

Previous studies have shown the importance of certain initial conditions for the growth of new companies (e.g., Ayyagari, Demirgüç-Kunt and Maksimovic, 2017). We advance this literature by documenting the importance of leverage at entry as a salient initial condition that has long-term effects on company growth. Leverage has received much attention in the finance literature, which has explored its determinants and the consequences of its level and variation for listed companies (e.g., DeAngelo and Roll, 2015, Graham, 2008). However, its role for young new companies is much less understood, and the literature has only recently started to investigate, conceptually and empirically, the role of debt for entrepreneurial companies.

Our first contribution is conceptual, and develops a new understanding of the role of leverage at entry. We draw on theoretical arguments and empirical facts to argue that the choice of leverage at entry is likely to result in the future growth of newly incorporated companies. Our arguments are based on the different benefits and constraints that arise when a company uses a different proportion of debt in its financing. The use of debt implies a positive effect of screening and monitoring by lenders, who use their ability to process soft information to overcome the strong asymmetric information that characterizes newly created companies (Berger, Bouwman, and Kim, 2017). Debt also implies governance rules that allow lenders to intervene to avoid deterioration of the company's financial situation (Kochhar, 1996). We conjecture that these effects have a positive influence on a company's long-term growth. On the other hand, debt also exposes companies to the risk of financial distress, which can degenerate into bankruptcy. As bankruptcy is costly to entrepreneurs (Armour and Cumming, 2008), we argue that an increase in leverage at entry has two effects that generate a negative influence on expected long-term growth. One is that the company may become more cautious and risk-averse. The other is that the company may shun long-term investment in favor of short-term use of its cash in order to avoid distress. Our conceptualization is also a call for entrepreneurial finance scholars to develop more fully theoretical bases for understanding the role of debt in the growth of entrepreneurial companies.

We bring these arguments together and conjecture that the positive role of debt for new companies' growth becomes weaker as leverage increases, and it yields to negative effects beyond a certain threshold. This key prediction guides our empirical analysis. We then extend our conceptual framework to include country-wide systemic conditions that shape the effect of leverage at entry on long-term growth by changing the incentives of lenders and borrowers. This part of our analysis provides a novel example of the importance of incorporating institutional factors when studying the choices of entrepreneurs and lenders (e.g., Demirgüç-Kunt, Love, and Maksimovic, 2006). We believe that further work could help explore the role of additional systemic conditions, as well as variation over time within a given country.

Overall, our study shows the importance of considering the real effects of financial variables by extending to newly incorporated companies the analysis of the real effects of different forms of finance for mature private or public companies (e.g., Degryse and Ongena, 2005, Jensen and Meckling, 1976).

Our empirical results provide novel and robust evidence that leverage at entry is a significant predictor of long-term growth of new companies, conditional on their survival. This effect is also economically appreciable. It implies that the positive influences on future growth of debt financing at entry give way to the negative ones when leverage becomes large enough. This switch occurs at a level of leverage at entry that is relatively low, slightly below its median and mean values. This points to the difficulty for new companies to achieve long-term growth when they are funded mainly by debt. While much of the academic and policy attention is focussed on overcoming financing constraints (e.g., Berger and Udell, 2002), our results point to a more composite effect, where the mix of debt and equity is also relevant for company growth.

We also document that systemic conditions make the relationship between leverage at entry and long-term growth steeper. This points to more investor-friendly economies allowing companies with 'intermediate' levels of leverage at entry the possibility to exploit the positive influence of debt funding to a larger extent than in other countries. Since systemic conditions are to a good extent set by policy choices, they can be influenced by policy-makers.

A direction for further research that arises directly from our exercise is to extend the analysis by looking at the role of the supply of funds as a possible moderator for our results. In particular, one could look into the nature of different recent financial instruments that are conceived to increase access to finance by entrepreneurial companies, such as crowdfunding and asset-back finance (see Block et al. (2018)).

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Figure 1. The Inverted-U Curve Hypothesis

The figure shows how the combined Lender Effect and the Debt Risk Effect give rise to the Inverted-U Curve Hypothesis. The horizontal axis measures leverage at entry and the vertical axis measures the company's long-term growth.

