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CORPORATE INCOME TAXATION, LEVERAGE AT ENTRY, AND THE GROWTH OF ENTREPRENEURIAL COMPANIES

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Corporate Income Taxation, Leverage at Entry, and the Growth of Entrepreneurial Companies

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Abstract

We study whether corporate income taxation affects the long-term growth of newly incorporated companies through its effect on their choice of leverage at entry. We first document the distribution of initial leverage, which is persistent over several years. We then find that a decrease in corporate income taxation leads to a sizeable decrease in leverage at entry. This effect on initial conditions has long-term effects: an inverted-U relationship exists between leverage at entry and long-term corporate growth, conditional on survival. These effects are economically sizeable, and stronger in countries with better creditor rights and more transparent financial transactions.

JEL Codes: G32; H25; L25; L26

Keywords: Corporate income taxation; Capital structure; Entrepreneurial finance. Corporate growth.

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1 Introduction

Modern economies grow largely by achieving higher productivity through a process of creative destruction that continuously creates entrepreneurial opportunities (Aghion and Howitt, 1992) and allows successful newcomers to feed innovations to incumbents (Akcigit and Kerr, 2018) or to challenge, and potentially displace, them (Acemoglu et al., 2018).

Entrepreneurial companies rely on external finance to fund the development of their innovations, because the cost of these investments typically exceeds the wealth of the founders. Both debt and equity are used for funding entrepreneurial innovation (Robb and Robinson, 2014), and access to external funding is beneficial for entrepreneurial experimentation, whether through debt (see, among others, Black and Strahan, 2002, Chava et al., 2013, Cornaggia et al., 2015) or through equity (see, among others, Kerr and Nanda, 2015, and Nanda and Rhodes-Kropf, 2013).

Debt and equity have different effects on firm growth also through their incentive and contractual characteristics. Theory holds that the use of 'convertible' securities, which have a strong equity component, is the optimal contract for funding entrepreneurial companies, because it provides investors with incentives to actively engage in building the company, entitle them to stronger control rights, and induces more efficient refinancing decisions (see Da Rin, Hellmann, and Puri (2013)).

Theory also points to the beneficial role of debt for screening and monitoring borrowers (Diamond, 1984). For founders, debt also has two important advantages over equity. First, it allows them to avoid the ownership dilution that comes with equity. Second, the deductibility of interest paid on debt for corporate income tax reduces the effective cost of financing through debt (Graham, 2000). Entrepreneurial companies often take several years to become profitable, but most countries allow the exploitation of tax deductibility through carry-forward allowances that are long enough to matter for the initial choice of indebtedness. A downside of debt, however, is that it exposes the company to financial distress and bankruptcy risk, which is particularly high for young companies whose sales can be volatile.

We therefore expect the choice of leverage to be relevant for the future growth of entrepreneurial companies. An analysis of how corporate income taxation affects the long-term growth of young firms through its effect on leverage at entry is however still missing. This is the main goal of our paper, which contributes to the literature on the importance of initial conditions for corporate performance. We specify our research question into three objectives.

First, we document the distribution of initial leverage (i.e., leverage at entry) and its evolution over the following nine years for a large sample of European newly incorporated companies. We still know very little about the capital structure of young, unlisted, entrepreneurial companies, (see, however, Robb and Robinson, 2014 and Dinlersoz et al. 2018, for two notable exceptions). Our findings contribute new evidence to fill this gap.

Second, the large empirical literature on the determinants of leverage is focussed mainly on large, mostly listed, companies (see Graham, 2008). We study how corporate income taxation affects the initial leverage of newly incorporated companies, providing the first study based on a large sample of such companies.

Third, we estimate an augmented growth model, with leverage at entry as additional independent variable, to examine the long-term effects of corporate income tax, through initial leverage, on conditional (on survival) corporate growth. The transition from small new company ('start-up') to large growing company ('scale-up') constitutes an important determinant for productivity and aggregate growth (see Duruflé, Hellmann, and Wilson, 2017). The intensive effect (growth conditional on survival) is more important than the extensive effect (survival) since it contributes disproportionately more to aggregate growth (see Haltiwanger, Jarmin, and Miranda, 2013, and Adelino, Ma, and Robinson, 2017). We study how corporate income tax policy affects this transition through the choice of initial leverage.

We assess two competing views of the desirability of leverage for young entrepreneurial companies. One view is based on the well documented fact that innovative companies in their early years of life are more likely to face financial distress (e.g., Cetorelli, 2009). This occurs for a variety of reasons, including the need for experimentation and the corresponding volatility of profits. Highly levered young firms are therefore potentially exposed to an amplification of the negative real effects triggered by adverse firm-specific, industry-specific, or macroeconomic shocks, for instance because of higher rollover risks and debt overhang (see Gertler and Gilchrist, 1994). This hypothesis predicts an adverse effect of initial leverage on the conditional growth of young companies. A second view posits an alternative mechanism, where access to debt reflects instead high firm quality and is therefore positively correlated with future performance. As pointed out by Cole and Sokolyk (2018) and by Robb and Robinson (2014), this would reflect the screening expertise of lenders able to identify and provide credit to new firms with superior performance prospects. A positive relationship between debt and performance would also reflect lenders' monitoring ability and use of loan covenants that deter entrepreneurial misbehavior (Cetorelli and Gambera, 2001). Which hypothesis is correct remains an open empirical question that we take to the data.

From a methodological point of view, we exploit the information included in our database to address two potential endogeneity problems that may affect our estimates: sample selection and unobserved firm heterogeneity capturing firm quality.

We find several results that are novel to the literature. First, we document a high variability in leverage at entry, whose mean and median levels are higher than for listed companies in the US and in other countries (Fan, Titman, and Twite 2012). We also find moderate evidence of convergence of leverage over time, up to nine years after incorporation. These findings show that young entrepreneurial companies behave differently from large incumbents: they have higher leverage at entry and keep it high for several years (Lemmon, Roberts, and Zender, 2008).

Second, we find that the corporate income tax, measured by the "effective average tax rate" (EATR, see Devereux and Griffith, 1998), has a positive effect on the level of leverage at entry that is statistically and economically significant. We employ the EATR as it is a theoretically sounder measure than marginal tax rates for understanding corporate financial decisions at entry, as we argue in section 2.3.2. In our preferred specification a ten percentage point decrease in the EATR leads to a mean decrease in initial financial leverage of 13.9 percentage points (median decrease: 9.3 percentage points). Such effect is larger than what typically found for listed companies, which is however computed on marginal tax rates that are not directly comparable with the EATR (see Feld, Heckemeyer, and Overesch, 2013, for a survey). This evidence is consistently robust across a variety of specifications and leverage definitions. We also find that the effect of the EATR on leverage at entry is stronger in countries where creditors enjoy better protection in case of default, and where there is more transparency in financial transactions. Protection of creditor rights is known to ease the supply of funds, while transaction transparency is known to discourage corporate tax elusion and tax evasion. Both are therefore expected to bolster the effect of the EATR on observed initial leverage levels, as it turns out to be the case.

Third, and most important, we find that a decrease in leverage at entry positively affects long-run growth, conditional on survival. When we impose a log-linear relationship we find that a ten percentage point decrease in leverage at entry leads to an increase in company assets size nine years after incorporation ranging from 1.6% to 2.1%. When we allow for a more flexible log-quadratic functional form we find evidence of an inverted-U relationship. This suggests that the probability of facing financing constraints increases more than proportionally with respect to initial leverage, but only after a given threshold. Below that threshold, the relationship between leverage at entry and growth is instead positive. The estimated effect of a ten percentage point decrease in leverage at entry to reach its mean (median) value is comparable in size to the one found in the log-linear specification, ranging from 1.8% to 2.1% (from 1.0% to 1.6%). This new evidence contributes to a small but growing literature that documents the importance of initial conditions for corporate growth (see Ayyagari, Demirgüç-Kunt, and Makimovic, 2017, and Sedláček and Sterk, 2018, among others).

We further ask under which conditions the effect we document is larger. We find that the effect is larger in the sub-sample of companies located in countries where creditors enjoy stronger protection rights, and where the level of transparency of economic and financial transactions is higher. This result, in turn, contributes to the large literature on the role of institutional quality for financial outcomes (see, for instance, Djankov, McLiesh, and Shleifer, 2007, Bennedsen and Zeume, 2018, and Hanlon, Maydew, and Thornock, 2015).

Overall, our results show an economically non-trivial effect of tax policy on the successful scaling-up of entrepreneurial companies through leverage at entry that had so far never been documented.