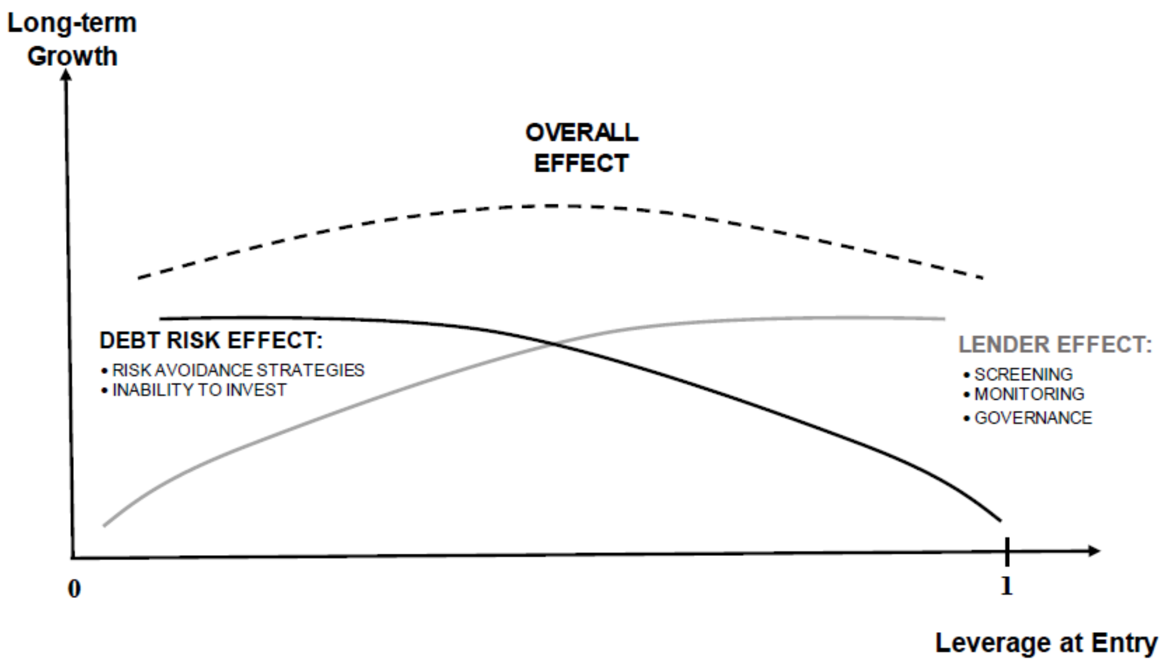

Figure 2. Distribution of leverage over time

The figure shows the distribution of financial leverage ($FinLev$) over time, from the first to the ninth year after incorporation, averaged across the subset of 85,740 firms that report information on leverage for all nine years after incorporation.

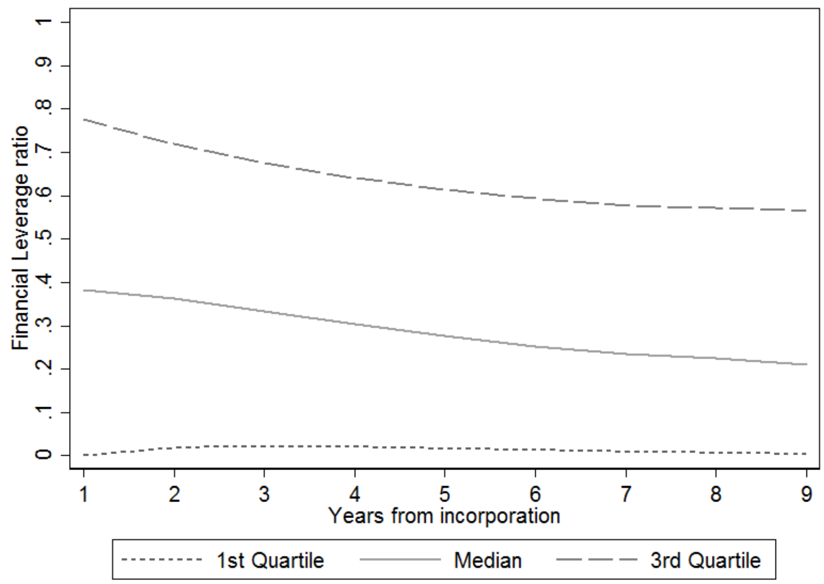

Figure 3. GDP growth rates in the EU-15 countries

This figure shows the GDP growth rates in the EU-15 countries over the period 1996-2017 (source: Eurostat). The dashed line represents the average GDP growth rate over this period, equal to 1.7%. The grey areas highlight the years under study: 1998-2001 (incorporation year), and 2007-2010 (evaluation years).

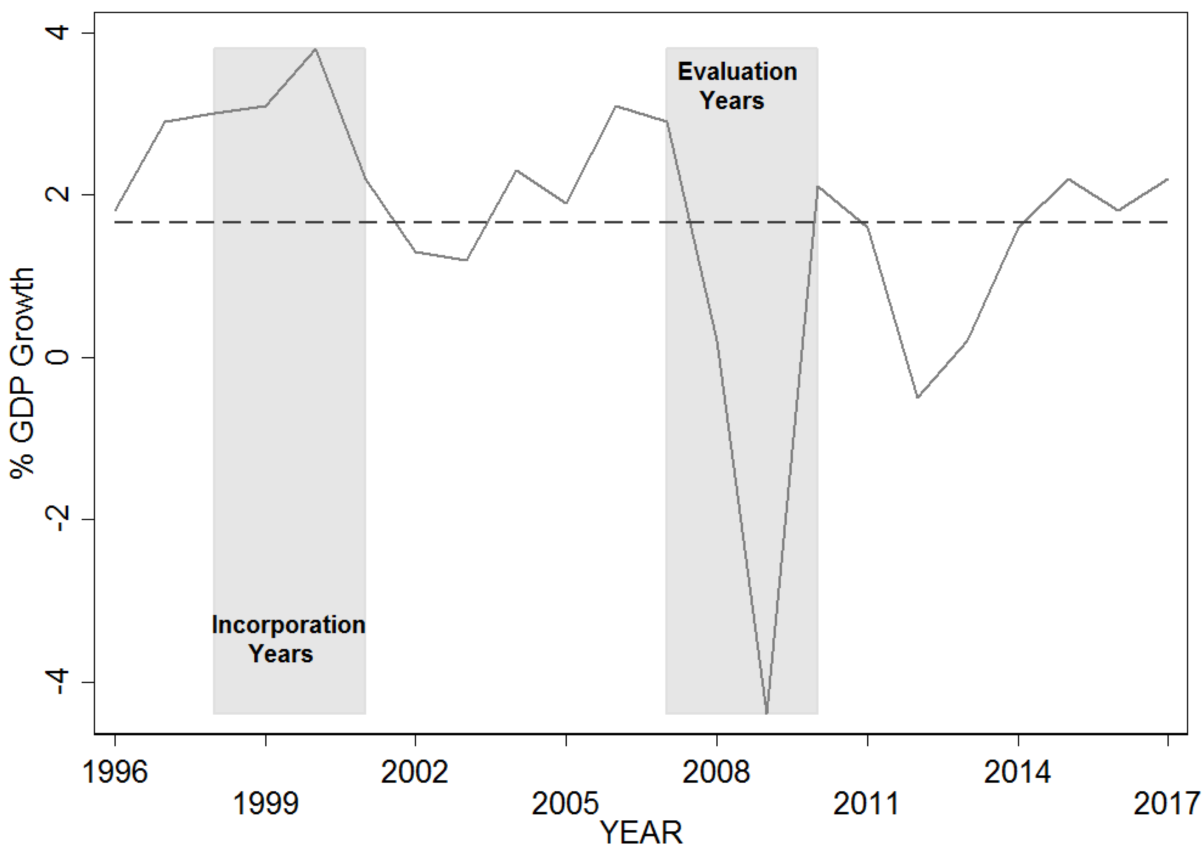

Figure 4. Predicted $Size_{t+9}$ for different levels of initial size ($Size_{t+1}$) and leverage at entry ($FinLev_{t+1}$)