The rest of the paper is organized as follows. Section 2 describes the data. Section 3 reports and discusses some descriptive evidence. Section 4 illustrates our empirical strategy. Section 5 presents and discusses our econometric results and is followed by a brief conclusion.

2 Data

2.1 Data sources and sample construction

Our first 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 base our analysis on the 2009 and 2011 December releases of the database. We include companies from 38 two-digit (NACE) industries in both manufacturing and industry-related services,[1] incorporated in fifteen countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and the UK.

We consider only those companies that incorporated in the years from 1998 to 2001, and follow them for nine years after incorporation. 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 1 shows that in these four years 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%. 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, as in Dinlersoz et al., 2018, and Sedláček and Sterk, 2018. Figure 1 shows that these years were characterized by a sharp, and arguably unexpected, contraction in economic growth.

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 only a slight increase over time. We then apply two restrictions. First, we require information on initial size, measured by total assets one year after incorporation; this more than halves the initial sample due to smaller companies often not being required to file complete financial accounts. Second, we also exclude very small companies, which are more likely to exit the database over the sample period because they drop below the threshold size required to file complete financial accounts. For this we exclude companies whose initial size is below the sample median computed for all companies in the same cohort with available size data; these median values range between 109,00 and 122,000 euros, depending on year.[2] We end up with a sample of 250,814 companies, also fairly evenly distributed across the four cohorts.

Table 2 reports the country composition of the sample. The first two columns report

[1] 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).

[2] By comparison, the average balance sheet size of the sample of entrepreneurial companies in Robb and Robinson (2014) is very close at 109,000 dollars.

the number and distribution of firms by country in the initial sample of nearly 1.2 million entrants. 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 final sample. The total share of the five large economies remains virtually unaltered (77.73%). However we observe a large decline for Italy (5.63% versus 11.93%) and especially for Germany (0.40% versus 12.89%). Symmetrically, we observe an increase for the other three large economies: France (18.57% versus 10.39%), Spain (23.77% versus 16.67%), and UK (29.36% versus 25.86%). This result is mainly driven by the fact that German and Italian entrants are more likely not to have their balance sheet data reported in the first few years after birth, because of lighter reporting rules for private companies.

Our second data source is the "Worldwide Corporate Tax Guide" published annually by Ernst & Young, a leading multinational tax consulting firm. We take from the Guides information on statutory corporate tax rates and on statutory depreciation rates, at both national and local level. These yearly 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.

2.2 Dependent variables

We build two firm-level dependent variables: a measure of leverage and a measure of firm growth. We examine them in turn.

2.2.1 Leverage

Our preferred measure for leverage is Financial Leverage ($FinLev$), which we compute as:

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

This is the standard measure used in the literature on capital structure (Frank and Goyal, 2009). We index variables by year of incorporation (t), and measure financial leverage at entry in the first year after incorporation ($FinLev_{t+1}$). The use of the leverage variable further reduces our sample size, as shown in the fourth line of Table 1. Our baseline sample is thus composed of 205,618 companies.

We also compute a broader measure of leverage at entry to test the robustness of our results, where we substitute Current Liabilities for Loans in the definition of $FinLev$. Current Liabilities is a broad aggregate which includes commercial debt and other current liabilities, such as pension liabilities, taxes, and accounts payable.[3] Total Leverage ($TotLev$) is therefore computed as:

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

This measure is less satisfactory from a theoretical point of view, since it includes liabilities which typically do not generate interest expenses that can be deducted for tax purposes, like debts to suppliers and contractors. On the other hand, it provides an even higher degree of comparability among countries by avoiding the risk that differences in accounting rules or in aggregation practices affect the way the accounting item 'Loans' is computed in the Amadeus database. $TotLev_{t+1}$ also includes trade credit, which is potentially important as a funding sources for entrepreneurial companies (Giannetti, Burkart, and Ellingsen, 2011). Table 1 shows that the number of observations for $TotLev_{t+1}$ is just marginally lower than for $FinLev_{t+1}$.

2.2.2 Firm growth

The second dependent variable we build is firm growth, which we measure by comparing size after nine years ($Size_{t+9}$) from incorporation with initial size ($Size_{t+1}$). Size is measured as the log of total assets 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, and 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.

2.3 Independent variables

2.3.1 Firm-level variables

We use three firm-level variables as controls throughout the analysis. First, we use initial size ($Size_{t+1}$). Second, we include two standard determinants of leverage: profitability and

[3] In the Appendix we report the balance sheet structure available in Amadeus.

tangibility (Frank and Goyal, 2009). Profitability at entry ($Profitability_{t+1}$) is measured by the ratio of operating profits (losses) to total assets in the first year after incorporation. Since we include the effect of the profitability rate on our measure of the effective corporate tax rate, we can interpret $Profitability_{t+1}$ as a control for non-tax effects. Tangibility at entry ($Tangibility_{t+1}$) is measured by the ratio of tangible fixed assets to total assets in the first year after incorporation. Note that both the size and the composition of assets, proxied by $Size_{t+1}$ and $Tangibility_{t+1}$, are firm-level choice variables and as such could be potentially jointly determined with the composition of liabilities in the same period. We discuss this issue in the empirical strategy section.

Finally, we build a variable that we use for the 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.

2.3.2 The Effective Average Tax Rate (EATR)

Our main independent variable of interest captures the intensity of corporate income taxation. Our aim is to obtain an accurate measure of the actual corporate income taxation that affects firms' leverage decision at entry. Obtaining such a measure is not immediate for two reasons. The first is general and applies to all studies which aim at assessing the effect of corporate income taxation on leverage: readily available measures 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 specific to 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, even finding a solution to the general problem 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 (see, for instance, MacKie-Mason, 1990). This approach simply requires the company to optimally react to tax changes given its current financial structure, without assuming that the company constantly rebalances its leverage ratio towards an optimal level. This approach uses 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, 1996a and 1996b), 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. 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.[4]

To deal with our specific problem we exploit some features of both routes. First, as noted by Graham (2008), we implicitly look at incremental debt issues since we study the initial leverage decision of newly established companies. 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. At the same time, 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 ($EATR$) introduced by King and Fullerton (1984) and developed by Devereux and Griffith (1998).

This measure has several advantages. First, it is comprehensive since 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 are difficult to compute, and possibly highly unreliable for newly established companies. Last, but not least, as pointed out by Sorensen (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 ($EATR_{t-1}$).

[4] The original simulated MTR is endogenous to financial decisions since simulations are based on pre-tax profits, which are obviuoly negatively correlated with leverage.

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 (DeAngelo and Masulis, 1980). They 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. We also take into account, indirectly, the effect of carry-forward of losses, which is a non-debt tax shield that is of material importance for newly incorporated companies.

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 is assumed to be industry-year specific but common across countries.[5] We assume that the industry-level profitability rate in the US constitutes 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. More details on the construction of the $EATR$ variable can be found in Da Rin, Di Giacomo, and Sembenelli (2011).

The $EATR$ varies across industries, countries, and incorporation years. This allows us to estimate its effect on leverage while controlling for industry, country, and year of incorporation fixed effects, or for interactions among these.[6]

[5] $R^* = \frac{p-r}{1+r}$ where p is the rate of return on the investment, in our case the industry profitability rate, and r is the real interest rate (see Devereux and Griffith, 1998).

[6] An additional advantage of the $EATR$ in our context is that it allows us to compute (industry-level) expected profits even for companies that go out of business.

3 Descriptive evidence

This section addresses the first objective of our research question. We provide for the first time 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. This is of interest in its own right, since it contributes to the still small literature on the corporate financial policy of young entrepreneurial companies. This descriptive evidence also contributes to the literature on the dynamics of leverage (see DeAngelo and Roll, 2015, and Heider and Ljungqvist, 2015) by comparing companies at the same life cycle point, therefore providing a natural anchor in the form of a choice of leverage made at the incorporation of the firm.

Table 3 provides summary statistics for our variables. For all variables at entry, we cautiously employ data from the year after incorporation in order to obtain a meaningful value. Using 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. $FinLev_{t+1}$ 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. $TotLev_{t+1}$ is substantially higher; its median value (0.85) is slightly more than twice that of $FinLev_{t+1}$, and its mean value (0.76) is slightly less than twice. $TotLev_{t+1}$ also shows substantially smaller interquartile range, pointing to a lower variability of current liabilities than loans.