This figure shows the predicted values for $Size_{t+9}$ as a function of leverage at entry ($FinLev_{t+1}$), for three different levels of initial size ($Size_{t+1}$): the first quartile, the median, and the third quartile. The figure is based on estimates from Table 7, column (v).

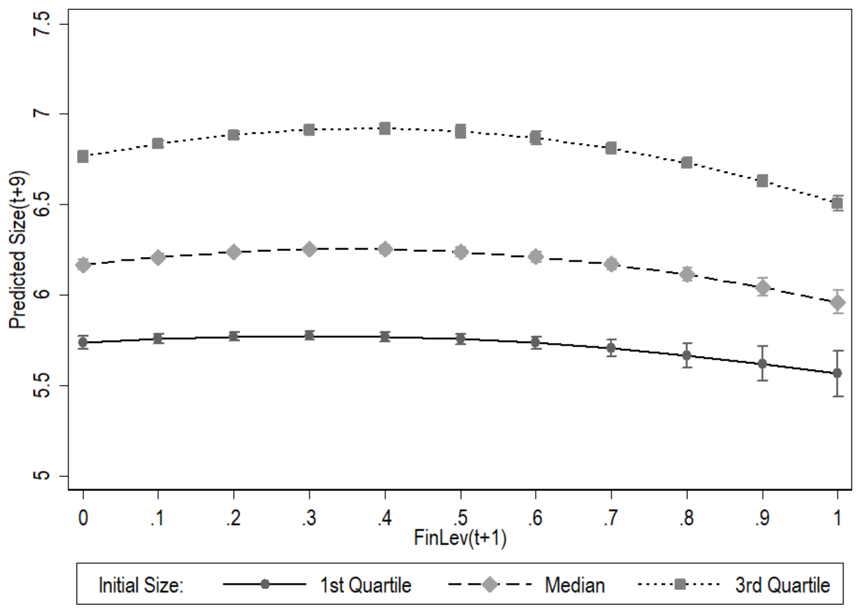

Figure 5. Predicted $Size_{t+9}$ for different levels of initial size ($Size_{t+1}$), leverage at entry ($FinLev_{t+1}$), and strength of creditor rights.

This figure shows the predicted values for $Size_{t+9}$ as a function of leverage at entry ($FinLev_{t+1}$), for three different levels of initial size ($Size_{t+1}$): the first quartile, the median, and the third quartile. The left panel reports values for companies in weak creditor rights countries, and the right panel reports values for companies in strong creditor rights countries. The figure is based on estimates from Table 8, column (i).

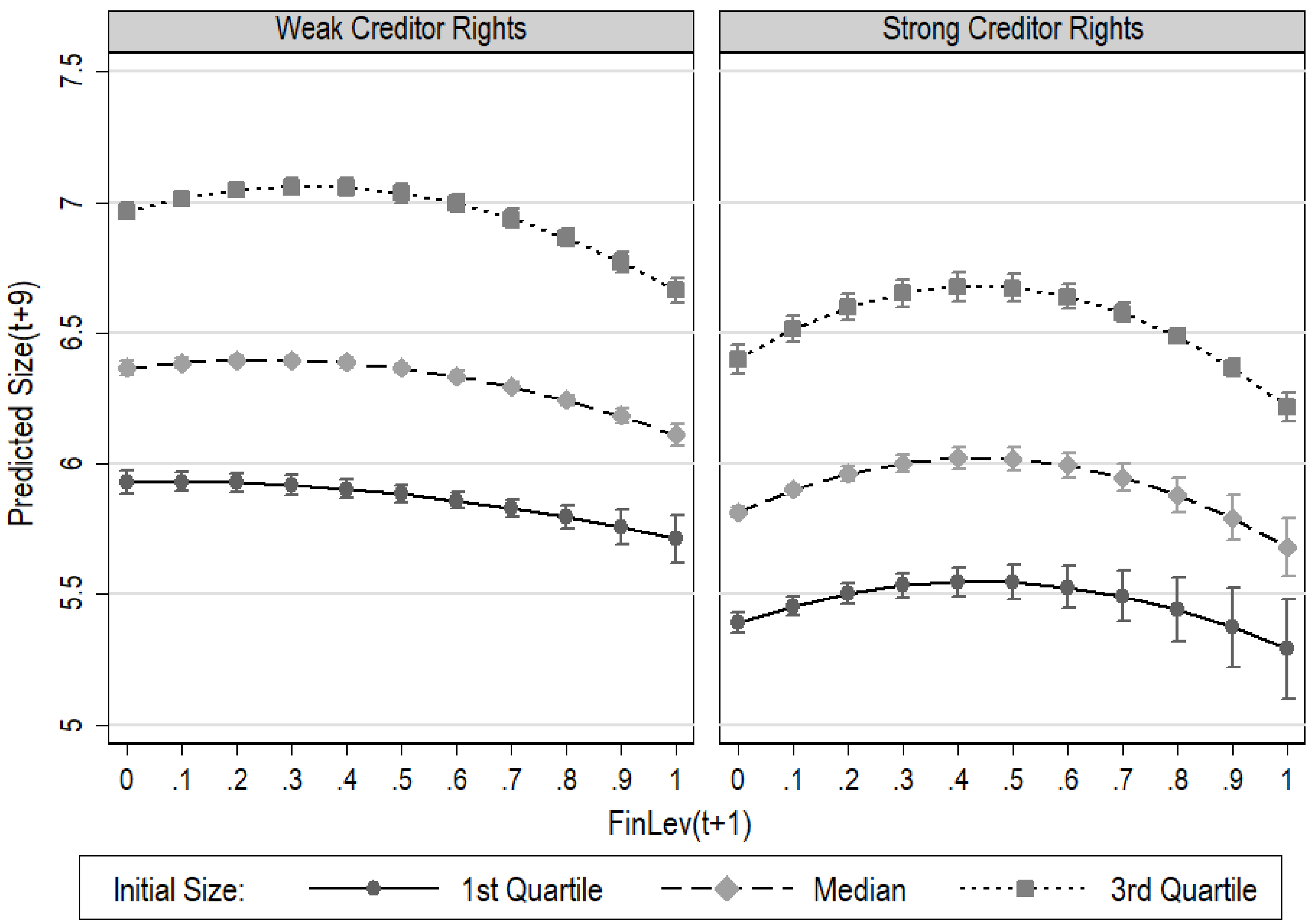

Figure 6. Predicted $Size_{t+9}$ for different levels of initial size ($Size_{t+1}$), leverage at entry ($FinLev_{t+1}$), and degree of corporate transparency.

This figure shows the predicted values for $Size_{t+9}$ as a function of leverage at entry ($FinLev_{t+1}$), for three different levels of initial size ($Size_{t+1}$): the first quartile, the median, and the third quartile. The left panel reports values for companies in low corporate transparency countries, and the right panel reports values for companies in high corporate transparency countries. The figure is based on estimates from Table 8, column (iii).

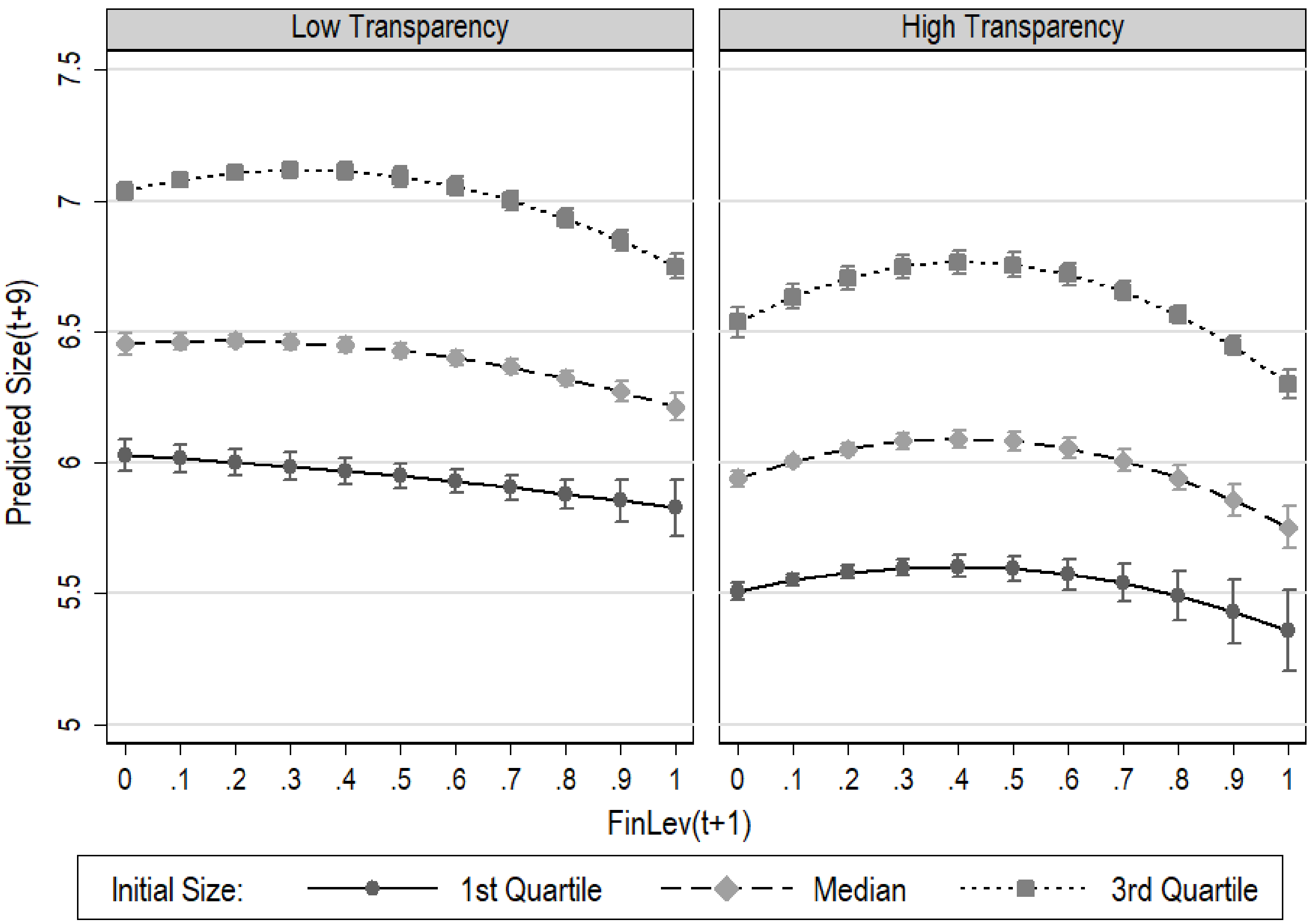

Table 1. Sample construction

This table shows the count of companies at different steps in the sample construction, as described in Section 3.1. Variables are defined in Section 3.2. Appendix Table A1 summarizes all the definitions. The median initial size, measured by total assets (for each cohort) is: 109,000 Euros (1998), 122,000 Euros (1999), 115,000 Euros (2000), and 122,000 Euros (2001).