Among firm-level independent variables, $Size_{t+1}$ shows substantial variation and an asymmetric distribution with a thin right-tail of (relatively) large companies. Its median value of 383,350 euros reflect the relatively small size of many sample firms, especially considering that we only included those with more than 100,000 euros of assets at entry. 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. 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, for economic or for reporting reasons. $Tangibility_{t+1}$ 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) twice the median value (0.05). Notice that we measure profitability from operating profits, which are a broad measure and explain the observed positive values. $Profitability_{t+1}$ 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. $EATR_{t-1}$ is just above 30% in both mean and median terms, and its inter-quartile range is 5.4 percentage points. Finally, the median number of years losses can be carried forward ($Carryforward_{t-1}$) is 10, with an interquartile range of 10 years.[7]

We provide additional evidence on the distribution of leverage from two different perspectives. First, in Table 4 we look at differences in leverage at entry across the four cohorts. The sample is fairly evenly split across these years, with a slight increase of coverage over time. The distribution of both $FinLev_{t+1}$ and $TotLev_{t+1}$ is remarkably stable across cohorts, with very small changes at all points of the distribution. This reflects stable conditions in credit availability during the sample period. Unsurprisingly, $FinLev_{t+1}$ remains substantially lower than $TotLev_{t+1}$ across all four cohorts.

Tables 3 and 4 also allow us to compare the leverage levels of newly incorporated companies in our sample to those found in other 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 somewhat intermediate between those of these two samples.

Second, we look into the dynamics of leverage over time from two different angles. First, Figure 2 shows how $FinLev$ and $TotLev$ change over the nine years after incorporation. We include only "survivors," that is companies that report either leverage variable for all nine years. Panel A of Figure 2, reports the distribution over time of $FinLev$ and is based on 85,740 companies. Panel B of Figure 2 reports the distribution of $TotLev$ and

[7] In some countries, there is no upper limit to the number of years losses can be carried forward. In these cases we imputed the maximum number of years observed in our sample conditional on the existence of an upper limit (15 years).

is based on 84,969 companies. These figures are slightly over 40% of those for which we have $FinLev$ or $TotLev$ at entry. Panel A shows that $FinLev$ 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. Panel B shows a similar pattern for $TotLev$, except that the first quartile also declines over time, reaching a value close to 0.4 by end of the sample period. In this case, the inter-quartile range increases. The decrease in $TotLev$ is therefore more uniform. Our approach enables us provide a contribution to the recent literature on leverage dynamics by comparing companies at the same life-cycle point. Recent studies on capital structure dynamics often suffer from the lack of "a comparable relative position in leverage cross-sections" (DeAngelo and Roll, 2015). Figure 2 provides such anchor and shows that there is milder evidence of convergence over time that what reported by Lemmon, Roberts, and Zender (2008) for US listed companies. Interestingly, Dinlersoz et al., 2018, also find a negative correlation between age and leverage in a large sample of of US private companies.

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. The second and third column of the table report data for $FinLev$. Almost two thirds (65.3%) of the firms with $FinLev_{t+1}$ below the sample median (0.37) still report a value of $FinLev$ below that sample median nine years after incorporation. The next two columns look at $TotLev$ and provide an almost identical picture, with 64.5% of the companies with $TotLev_{t+1}$ below the sample median (0.85) that remain below that value after nine years. This pattern sharply contrasts with that of 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 documented implies that, regardless of the chosen measure, leverage at entry is strongly correlated to leverage in future years. This makes the analysis of the determinants of leverage at entry—including corporate taxation—of great interest, since this initial choice does not appear easily reversible and therefore might be expected to affect long-run company growth. We take this insight to the design of our empirical strategy.

4 Empirical strategy

We now turn to the two main objectives of our research question: studying how the corporate income tax affects leverage at entry, and how leverage at entry, in turn, affects the long-run growth of newly incorporated companies. We let the descriptive evidence of Section 3 inform and guide our empirical strategy.

4.1 Leverage equation

We start by modelling the determinants of initial leverage noticing that leverage is a "fractional" variable taking values in the unit interval with a positive probability mass at zero. Following Papke and Wooldrige (1996), we therefore estimate the following fractional Probit model:

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

where the expected value of financial 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 firm-specific explanatory variables, contained in the vector $\mathbf{x}$, 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 the year of incorporation dummy ($\mathbf{DIY}_t$) with the country dummy ($\mathbf{DC}_c$) and with the industry dummy ($\mathbf{DI}_j$) of firm i. These fixed effects account for any possible systematic differences in leverage across year and country combinations, and across year and industry combinations.

Though our sample includes relatively homogeneous Western European economies, controlling for country fixed effects is important to account for differences in institutional aspects that may affect leverage, such as reporting requirements and the quality of accounting practices. Industry fixed effects capture several factors that have been shown in the literature to be relevant for the choice of leverage (see Mackay and Phillips, 2005). First, industries themselves are important determinants of leverage; this is sometimes captured by controlling for median industry-level leverage. Second, there are industry-level determinants of leverage that we cannot include given our sample structure. 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. While we have provided evidence on the homogeneity of initial leverage across cohorts, time fixed effects account for any remaining year differences in initial conditions and exposure to economic variations through the nine-year span we look at. Interacting year of incorporation fixed effects with country and industry dummies therefore allow us to account for any differences in these fine-grained effects over time.

The function $\mathbf{\Phi}(.)$ is chosen to be a standard normal cumulative distribution function, so to ensure that the predicted values from equation (1) lie in the unit interval.[8] In the estimation of equation (1) we assume that unobserved heterogeneity at the firm level is orthogonal to all explanatory variables, including our country-industry-year specific taxation measure. Such assumption may not hold if policy-makers anticipate a country-industry clustered increase (decrease) in leverage and adjust the effective tax rate accordingly (one year before incorporation). This might happen, for instance, if policy-makers are induced to increase (decrease) the tax rate or the tax base in response to the forecast of entry of excessively under-capitalized (over-capitalized) firms. In this case taxation and leverage may be simultaneously determined and taxation should be considered endogenous in our model of leverage determinants. Under this scenario—unlikely as it might be—our chosen estimator is expected to underestimate β, and this in turn suggests 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 only if the size and the composition of assets (i.e. tangibility) are pre-determined with respect to the composition of liabilities (i.e. leverage). This is more likely to occur in expansionary periods like the one we chose for our sample (1998–2001) since the severity of financing constraints is known to be counter-cyclical. Still, to address this legitimate concern in the empirical section, we also report the average marginal effects based on a linearized version of (1) estimated with OLS.

[8] The parameters β and γ are consistently estimated using the Bernoulli quasi-ML estimator proposed by Papke and Wooldridge (1996), conditional on equation (1) being correctly specified. We use robust inference by computing standard errors clustered at the country-industry level.

4.2 Growth equation

We now turn to the third objective of our research question, and investigate the role of the initial choice of leverage on long-run corporate growth. For this, we follow the sample of entrants over time and take to the data the following relationship, which is a simple augmented growth equation:

$$
\begin{aligned}
Size_{icjt+9} = \delta FinLev_{icjt+1} + \mathbf{x}'_{icjt+1}\boldsymbol{\zeta} + \\
+ (\boldsymbol{DC}_c \times \boldsymbol{DI}_j \times \boldsymbol{DIY}_t)'\boldsymbol{\lambda} + \varepsilon_{icjt+9}
\end{aligned} \tag{2}
$$

where firm size nine years after incorporation of firm i ($Size_{t+9}$) is explained by leverage at entry ($FinLev_{t+1}$) and by the variables contained in the vector $\mathbf{x}$, all observed at entry: initial size, tangibility and profitability. Equation (2) can also be seen as an investigation on whether firm initial conditions predict long-term success. We add financial leverage to other types of initial conditions studied by Ayyagari, Demirgüç-Kunt and Maksimovic, 2017 (size), Bloom et al., 2013 (management quality), Lee, Moon, and Oh, 2018 (R&D competence), Maksimovic, Phillips, and Yang, 2013 (size and productivity), and Sedláček and Sterk, 2018 (employment), among others. As we did for model (1), we also include fixed effects for country ($\mathbf{DC}_c$), industry ($\mathbf{DI}_j$) and incorporation year ($\mathbf{DIY}_t$). Since all explanatory variables vary at the firm level, we are able to introduce their triple interaction, unlike in equation (1). The triple 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 eliminate many possible alternative interpretations of the data, as it controls for a very large set of potentially unobserved factors at a very granular level.