Incorporation Year	1998	1999	2000	2001	Total
All entrants	256,529	287,070	330,798	336,434	1,210,831
With initial size	96,677	119,475	143,465	153,747	513,364
Initial size > median	47,217	58,378	70,054	75,165	250,814
$FinLev_{t+1}$	38,166	47,749	57,584	62,119	205,618
$FinLev_{t+9}$	20,355	21,362	23,751	20,272	85,740

Table 2. Country coverage

This table shows the count and distribution of companies by country. 'All entrants' refers to the first line of Table 1 (1,210,831 companies). Sample refers to the fourth line of Table 1 (205,618 companies).

	All entrants		Sample	
Country	Firms	%	Firms	%
Austria	12,202	*1.01*	16	*0.01*
Belgium	55,750	*4.60*	18,854	*9.17*
Denmark	28,075	*2.32*	0	*0.00*
Finland	14,432	*1.19*	222	*0.11*
France	125,830	*10.39*	40,769	*19.83*
Germany	156,044	*12.89*	739	*0.36*
Greece	4,184	*0.35*	2,867	*1.39*
Ireland	23,361	*1.93*	3,296	*1.60*
Italy	144,501	*11.93*	13,232	*6.44*
Luxembourg	2,008	*0.17*	61	*0.03*
Netherlands	40,919	*3.38*	6,970	*3.39*
Portugal	57,923	*4.78*	2,850	*1.39*
Spain	201,808	*16.67*	47,802	*23.25*
Sweden	30,625	*2.53*	9,436	*4.59*
UK	313,169	*25.86*	58,504	*28.45*
Total	1,210,831	*100*	205,618	*100*

Table 3. Summary statistics

This table reports summary statistics for our sample of entrants. Variables are defined in Section 3.2. Appendix Table A1 summarizes all the definitions. $Size_{t+1}$ and $Size_{t+9}$ are measured in thousand euros, deflated by Eurostat CPI (base year 2005), and they are trimmed above the 99th percentile. They enter all specifications in logarithmic transformation.

	Mean	St.Dev.	1st Quartile	Median	3rd Quartile	Obs.
$Size_{t+1}$	1,126.88	2,571.83	213.87	383.35	873.31	205,618
$Size_{t+9}$	1,560.23	3,054.18	235.66	563.33	1,441.34	134,429
$FinLev_{t+1}$	0.414	0.380	0	0.370	0.800	205,618
$Tangibility_{t+1}$	0.258	0.302	0.026	0.121	0.400	196,764
$Profitability_{t+1}$	0.090	0.184	0.005	0.050	0.137	153,571
AIR_{t+9}	27.901	21.528	10.099	22.694	37.201	205,616
$EATR_{t-1}$	31.491	3.228	29.026	30.705	34.404	205,618
$CredAcc_{t+1}$	0.698	0.459	0	1	1	205,618

Table 4. Distribution of leverage at entry

This table reports summary statistics for the distribution of $FinLev_{t+1}$. This variable is defined in Section 3.2

	Mean	St.Dev.	1st Quartile	Median	3rd Quartile	Obs.
1998	0.413	0.376	0	0.375	0.791	38,166
1999	0.422	0.380	0	0.394	0.806	47,749
2000	0.404	0.381	0	0.344	0.794	57,584
2001	0.417	0.381	0	0.372	0.807	62,119
Total	0.414	0.380	0	0.370	0.800	205,618

Table 5. Persistence of leverage over time

This table reports the number (and the fraction, in *italics*) of companies that report a value of leverage below the sample median up to nine years from incorporation. Leverage is defined in Section 3.2. We restrict the analysis to the subset of 85,740 firms that report information on Leverage ratios for all nine years after incorporation.

Years from	$FinLev$	
incorporation	Firms	%
1	42,869	*100*
2	36,497	*85.1*
3	34,058	*79.5*
4	32,349	*75.5*
5	30,960	*72.2*
6	29,796	*69.5*
7	28,963	*67.6*
8	28,416	*66.3*
9	27,978	*65.3*

Table 6. Growth equation

This table reports estimation results for equation (1) in columns (i) and (ii), and for equations (1) and (2) in columns (iii) and (iv). These models are discussed in Section 5.1. The dependent variable is $Size_{t+9}$. Variables are defined in Section 3.2. Appendix Table A1 summarizes all the definitions. Standard errors (in parentheses) are clustered at country-industry level in columns (i)-(ii), and are bootstrapped with 500 replications in columns (iii)-(iv). $^{***}p < 0.01;^{**}p < 0.05;^{*}p < 0.1$.

	(i)	(ii)	(iii)	(iv)
	OLS	*OLS*	*Heckman*	*Heckman*
Dep. Variable:		$Size_{t+9}$		
$FinLev_{t+1}$	0.604***	0.356***	0.613***	0.353***
	(0.10)	(0.06)	(0.04)	(0.04)
$FinLev_{t+1} - SQ$	-0.843***	-0.612***	-0.863***	-0.617***
	(0.09)	(0.06)	(0.04)	(0.04)
$Size_{t+1}$	0.763***	0.776***	0.770***	0.783***
	(0.02)	(0.02)	(0.005)	(0.005)
$Tangibility_{t+1}$		0.087***		0.093***
		(0.03)		(0.02)
$Profitability_{t+1}$		0.191***		0.194***
		(0.06)		(0.03)
Constant	1.115***	1.649***	0.892**	1.146***
	(0.14)	(0.13)	(0.44)	(0.05)
			Selection Equation	
AIR_{t+9}			-0.025***	-0.024***
			(0.001)	(0.001)
$FinLev_{t+1}$			0.423***	0.271***
			(0.03)	(0.04)
$FinLev_{t+1} - SQ$			-0.478***	-0.329***
			(0.04)	(0.04)
$Size_{t+1}$			-0.046***	-0.031***
			(0.003)	(0.003)
$Tangibility_{t+1}$				0.259***
				(0.01)
$Profitability_{t+1}$				0.492***
				(0.02)
Constant			1.347***	-5.121***
			(0.33)	(0.11)
Mills' lambda			0.02	0.002
			(0.04)	(0.05)
R^2	0.35	0.42		
Observations	134,429	96,363	205,616	150,174
Observations censored			71,189	53,811
Country Fixed Effects	No	No	Yes	Yes
Industry-Year Fixed Effects	No	No	Yes	Yes
Country-Year-Industry Fixed Effects	Yes	Yes	No	No
Slope at $FinLev_{t+1} = 0$	0.604	0.356	0.613	0.353
Slope at $FinLev_{t+1} = 1$	-1.081	-0.867	-1.113	-0.881
Test for U-shaped [p-val]	6.23 [0.00]	5.51 [0.00]	15.99 [0.00]	13.56 [0.00]
Turning point	0.359	0.291	0.355	0.286
95% confidence interval, Fieller method	[0.301; 0.396]	[0.229; 0.337]	[0.340; 0.368]	[0.218; 0.328]

Table 7. Growth equation: Robustness tests

This table reports estimation results for equation (1), discussed in Section 5.1. The dependent variable is $Size_{t+5}$ in columns (i) - (ii), and $Size_{t+9}$ in columns (iii)-(viii). The estimation method is OLS. Variables are defined in Sections 3.2. Appendix Table A1 summarizes all the definitions. Standard errors (in parentheses) are clustered at country-industry level. $^{***}p < 0.01;^{**} p < 0.05;^{*} p < 0.1$.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)
Dep. Variable:	$Size_{t+5}$		$Size_{t+9}$					
$FinLev_{t+1}$	0.495***	0.232***	0.579***	0.360***	-1.908***	-1.754***		
	(0.09)	(0.05)	(0.13)	(0.10)	(0.52)	(0.35)		
$FinLev_{t+1} - SQ$	-0.710***	-0.449***	-0.798***	-0.598***	2.070**	1.627***		
	(0.09)	(0.04)	(0.12)	(0.10)	(0.81)	(0.48)		
$FinLev_{t+1} \times Size_{t+1}$					0.403***	0.340***		
					(0.08)	(0.06)		
$FinLev_{t+1} - SQ \times Size_{t+1}$					-0.464***	-0.359***		
					(0.13)	(0.07)		
$CredAcc_{t+1}$							0.023	-0.035
							(0.02)	(0.02)
$FinLev_{t+1} \times IY1999$			0.093	0.099				
			(0.10)	(0.11)				
$FinLev_{t+1} \times IY2000$			-0.017	-0.079				
			(0.10)	(0.12)				
$FinLev_{t+1} \times IY2001$			0.032	-0.031				
			(0.10)	(0.10)				
$FinLev_{t+1} - SQ \times IY1999$			-0.101	-0.119				
			(0.11)	(0.12)				
$FinLev_{t+1} - SQ \times IY2000$			-0.024	0.046				
			(0.10)	(0.12)				
$FinLev_{t+1} - SQ \times IY2001$			-0.056	0.013				
			(0.11)	(0.12)				
$Size_{t+1}$	0.828***	0.845***	0.763***	0.776***	0.744***	0.746***	0.754***	0.774***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)
$Tangibility_{t+1}$		0.060***		0.087***		0.084***		0.049
		(0.02)		(0.03)		(0.03)		(0.04)
$Profitability_{t+1}$		0.177***		0.191***		0.195***		0.282***
		(0.04)		(0.06)		(0.05)		(0.06)
Constant	1.036***	0.981***	1.116***	1.638***	1.230***	1.250***	1.141***	1.616***
	(0.12)	(0.11)	(0.13)	(0.13)	(0.08)	(0.11)	(0.14)	(0.12)
R^2	0.46	0.55	0.35	0.42	0.35	0.42	0.35	0.41
Observations	190,861	138,289	134,429	96,363	134,429	96,363	134,429	96,363
Country-Year-Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wald Stat. Interactions $FinLev_{t+1} \times IY$			0.80	0.70				
p-value [degrees of freedom]			0.57 [6]	0.65 [6]				

Table 8. Growth equation: The role of systemic conditions

This table shows estimation results for equation (1), discussed in Section 5.1. The dependent variable is $Size_{t+9}$. The estimation method is OLS. Variables are defined in Section 3.2. Appendix Table A1 summarizes all the definitions. Countries with strong creditor rights are: Austria, Germany, Luxembourg, the Netherlands and UK. Countries with high corporate transparency are: Finland, France, Germany, the Netherlands, Sweden and UK. Standard errors (in parentheses) are clustered at country-industry level. $^{***}p < 0.01;^{**} p < 0.05;^{*} p < 0.1$.