Two problems may arise when estimating equation (2) that would affect the consistent estimation of the parameters of interest: sample selection and unobserved heterogeneity capturing firm quality. First, selection issues may arise because of survivorship bias. 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, or liquidate, they can fall below the reporting threshold, and 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 conjecture that the unreported data on size at nine years after incorporation are partially explained by delays in reporting accounting information.[9]

We account for selection issues by estimating a two-step Heckman selection model (Heckman, 1979). The selection equation models the selection mechanism, i.e., the variable of interest $Size_{t+9}$ is only observed if the selection indicator $SELECT_i$ is equal to one:

$$SELECT_{icjt+9} = \mathbf{\Phi}(\theta FinLev_{icjt+1} + \mathbf{x}'_{icjt+1}\boldsymbol{\mu} + \nu AIR_{ct+9} + (\boldsymbol{DC}_c)'\boldsymbol{\pi}_1 + (\boldsymbol{DI}_j \times \boldsymbol{DIY}_t)'\boldsymbol{\pi}_2) \quad (3)$$

where $SELECT_{icjt+9}$ is a binary variable indicating whether firm i has accounting data nine years after incorporation and $\mathbf{x}$ is the usual vector of control variables. We also include the Accounting Inactive Ratio variable (AIR_{t+9}), which measures the share of active companies with no accounting data over the total number of active companies in a particular country-year couple. AIR_{t+9} appears only in the selection equation to ensure the validity of the exclusion restriction. Our assumption is that the AIR_{t+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. If this is the case we expect AIR_{t+9} to affect the probability of observing $Size_{t+9}$ at the firm level (the selection equation), but not to affect the expectation of $Size_{t+9}$ 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.[10]

The second issue we need to tackle in the estimation of equation (2) is the potential endogeneity of the initial leverage. This concern is typically overlooked in the firm-level empirical literature which investigates the role of initial conditions on firm's future performance. The implicit rationale for this is grounded on the observation that the error term in equation (2) is dated at time $t + 9$, that is nine years after firm's initial conditions are set. Unobservable factors at entry are therefore allowed to be correlated with observable initial conditions under the maintained assumption that these factors are transitory (i.e.

[9] 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.

[10] A legitimate alternative option would be to estimate our two equation system jointly by Full Information Maximum Likelihood, under a joint normality assumption of the error terms in the main and in the selection equation. Indeed, if we do so the results we present in Table 9 are virtually unaltered. However we focus on the two-step approach in order to make the results fully comparable with those obtained by allowing initial leverage to be endogenous. In this case the FIML approach is in general hard to apply. More specifically, models estimated with FIML fail to converge in our application.

$E(\varepsilon_{t+9}|\varepsilon_t) = 0)$. This is not the case, for instance, if the error term captures time-invariant unobserved firm heterogeneity that is potentially correlated to initial leverage. The potential bias in the estimated effects of initial leverage on long run growth may be either upward or downward. The bias may be upward if ex-ante higher quality companies obtain higher equity financing resources, and the observed relationship between lower leverage and higher growth may therefore be spurious, due to unobserved firm quality. The bias may also be downward if risk-averse entrepreneurs, who are expected to enter with low leverage, are characterized by lower levels of growth because of the unobserved risk aversion. While including some proxies of firm quality, i.e. size, tangibility and profitability at entry, may weaken concerns for this source of endogeneity, we argue that further exploration for a more rigorous approach to deal with the endogeneity of initial leverage is advisable. As we discuss more thoroughly in the next section, we therefore borrow from the literature on financial dependence and growth (Rajan and Zingales, 1998) and construct a set of instruments based on the availability of data on leverage and external financial dependence for a sample of mature large UK companies.

5 Results

5.1 Leverage equation

5.1.1 Baseline model

Table 6 reports the results from estimating equation (1) with our preferred leverage variable, $FinLev_{t+1}$ as dependent variable. As we discuss in Section 4.1, this model controls for additive fixed effects given by the interaction of country and year of incorporation and by the interaction of industry and year of incorporation which allow us to control for a rich set of economic effects. Standard errors are clustered at industry-country level.

We let the $EATR$ enter either linearly (columns (i) and (ii)) or quadratically (columns (iii) and (iv)) in the underlying latent specification. The quadratic form allows for the marginal effects to change sign over the distribution, providing a more flexible structure than the linear specification, which imposes a constant sign over the whole distribution. Moreover, columns (i) and (iii) include only initial size ($Size_{t+1}$) as control variable, whereas in columns (ii) and (iv) the vector of control variables is expanded to include the firm's share of tangible assets ($Tangibility_{t+1}$) and firm profitability ($Profitability_{t+1}$).

The inclusion of these additional control variables reduces the sample size considerably, by about 55,000 observations, since some of the accounting items needed to compute these variables are not available for a non-negligible number of companies.[11]

In the linear specification the coefficient of $EATR_{t-1}$ is positive, and significantly so, both in column (i) and in column (ii). In the lower part of the Table we report the corresponding distribution of marginal effects, whose mean value equals 0.030 and 0.027, respectively. As we discuss in Section 4.1, 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 6 we also report the (constant) marginal effects based on a linearized version of (1) estimated with OLS.[12] The estimated effects are comfortingly very similar: 0.032 (vs. 0.030) for column (i) and 0.027 (vs. 0.027) for column (ii).

These results are broadly confirmed in the quadratic specifications in $EATR_{t-1}$ reported in columns (iii) and (iv) of Table 6. Note first that we reject the null hypothesis of a linear specification since in both columns the estimated coefficients on the quadratic term are significantly different from zero at conventional significance levels. The mean marginal effects retain their positive sign but become smaller—more so in the specification of column (iv), where the full set of control variables is included. The estimated mean marginal effects are 0.018 in column (iii) and 0.014 in column (iv). The estimated mean marginal effects for the linearized version of the model estimated with OLS are also smaller than those of the linear specifications, but slightly larger than those based on the Papke and Woolridge (1996) estimator both in column (iii)—0.020 vs. 0.018—, and in column (iv)—0.015 vs. 0.014.[13] In our preferred, more flexible and less parsimonious

[11] Comfortingly, however, the median initial size for this sub-sample of firms (367,000 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 (390,000 euros).

[12] The OLS estimator for β is consistent if $E(u|EATR, \mathbf{x}, \mathbf{D}) = E(u|\mathbf{x}, \mathbf{D})$ where $\mathbf{D}$ includes country, industry and cohort dummies.

[13] We also extend the baseline model by including $Carryforward_{t-1}$ as additional explanatory variable. This non-debt tax shield should in principle be included in the $EATR$. However, we do not observe all the specific accounting details necessary to compute the reductions in the tax base associated to these provisions. Nevertheless, in order to check that our results are not driven by the exclusion of this component, we include the one element that we observe for all country-years, namely the log-transformed number of years allowed for loss carryforwards. All our results are substantially confirmed. When significant, the estimated parameter on this variable enters with a negative sign, as expected. Detailed results are available in the

specification (column (iv)) a ten percentage point decrease in the EATR leads therefore to a mean (median) decrease in initial financial leverage of 13.9 percentage points (9.3 p.p.).

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 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 rationalized 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.

5.1.2 Extensions and robustness

Table 7 replicates the analysis of Table 6 using $TotLev_{t+1}$ as dependent variable. We do this with the purpose of checking that our previous results continue to hold when using a measure of leverage which, though theoretically less satisfactory, is less likely to suffer from measurement errors associated with potential differences in accounting rules across countries. The mean marginal effects of $EATR$ on $TotLev_{t+1}$ remain positive and similar in size to those of Table 6 in all specifications. The estimates range between 0.022 and 0.029 when we employ the Papke and Wooldridge estimator, and between 0.023 and 0.032 when we instead apply the OLS estimator. As to the control variables, $Size_{t+1}$ changes sign from positive to negative, whereas $Profitability_{t+1}$ retains its negative sign in all columns where it is included. Finally, the coefficients on $Tangibility_{t+1}$ are not significantly different from zero at conventional significance levels.

Table 8 reports results of models where we test whether the coefficients of $EATR_{t-1}$ and the implied marginal effects are constant or vary across sets of countries with different levels of nstitutional quality. These models provide useful evidence on whether and to what degree the response of leverage to corporate income taxation is country-specific (Giannetti, 2003). They explore two different country-level mechanisms through which the $EATR$ can affect the leverage decision. The rationale for this exercise is that a reduction in

Appendix (Table A1).

corporate income taxation might be more effective in countries with a higher degree of creditor protection or with more transparency in corporate transactions. Stronger creditor rights should ease the supply of funds (Djankov, McLiesh, and Shleifer, 2007), therefore amplifying the effect of a change in the $EATR$ on the equilibrium level of leverage. A different mechanism might operate through transparency. A more transparent financial environment discourages tax elusion and tax evasion (Bennedsen and Zeume, 2018, Hanlon, Maydew, and Thornock, 2015); this, in turn, makes the tax deductibility of debt more valuable to companies, and we therefore expect that it increases the effect of the $EATR$ on leverage at entry.