	(i)	(ii)	(iii)	(iv)
Dep. Variable:	$Size_{t+9}$			
$FinLev_{t+1}$	-2.115***	-1.779***	-2.540***	-2.031***
	(0.43)	(0.37)	(0.52)	(0.39)
$FinLev_{t+1} - SQ$	2.216***	1.651***	2.666***	1.894***
	(0.70)	(0.49)	(0.80)	(0.50)
$Size_{t+1}$	0.747***	0.747***	0.729***	0.732***
	(0.02)	(0.02)	(0.02)	(0.02)
$FinLev_{t+1} \times Size_{t+1}$	0.399***	0.338***	0.450***	0.364***
	(0.07)	(0.06)	(0.08)	(0.06)
$FinLev_{t+1} - SQ \times Size_{t+1}$	-0.458***	-0.360***	-0.511***	-0.384***
	(0.11)	(0.08)	(0.12)	(0.08)
$FinLev_{t+1} \times Strong\,Creditor\,Rights$	0.688***	0.423***		
	(0.14)	(0.15)		
$FinLev_{t+1} - SQ \times Strong\,Creditor\,Rights$	-0.570***	-0.252		
	(0.14)	(0.18)		
$Size_{t+1} \times Strong\,Creditor\,Rights$	-0.017	-0.004		
	(0.04)	(0.05)		
$FinLev_{t+1} \times High\,Transparency$			0.618***	0.344**
			(0.16)	(0.14)
$FinLev_{t+1} - SQ \times High\,Transparency$			-0.566***	-0.300**
			(0.15)	(0.14)
$Size_{t+1} \times High\,Transparency$			0.014	0.029
			(0.04)	(0.04)
$Tangibility_{t+1}$		0.083***		0.084***
		(0.03)		(0.03)
$Profitability_{t+1}$		0.198***		0.207***
		(0.05)		(0.05)
Constant	1.267***	1.174***	1.215***	1.113***
	(0.19)	(0.22)	(0.15)	(0.15)
R^2	0.36	0.42	0.36	0.42
Observations	134,398	96,354	132,393	96,264
Country-Year-Industry Fixed Effects	Yes	Yes	Yes	Yes

Table 9. Leverage equation

This table reports results of the estimation of equation (3), discussed in Section 5.4. The dependent variable is $FinLev_{t+1}$. The estimation method is fractional probit. In columns (i) and (ii) $EATR_{t-1}$ enters linearly, while in columns (iii) and (iv) $EATR_{t-1}$ enters also squared ($EATR_{t-1} - SQ$). We compute and report two sets of marginal effects for $EATR$: (a) using the fractional Probit estimates, as in Papke and Wooldrige (1996); (b) using OLS estimates. Variables are defined in Sections 3.2. Appendix Table A1 summarizes all the definitions. Standard errors (in parentheses) are clustered at country-industry level. $^{***}p < 0.01$;$^{**}p < 0.05$;$^{*}p < 0.1$.

	(i)	(ii)	(iii)	(iv)
Dep. Variable:	$FinLev_{t+1}$			
$Size_{t+1}$	0.120***	0.057***	0.119***	0.055***
	(0.02)	(0.01)	(0.02)	(0.01)
$EATR_{t-1}$	2.543**	2.313***	30.140***	26.852***
	(1.02)	(0.88)	(9.51)	(8.85)
$EATR_{t-1} - SQ$			-4.169***	-3.716***
			(1.45)	(1.36)
$Tangibility_{t+1}$		0.636***		0.633***
		(0.21)		(0.21)
$Profitability_{t+1}$		-0.796***		-0.800***
		(0.10)		(0.09)
Constant	-9.929***	-8.116***	-55.519***	-48.627***
	(3.49)	(2.94)	(15.81)	(14.55)
Observations	205,618	150,174	205,618	150,174
Country-Year Fixed Effects	Yes	Yes	Yes	Yes
Industry-Year Fixed Effects	Yes	Yes	Yes	Yes
Mean Marginal Effects for $EATR_{t-1}$				
Fractional Probit	0.030	0.027	0.018	0.014
OLS	0.032	0.027	0.020	0.015

Appendix

The Effective Average Tax Rate (EATR)

In the analysis of leverage at entry we employ an independent variable that aims to measure accurately the corporate income taxation that affects firms' leverage decision at entry. Obtaining such a measure is not immediate for two reasons. The first is general: readily available measures of corporate income taxation are either inaccurate (e.g., the statutory corporate tax rate) or endogenous to financial choices (e.g., the ratio of tax payments to taxable income). The second reason is salient for our study: we need a measure at entry, when the company decides its initial capital structure without having a previous taxable income record.

As Graham (2008) points out, finding a solution is inherently difficult, and a widely accepted approach has not yet emerged. Possible solutions take either of two routes. In the first one, the empirical strategy focuses on the effect of corporate income taxation on incremental debt issuing decisions. This approach employs lagged tax measures in an attempt to avoid including the effect of contemporaneous debt decisions on the tax measure itself. One such measure is Graham's influential simulated Marginal Tax Rate (MTR, see Graham, 1996), which relies on historic data to compute a firm's mean and variance of taxable income changes with the purpose of simulating future firm-level pre-tax profits. The resulting lagged simulated MTR is a comprehensive firm-level measure that incorporates non-debt tax shields such as carry-backwards, carry-forwards, and tax credits. Still, MTR is endogenous to financial decisions since simulations are based on pre-tax profits, which are negatively correlated with leverage.

The second route focuses instead on measures of tax rates before ('but for') financing decisions, in order to bypass directly the endogeneity of taxation issue. An example is provided by Graham, Lemmon, and Schallheim (1998), who modify Graham's MTR measure by running simulations on income before interest expenses are deducted.

To deal with our specific problem we exploit some features of both routes. First, since we study the initial leverage decision of newly established companie, we implicitly look at incremental debt issues. As common in the literature which focuses on changes in debt levels, we deal with the simultaneity issue by using lagged measures of tax status. Second, we also apply the 'but for' approach by using a comprehensive measure of taxation evaluated before financing decisions are taken, the Effective Average Tax Rate ($EATR$) developed by Devereux and Griffith (1998).

This measure has several advantages. First, it incorporates both the tax rate and the elements which define the tax base (expected profitability, debt and non-debt tax shields). Second, it is forward-looking, since it computes the effect of taxation on economic returns over the entire life span of a stylized project. Third, it does not require firm-level simulations of future profits, which would be highly unreliable for newly established companies. Last, but not least, as pointed out by Sørensen (2008), it is suitable when evaluating the effect of taxation on firm decisions at the extensive margin, including firm location and firm entry. We measure effective corporate income taxation in the year before incorporation ($EATR_{t-1}$).

We construct the $EATR$ as a 'but for' measure by choosing a 100% equity financing at incorporation. In principle, the $EATR$ incorporates all non-debt tax shields, which reduce the effective tax rate. These are also naturally correlated with current profitability, which may create a downward bias in tax coefficients if profitability is correlated with debt. Because of data limitations we can only include directly one non-debt tax shield, depreciation.

The size and distribution of the $EATR$ depend on several assumptions about the characteristics of the project and of the national tax system. We assume that the company is resident and operates plant and machinery. Let R^* and R be the pre-tax and post-tax net present value of an investment project, respectively. The $EATR$ is defined as the fall in the rate of return of an investment induced by corporate taxation:

$$EATR = \frac{R^* - R}{R^*}$$

R^* incorporates the (forward-looking) rate of return on the investment which we assume to be industry-year specific but common across countries, following Devereux and Griffith (1998). We take the industry-level profitability rate in the US as a natural benchmark because of fewer regulations and entry restrictions, and therefore a more competitive environment.

The after-tax value of the project (R) reflects the after-tax rate of return of the investment after the statutory corporate tax rate and depreciation rates are applied. In our specifications we present results based on the maximum statutory corporate tax rate and the maximum fiscal depreciation rate for plant and machinery in the year before incorporation.

The $EATR$ therefore varies across industries, countries, and incorporation years. This allows us to estimate its relationship with leverage while controlling for industry, country, and year of incorporation fixed effects, or for interactions among these.

We take the data on corporate income taxation from the "Worldwide Corporate Tax Guide" published annually by Ernst & Young, a leading multinational tax consulting firm. These publications are compiled by Ernst&Young's local offices in over 140 countries following common criteria, ensuring high professional standards and consistency both over time and across countries. More details on the construction of the $EATR$ variable can be found in Da Rin, Di Giacomo, and Sembenelli (2011).

Table A1. Definition of variables

Main Variables	
$Size_{t+9}$	Logarithm of Total Assets, nine years after incorporation
$FinLev_{t+1}$	(Non Current Liabilities + Loans)/ (Non Current Liabilities + Loans + Total Shareholders Funds), one year after incorporation
$Size_{t+1}$	Logarithm of Total Assets, one year after incorporation
Other Variables	
$Tangibility_{t+1}$	Tangible fixed assets / Total Assets, one year after incorporation
$Profitability_{t+1}$	Operating profits (losses) / Total Assets, one year after incorporation
AIR_{t+9}	(Share of active companies with no accounting data)/ (total number of active companies) in country c, computed nine years after incorporation
$EATR_{t-1}$	(Rate of return on the investment - After-tax value of the project) / Rate of return on the investment, one year after incorporation
$IY year$	(year = 1999, 2000, 2001) Dummy variable that takes value 1 when the company's incorporation year is equal to 1999 (or 2000, or 2001), and 0 otherwise.
$CredAcc_{t+1}$	Dummy variable that takes value 1 when $FinLev_{t+1}$ is strictly positive, and 0 otherwise.
$Strong\,Creditor\ Rights$	Dummy variable that takes value 1 for companies located in a country with Creditor Rights Index larger than or equal to 3, and 0 otherwise.
$High\,Transparency$	Dummy variable that takes value 1 for companies located in a country with Transparency Index larger than our sample median (22.4), and 0 otherwise.

Table A2. Growth equation: Heterogeneity across industries

This table reports estimation results for equation (1). These models are discussed in Section 5.1. The dependent variable is $Size_{t+9}$. Variables are defined in Section 3.2. Appendix Table A1 summarizes all the definitions. Standard errors (in parentheses) are clustered at country-industry level. $^{***}p < 0.01;^{**} p < 0.05;^{*} p < 0.1$.

	(i) *Manufacturing*	(ii) *Services*	(iii) *Manufacturing*	(iv) *Services*
Dep. Variable:	$Size_{t+9}$			
$FinLev_{t+1}$	0.296**	0.647***	0.177	0.383***
	(0.12)	(0.11)	(0.13)	(0.07)
$FinLev_{t+1} - SQ$	-0.544***	-0.884***	-0.438***	-0.638***
	(0.12)	(0.10)	(0.12)	(0.07)
$Size_{t+1}$	0.806***	0.756***	0.802***	0.771***
	(0.01)	(0.03)	(0.01)	(0.02)
$Tangibility_{t+1}$			0.028	0.093***
			(0.06)	(0.03)
$Profitability_{t+1}$			0.156**	0.193***
			(0.07)	(0.06)
Constant	0.949***	1.154***	1.542***	1.525***
	(0.07)	(0.15)	(0.09)	(0.15)
R^2	0.47	0.33	0.51	0.40
Observations	18,224	116,205	14,141	82,222
Country-Year-Industry Fixed Effects	Yes	Yes	Yes	Yes
Slope at $FinLev_{t+1} = 0$	0.296	0.647	0.177	0.382
Slope at $FinLev_{t+1} = 1$	-0.791	-1.121	-0.699	-0.892
Test for U-shaped [p-val]	2.54 [0.01]	6.03 [0.00]	1.40 [0.08]	5.31 [0.00]
Turning point	0.272	0.366	0.202	0.300
95% confidence interval, Fieller method	[0.102; 0.355]	[0.311; 0.404]	[-0.179; 0.327]	[0.234; 0.348]