We thus expand our baseline model by introducing interaction terms between $EATR_{t-1}$ and $EATR-SQ_{t-1}$ and two binary variables capturing institutional differences: HIGH-CREDITOR-RIGHTS and HIGH-TRANSPARENCY. HIGH-CREDITOR-RIGHTS is built on the creditor rights index by Djankov et al. (2007). This index varies between 0 and 4, with higher values corresponding to stronger creditor rights. HIGH-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. HIGH-TRANSPARENCY is based on the Transparency index by Francis et al. (2009). The index aims to capture the corporate information environment of a country. It is based on 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 is a binary variable equal to 1 if a country's Transparency index is larger than its median value in our sample, and 0 otherwise.

Columns (i) and (ii) of Table 8 show the results for the linear and the quadratic model when we interact $EATR_{t-1}$ with HIGH-CREDITOR-RIGHTS. In both specifications we include the full set of control variables. The interaction term is positive and significant at the 10% level in the linear specification. However, the two interaction terms are neither individually nor jointly significant at any conventional significance level in our preferred quadratic specification. Columns (iii) and (iv) of Table 8 perform a similar exercise where we interact $EATR_{t-1}$ with HIGH-TRANSPARENCY. Here we find that the interaction terms are significant both in the linear and in the quadratic specification. The distribution of the implied marginal effects clearly indicates that $EATR_{t-1}$ has a much larger effect in those countries where the level of transparency and, to a lesser extent, the degree of creditor rights are higher. This suggests that a country's institutional setting is important for the effect of $EATR_{t-1}$ on leverage.[14]

5.2 Growth equation

5.2.1 Baseline linear model

We now turn to the last, and more ambitious, objective of our research question,the role of leverage at entry for long-run corporate growth. In this section we discuss the estimates of equations (2) and (3). Table 9 reports baseline results grounded on a linear specification, whereas Table 10 reports a number of extensions and robustness checks. Finally, Table 11 allows the functional form to depend on country-specific institutional features, along the lines of Table 8.

In Table 9, the dependent variable is our corporate growth measure, $Size_{t+9}$, and $FinLev_{t+1}$ is now the main explanatory variable of interest. We report six different specifications of equation (2). We first estimate equation (2) with OLS (columns (i) to (iv)). In columns (i) and (ii) we include country-year of incorporation and industry-year of incorporation fixed effects in order to control for country-wide and industry-wide time varying unobservable variables that may affect firm growth. Columns (iii) and (iv) include an even more granular structure for the fixed effects, which allows us to control for any industry-country-cohort specific shock. This means that shocks which are industry-country specific are controlled for separately for each cohort of firms. In columns (v) and (vi) we then address the sample selection problem and estimate equations (2) and (3) by applying the Heckman two-step approach, as discussed in Section 4.2. To achieve convergence in these specifications we control only for country, and industry-year of incorporation specific fixed effects.

[14] We also estimate additional equations where $EATR$ is interacted with two geographical binary variables, $NORTH$ and $CORE$. $NORTH$ takes the value of one if a firm is located in Northern Europe, and zero otherwise. $CORE$ takes the value of one if a firm is located in one of Europe's core countries, and zero othewise (see Camacho, Perez-Quiros, and Saiz, 2006). These partitions are different from those corresponding to the creditor rights and financial transparency variables, and allow us to test whether our finding on the role played by creditor rights and transaprency does not simply proxy for other economic and cultural differences. We find that in both linear and quadratic specifications, the interacted variables are not statistically significant, suggesting that our main results do not reflect generic geographical effects. Also, in the quadratic specifications we do not reject the null that both interacted terms are jointly equal to zero. The results are reported in Table A2 of the Appendix.

The reported estimates therefore vary across columns because of different estimation methods and because the vector of control variables changes across specifications. We report specification both without (columns (i), (iii) and (v)) and with ((columns (ii), (iv) and (vi)) $Tangibility_{t+1}$ and $Profitability_{t+1}$. We include $Size_{t+1}$ in all specifications.

The main reason why we include tangibility and profitability—despite the loss of observations and the concerns about their exogeneity we discuss in Section 4.2—is that both variables 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 $FinLev_{t+1}$ and $Size_{t+9}$.

The main finding of Table 9 is that $FinLev_{t+1}$ has a consistently negative effect on $Size_{t+9}$, after controlling for $Size_{t+1}$ and, in some specifications, for $Tangibility_{t+1}$ and $Profitability_{t+1}$. The size of this effect varies across specifications. Point estimates range from -0.156 to -0.207 when the main equation is estimated with OLS. Accounting for the possible sample selection with the Heckman two-step estimator does not make much difference, since the implied coefficients are very similar to those obtained with OLS (-0.167 and -0.207). Given the imposed log-linear specification, a reduction of ten percentage points in leverage is therefore associated to an increase in long-term growth ranging from 1.56% to 2.07%. The fact that Mills' lambda is not significantly different from zero in both columns suggests that sample selection is not a serious issue in our case.

The additional control variables, $Size_{t+1}$, $Profitability_{t+1}$ and $Tangibility_{t+1}$ enter with the expected positive sign in all specifications. This implies that both initial profitability and initial tangibility have some predictive power for future survival and 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).

When focusing on the selection equation, we find that AIR_{t+9} enters with the expected negative sign and it is statistically significant in both specifications. $FinLev_{t+1}$ has a negative effect on the probability of observing $Size_{t+9}$, but significantly so only in column (vi), which has a smaller number of observations as discussed in Section 4.2. The corresponding mean marginal effect (unreported) is small: a ten percentage point increase in financial leverage at entry is associated with a fall in the probability of observing $Size_{t+9}$ of -0.25%. Since the unobservability of assets nine years after incorporation could also be interpreted as a negative sign of "accounting survival," we refrain from giving these marginal effects an economic interpretation, even if the model controls for systematic cross-country differences in updating times through AIR_{t+9}.

5.2.2 Extensions and robustness

We now report a battery of additional estimates that address a variety of potential concerns with our growth equation. First, we substitute $FinLev_{t+1}$ with $TotLev_{t+1}$ as our main explanatory variable of interest. thus allowing for the possibility that what matters in the growth equations is the overall debt burden, rather than just financial debt. In columns (i) and (ii) in Table 10 we then re-estimate columns (iii) and (iv) in Table 9 with $TotLev_{t+1}$ replacing $FinLev_{t+1}$. The coefficients of $TotLev_{t+1}$ have a negative sign and their magnitudes are roughly comparable to the ones reported in Table 9 (-0.176 vs -0.156 and -0.308 vs -0.199), providing evidence that our results are robust to alternative definitions of leverage.

Second, we exploit the fact that the four cohorts of newly incorporated firms were exposed differently to the 2007 financial crisis and the Great Recession which followed in 2008-2010. Figure 1 shows that the growth rate of the EU–15 countries took a consistent dive starting in 2008, with a negative average growth rate, which persisted until 2010. 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. On these grounds, in columns (iii) and (iv) of Table 10 we report the results of an extended model where $FinLev_{t+1}$ is interacted with cohort dummies. This allows the effect of initial leverage to vary as a function of the intensity of exposure to the negative shock triggered by the 2007 financial crisis. All interaction terms are statistically insignificant. We also cannot reject the null that they are jointly equal to zero. We conclude that using aggregate macroeconomic conditions to identify differential effects across cohorts is not very powerful in our application.

Third, our results so far do not provide evidence in favor of a causal positive effect of an early access to financial credit on future growth, as suggested by Cole and Sokolyk (2018). This, however, might depend on the fact that initial leverage is not a suitable variable to capture the favorable role that credit access at entry can have through quality certification and monitoring. Similarly, it might be argued that it is the linear functional form between leverage and future performance not to be appropriate, since these positive effects are plausibly non-linear in leverage and are at work only when leverage remains relatively low. To address these issues we follow Cole and Sokolyk (2018), and replace $FinLev_{t+1}$ with the binary variable they use in their study to measure credit access. We define $CredAcc_{t+1}$, to be equal to 1 if a firm obtained financial credit at entry $(t+1)$ and 0 otherwise. The estimated coefficients are reported in columns (v) and (vi) of Table 10, and show no role for early credit access on future growth.

As an additional robustness check, we re-estimate columns (iii) and (iv) of Table 9 allowing a quadratic specification for $FinLev_{t+1}$. We report the results in columns (vii) and (viii) of Table 10. We find that the coefficients on both the linear and the quadratic terms are significantly different from zero. They point to an inverted-U relationship between $Size_{t+9}$ and $FinLev_{t+1}$. This, in turn, suggests that the probability of facing financing constraints because of rollover risks and debt overhang is likely to increase more than proportionally in the debt burden, but only after a given threshold. Below that threshold, the relationship between leverage at entry and growth remains positive.[15] Such evidence suggests that the quality certification and monitoring hypothesis put forward by Cole and Sokolyk (2018) operates only below a certain level of initial leverage. These results imply that the estimated effect on corporate growth of a ten percentage point decrease in leverage at entry, computed to reach the mean (median) initial leverage from above, is comparable in size to the one found in the log-linear specification and it ranges from 1.8% to 2.1% (from 1.0% to 1.6%). Since the imputed decrease in leverage corresponds approximately to a ten percentage points decrease in EATR, from Table 6, we conclude that the indirect impact of corporate taxation on growth through leverage is economically non-negligible.

As mentioned in the previous section, it might be argued that despite the inclusion of profitability and tangibility as proxies for firm quality, the growth equations we presented so far still suffer from a residual endogeneity problem associated to the fact that both the initial leverage choice and future growth prospects are determined by a time-invariant unobserved firm-level component that we cannot control for. To address this concern we borrow from the literature on the effects of financial dependence on growth (Rajan and Zingales, 1998, Hadlock and Pierce, 2010, Brown, Cookson, and Heimer, 2017) and construct

[15] The estimated thresholds equal 0.35 in column (vii) an 0.29 in column (viii). Both are lower than the median (0.37) and the mean (0.41) levels of $FinLev_{t+1}$.

two instruments based on industry-level measures of 'optimal' leverage and 'structural' external financial dependence. We identify such values from data on incumbent large UK companies. We measure leverage of incumbents as $FinLev$ over the 1998-2001 period. We measure external financial dependence ($ExtFin$) as the firm-year level difference between capital expenditures and cash flows from operations, divided by capital expenditures, over the 1998-2001 period. Under the assumption that capital markets in the UK are relatively frictionless for large companies, this method allows us to identify industry-specific benchmark levels of leverage and external financial dependence which are exogenous with respect to the unobservable characteristics of the newly incorporated firms in our sample.

We then compute 'optimal' leverage ($UK - LargeFirms - FinLev$) as the industry-level median value of $FinLev$ for large incumbent UK companies, and 'structural' external financial dependence ($UK - LargeFirms - FinDep$) as the industry-level median value of $ExtFin$ for large incumbent UK companies. A firm is defined as 'large' in the Amadeus database if it fulfills the size criteria adopted by Eurostat.[16] We obtain our instruments by interacting these two industry-level variables with the measure of Transparency we introduced in Section 5.1.2.

We report the results for this exercise in columns (ix) and (x) of Table 10, where we estimate a 2SLS model where equation (2) is the growth equation. Estimates for the growth equation are reported under column (ix) and for the corresponding first-stage equation under column (x). Estimates of the parameters of $FinLev_{t+1}$ and $FinLev_{t+1}{-}SQ$ are substantially higher than their OLS counterparts. They are both significantly different from zero and also point to a inverted-U relationship, thus confirming our previous findings. The threshold for the change in the sign of the effect of $FinLev_{t+1}$ interest is higher than the ones estimated in columns (vii) and (viii) (0.49 vs. 0.35 and 0.29, respectively), but still in the admissible range. However, the estimated size of the effect is implausibly large even when evaluated in the proximity of the leverage value (0.49) associated to the maximum of $Size_{t+9}$. In this case a ten percentage point decrease in leverage at entry leads to a 24.1% decrease in corporate growth. Estimated effects grow obviously even larger when evaluated away from the maximum of $Size_{t+9}$. One potential reason for this drawback is the insufficient strength of our instruments. It is now well known in the literature that critical values for robust F-statistics are not available for the case of multiple endogenous regressors and multiple instruments (Montiel Olea and Pflueger, 2013). For this reason at

[16] See https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Enterprise_size

the bottom of column (x) we report several F-statistics that are robust to deviations from the standard homoskedasticy assumption. Despite the unavailability of rigorous hypothesis testing, the very low value of the F-statistic robust to clustering (5.12) suggests that this is indeed the case. For this reason, in what follows we choose to use the results reported in columns (vii) and (viii) as benchmarks to test for the stability of our preferred quadratic specification when applied to subsets of countries sharing common institutional features

5.2.3 Exploiting cross-country differences

Our main finding so far is the existence of an inverted-U relationship between initial leverage and size nine years after incorporation, conditional on initial size. We close our study by exploring the additional hypothesis that this functional form may apply differently to new companies depending of their country's institutional setting. This allows us to contribute to the literature on country-level institutional conditions and corporate growth (see, among others, Cornaggia et al., 2015).

Given that we are studying corporate financial policy decisions, we build on our arguments in Section 5.1.2 and look into whether the curvature of this relationship is more pronounced in countries where the effect of $EATR$ on leverage is expected to be stronger. We expect this to be where creditor rights are more strongly enforced (credit supply channel), or where economic and financial exchanges occur in a more transparent environment (tax elusion/evasion reduction channel). An obvious implication of this hypothesis is that the effect of corporate income taxation on firm growth through leverage may not be homogenous across countries, but depends instead on observable country-level institutional characteristics. We also consider the possibility that, even within a country, the curvature of the relationship between initial leverage 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 (see Hadlock and Pierce, 2010).

To examine these hypotheses, we estimate additional specifications of equation (2) where $Finlev_{t+1}$ and $Finlev_{t+1} - SQ$ are interacted with country-level measures of institutional quality. Table 11 reports the results. In columns (i) and (ii) the interaction is with initial size ($Size_{t+1}$). In columns (iii) and (iv) the interaction is with initial size and with the dummy for strong creditor rights that we introduced in Section 5.1.2 (HIGH-CREDITOR-RIGHTS). In columns (v) and (vi) the interaction is with initial size and with the dummy for high transparency of economic transactions that we introduced in

Section 5.1.2 (HIGH-TRANSPARENCY).

Across columns, most interaction terms are significantly different from zero. Since double and triple interactions make the interpretation of estimated coefficients cumbersome, we take a visual approach and use Figures 3, 4, and 5 to show the estimated quadratic relationships associated to the coefficient estimates reported in Table 11.

Figure 3 is based on the estimates reported in column (i). It shows that the curvature of the relationship is more pronounced for companies with a larger size at entry. In Figure 4 we then allow this relationships to vary with the degree of creditor rights, based on the estimates reported in column (iii), and in Figure 5 we allow this relationships to vary with the degree of transparency. Figure 4 shows that the curvature is more pronounced for firms operating in more creditor-friendly institutional settings and this applies, at least to a certain degree, irrespective of size at entry. A similar, only slightly weaker, result arises from Figure 5.

We draw the following conclusions from these findings. First, we uncover a composite effect of leverage on corporate growth. The inverted-U relationship is consistent with both the quality certification and monitoring effect and the financing constraint effect, at least in countries endowed with good economic institutions. Figures 4 and 5 show that the first effect prevails at lower levels of initial leverage, as documented by the initial positive slope of the estimated functions, whereas the second effect becomes predominant at higher levels of initial leverage, when the probability of financial distress is likely to grow more than proportionally with respect to the level of initial leverage. A second conclusion is more relevant from a policy perspective. Exogenous changes to initial leverage, possibly following changes in corporate income taxation, are likely to have a stronger effect on growth for companies located in countries with stronger creditor rights or with more transparency. However, since this effect is non-linear, a reduction in corporate income taxation, by making the access to debt less appealing, might lead to an increase or to a decrease in long-term growth, through initial leverage, depending on where each company is located on the relevant curve.

6 Conclusion

A large cross-country empirical literature has documented that entrepreneurial companies' demography is significantly different across countries in terms of birth rates, survival rates, and growth, and that these demographic patterns are influenced by country-specific institutions and policies (see, among others, Ciccone and Papaioannou, 2007, Demirgüç-Kunt, Love, and Maksimovic, 2006, Klapper, Laeven, and Rajan, 2006). Recent empirical evidence shows that corporate income taxation is an important determinant both of entry rates (Da Rin, Di Giacomo, and Sembenelli, 2011; Djankov et al., 2010) and of entrants' size (Da Rin, Di Giacomo, and Sembenelli, 2010). To the best of our knowledge, however, far less is known about the effect of this policy instrument on firms' survival and long-term growth. This is unfortunate, since the scaling-up of young firms into large companies is an important factor contributing to aggregate economic growth.

In this paper we study this issue and focus on a specific channel through which corporate income taxation can have long-term real effects: the choice of financial leverage at entry. On the one hand, high levels of leverage reflect lenders' screening, monitoring, and certification of firm quality, which enhance future growth prospects. On the other hand, high levels of leverage increase the probability of financial distress, and potentially bankruptcy. We show that both these economic mechanisms are present in our data, and that initial financial conditions matter for long-term outcomes. We find that a reduction in the corporate income tax rate enhances the long-term growth of newly incorporated companies by reducing initial leverage through the non-neutrality of interest deductibility, but only when initial leverage is above a given threshold. We also find that this effect is larger (at higher levels of initial leverage) for companies located in countries where creditors enjoy stronger rights and where the level of economic and financial transparency is higher. This points to the relevance of the institutional context for the interpretation of our main result. It also points to the need to further explore the interplay of corporate tax policy with institutional aspects that may affect its effectiveness.

References

[1] Acemoglu, Daron, Ufuk Akcigit, Nick Bloom, Harun Alp, and William Kerr (2018) Innovation, Reallocation and Growth. *American Economic Review*, 108(11), 3450–91.

[2] Adelino, Manuel, Song Ma, and David Robinson, 2017, Firm Age, Investment Opportunities, and Job Creation, *Journal of Finance*, 72(3), 999–1038.

[3] Aghion, Philippe, and Peter Howitt (1992) A model of growth through creative destruction. *Econometrica*, 60(2), 323–351.

[4] Akcigit, Ufuk, and Will Kerr (2018) Growth through Heterogeneous Innovations. *Journal of Political Economy*, 126(4), 1374–1443.

[5] Asker, John, Joan Farre-Mensa, and Alexander Ljungqvist (2011) Comparing the Investment Behavior of Public and Private Firms. NBER Working Paper 17394.

[6] Ayyagari, Meghana, Asli Demirgüç-Kunt, and Vojslav Maksimovic (2017), What Determines Entrepreneurial Outcomes in Emerging Markets? The Role of Initial Conditions, Review of Financial Studies, 30(7), 2478-2522.

[7] Bennedsen, Morten, and Stefan Zeume (2018) Corporate Tax Havens and Transparency. *The Review of Financial Studies*, 31(4), 1221–1264.

[8] Black, Sandra, and Philip Strahan (2002) Entrepreneurship and Bank Credit Availability. *Journal of Finance*, 57(6), 2807–2833.

[9] Bloom, Nicholas, Benn Eifert, Aprajit Mahajan, David McKenzie, and John Roberts (2013) Does management matter? Evidence from India, *Quarterly Journal of Economics,* 128(1), 1–51.

[10] Brown James, Anthony J. Cookson, and Rawley Z. Heimer (2017) Law and Finance Matter: Lessons from Externally Imposed Courts. *Review of Financial Studies*, 30 (3), 1019-1051.

[11] Cabral, Luís, and Josè Mata (2003) On the Evolution of the Firm Size Distribution: Facts and Theory. *American Economic Review*, 93(4), 75–90.

[12] Camacho, Maximo, Gabriel Perez-Quiros, and Lorena Saiz (2006) Are European business cycles close enough to be just one? *Journal of Economic Dynamics and Control*, 30(9–10), 1687–1706.

[13] Cetorelli, Nicola, and Michele Gambera (2001) Banking Market Structure, Financial Dependence and Growth: International Evidence from Industry Data. *Journal of Finance,* 56(2), 617–648.

[14] Cetorelli, Nicola (2009) The Impact of Banking Market Structure on the Life-cycle Dynamics of Non-Financial Industries. U.S. Census Bureau, Center for Economic Studies Working paper No. 09-07.

[15] Chava, Sudheer, Alexander Oettl, Ajay Subramanian, and Krishnamurthy Subramanian (2013) Banking deregulation and innovation. *Journal of Financial Economics*, 109(3), 759-774.

[16] Cole Rebel, and Tatyana Sokolyk (2018) Debt Financing, Survival and Growth of Start-Up Firms, *Journal of Corporate Finance*, 50, 609—625.

[17] Ciccone, Antonio, and Elias Papaioannou (2007) Red Tape and Delayed Entry. *Journal of the European Economic Association,* 5(2-3), 444–458.

[18] Cornaggia, Jess, Yifei Mao, Xuan Tian, and Brian Wolfe (2015) Does banking competition affect innovation?' *Journal of Financial Economics*, 115(1), 189–209.

[19] Da Rin, Marco, Marina Di Giacomo, and Alessandro Sembenelli (2010) Corporate Taxation and the Size of New Firms: Evidence from Europe. *Journal of the European Economic Association,* vol. 8(2-3), 606–616.

[20] Da Rin, Marco, Marina Di Giacomo, and Alessandro Sembenelli (2011) Entrepreneurship, Firm Entry, and the Taxation of Corporate Income: Evidence from Europe. *Journal of Public Economics,* 95(9-10), 1048–1066.

[21] Da Rin, Marco, Thomas Hellmann, and Manju Puri (2013) A Survey of Venture Capital Research, Chapter 8 in George Constantinides, Milton Harris, and Reneé Stulz (eds) *Handbook of the Economics of Finance*, Amsterdam, Elsevier, 573–648.

[22] DeAngelo, Harry, and Ron Masulis (1980) Optimal Capital Structure and Corporate and Personal Taxation. *Journal of Financial Economics*, 8(1), 3–29.

[23] DeAngelo, Harry, and Richard Roll (2015) How Stable are Corporate Capital Structures?, *Journal of Finance*, 70(1), 373–418.

[24] Demirgüç-Kunt, Asli, Inessa Love, and Vojislav Maksimovic (2006) Business Environment and the Incorporation Decision. *Journal of Banking and Finance,* 30(5), 2967–2993.

[25] Devereux, Michael, and Rachel Griffith (1998) Taxes and the Location of Production: Evidence from a Panel of US Multinationals, *Journal of Public Economics*, 68(3), 335–367.

[26] Diamond, Douglas (1984), Financial Intermediation and Delegated Monitoring. *Review of Economic Studies*, 51(3), 393–414.

[27] Dinlersoz, Emin, Sebnem Kalemly-Ozcan, Henry Hyatt, and Veronila Penciakova (2018), Leverage over the Life Cycle and Implications for Firm Growth and Shock Responsiveness, NBER Working Paper 25226.

[28] Djankov, Simeon, Tim Ganser, Caralee McLiesh, Rita Ramalho, and Andrei Shleifer (2010) The Effect of Corporate Taxes on Investment and Entrepreneurship. *American Economic Journal: Macroeconomics*, 2(3), 31–64.

[29] Djankov, Simeon, Caralee McLiesh, and Andrei Shleifer (2007) Private Credit in 129 Countries. *Journal of Financial Economics* 12(2), 77–99.

[30] Duruflé, Gilles, Thomas Hellmann, and Karen Wilson (2017) From Start-up to Scale-up: Examining Public Policies For the Financing of High-growth Venture. Forthcoming in Colin Mayer, Stefano Micossi, Marco Onado, Marco Pagano and Andrea Polo (Eds.) Finance and Investment: The European Case, Oxford University Press.

[31] Fan, Joseph, Sheridan Titman, and Garry Twite (2012) An International Comparison of Capital Structure and Debt Maturity Choices. *Journal of Financial and Quantitative Analysis*, 47(1), 23–56.

[32] Feld, Lars, Jost Heckemeyer, and Michael Overesch (2013) Capital Structure Choice and Company Taxation: A Meta-study, *Journal of Banking and Finance*, 37(8), 2850–2866.

[33] Francis, Jere, Shawn Huang, Inder Khurana, and Raynold Pereira (2009) Does Corporate Transparency Contribute to Efficient Resource Allocation?, *Journal of Accounting Research*, 47(4), 943–89.

[34] Frank, Murray, and Vidhan Goyal (2009) Capital Structure Decisions: Which Factors Are Reliably Important?, *Financial Management*, (38)1, 1–37.

[35] Gertler, Mark, and Simon Gilchrist (1994) Monetary Policy, Business Cycles, and the Behavior of Small Manufacturing Firm. *The Quarterly Journal of Economics*, 109(2), 309–340.

[36] Giannetti, Mariassunta (2003) Do Better Institutions Mitigate Agency Problems? Evidence from Corporate Finance Choices. *Journal of Financial and Quantitative Analysis*, (38)1, 185–212.

[37] Giannetti, Mariassunta, Mike Burkart, and Tore Ellingsen (2011) What You Sell Is What You Lend? Explaining Trade Credit Contracts. *Review of Financial Studies*, 24(4), 1261–1298.

[38] Graham, John (1996a) Debt and the Marginal Tax Rate. *Journal of Financial Economics*, (41)1, 41–73.

[39] Graham, John (1996b) Proxies for the Marginal Tax Rate. *Journal of Financial Economics*, (41)1, 187–221.

[40] Graham, John (2000) How Big Are the Tax Benefits of Debt? *Journal of Finance*, 55(5), 1901–1941.

[41] Graham, John (2003) Taxes and Corporate Finance: A Review. *The Review of Financial Studies*, 16,1075–1129.

[42] Graham, John (2008) Taxes and Corporate Finance. Chapter 11 in Espen Eckbo (Ed.), *Handbook of Empirical Corporate Finance*, vol.2, Amsterdam Elsevier.

[43] Graham, John, Michael Lemmon, and James Schallheim (1998) Debt, Leases, Taxes, and the Endogeneity of Corporate Tax Status. *Journal of Finance*, 53(1), 131–162.

[44] Hadlock, Charles, and Joshua Pierce (2010) New Evidence on Measuring Financial Constraints: Moving beyond the KZ Index. *Review of Financial Studies*, 23(5), 1909-1940.

[45] Hanlon, Michelle, Edward Maydew, and Jacob Thornock (2015) Taking the Long Way Home: U.S. Tax Evasion and Offshore Investments in U.S. Equity and Debt Markets *Journal of Finance,* 70(1), 257–287.

[46] Haltiwanger, John, Ron Jarmin, and Javier Miranda (2013) Who Creates Jobs? Small versus Large versus Young. *Review of Economics and Statistics*, 95(2), 347—361.

[47] Heckman, James (1979) Sample Selection Bias as a Specification Error. *Econometrica*, 47(1), 153–161.

[48] Heider, Florian, and Alexander Ljungqvist (2015) As Certain as Debt and Taxes: Estimating the Tax Sensitivity of Leverage From State Tax Changes., *Journal of Financial Economics*, 118(3), 684–712.

[49] Kerr, Will, and Ramana Nanda (2015) Financing Innovation, Annual *Review of Financial Economics*, 7, 445–462.

[50] King, Mervyn, and Don Fullerton (1984) *The Taxation of Income from Capital.* University of Chicago Press, Chicago.

[51] Klapper, Leora, Luc Laeven, Raghuram Rajan (2006) Entry Regulation as a Barrier to Entrepreneurship. *Journal of Financial Economics*, 82(3), 591–629.

[52] Lee, Kyungran, Katie Moon, and Seungjoon Oh (2018) Well Begun Is Half Done: Initial R&D Competence and Firm Growth, mimeo, University of Hong Kong.

[53] Lemmon, Michael, Michael Roberts, and Jaime Zender (2008) Back to the Beginning: Persistence and the Cross-section of Corporate Capital Structure, *Journal of Finance*, 63(4), 1575–1608.

[54] MacKie-Mason, Jeffrey (1990) Do Taxes Affect Corporate Financing Decisions? *Journal of Finance*, 45(4), 471–1493.

[55] Mackay, Peter, and Gordon Phillips (2005) How Does Industry Affect Firm Financial Structure? *Review of Financial Studies*, 18(4), 1433–1466.

[56] Maksimovic, Vojislav, Gordon Phillips, and Liu Yang (2013) Private and Public Merger Waves. *Journal of Finance*, 68(5), 2177-2217.

[57] Montiel Olea, Josè Luis, and Carolin Pfueger (2013), A Robust Test for Weak Instruments, *Journal of Business and Economic Statistics*, 31(3), 358-369.

[58] Myers, Steven (1977) Determinants of Corporate Borrowing. *Journal of Financial Economics*, 5(1), 147–175.

[59] Myers, Steven, and Nicholas Majluf (1984) Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2), 187—221.

[60] Nanda, Ramana, and Matthew Rhodes-Kropf (2013) Investment cycles and startup innovation. Journal of Financial Economics 110(2), 403–418.

[61] Papke, Leslie, and Jeffrey Wooldridge (1996) Econometric Methods for Fractional Response Variables with an Application to 401(K) Plan Participation Rates. *Journal of Applied Econometrics*, 11(6), 619–32.

[62] Rajan, Raghuram, and Luigi Zingales (1998) Financial Dependence and Growth. *American Economic Review*, 88(3), 559–586.

[63] Robb, Alicia, and David Robinson (2014) The Capital Structure Decision of New firms. *Review of Financial Studies*, 27(1), 153–179.

[64] Sedláček, Petr, and Vincent Sterk (2018) The Growth Potential of Startups over the Business Cycle. *American Economic Review*, 107(10), 3182–3210.

[65] Sorensen, Peter Birch (2008) Estimating Effective Rates on Corporate Income. Mimeo, University of Copenhagen.

Figure 1. GDP growth rates in 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 (1.7%). The grey areas highlight the years under study: 1998-2001 (incorporation year), and 2007-2010(evaluation years).

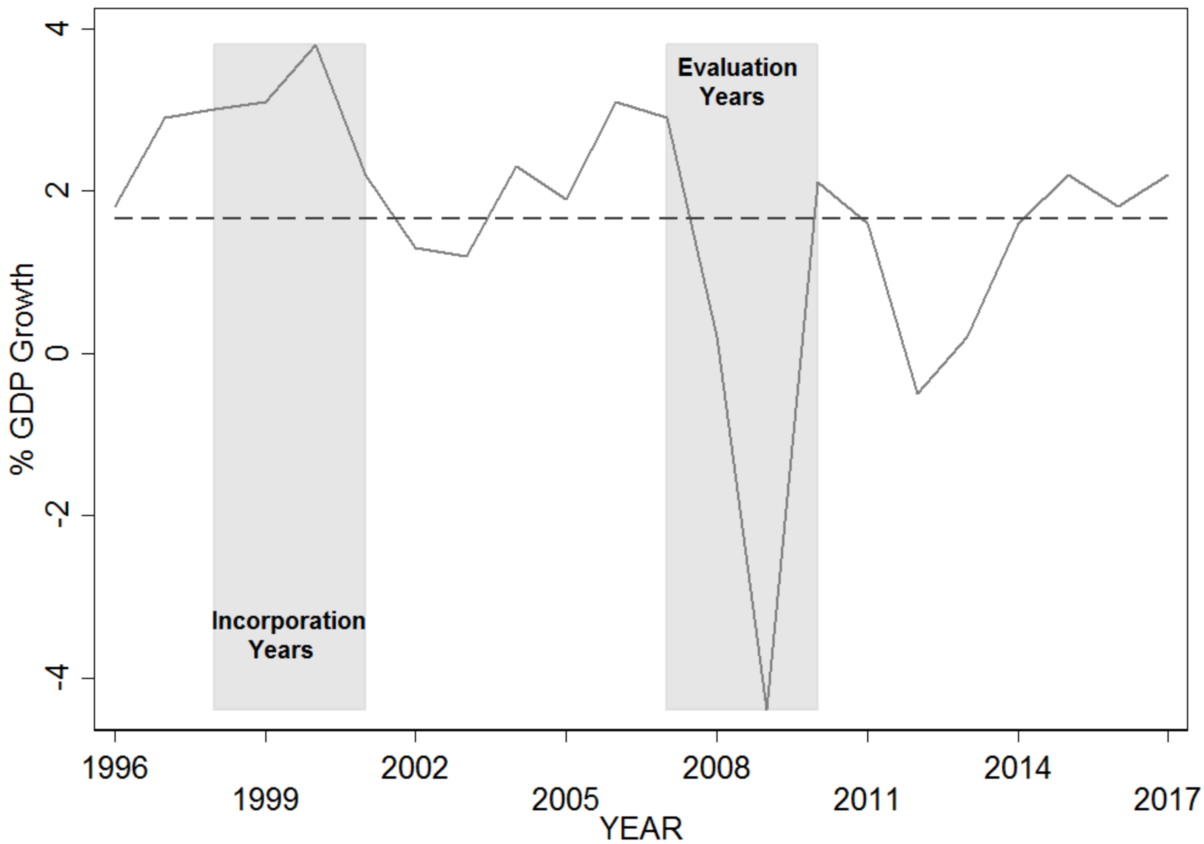
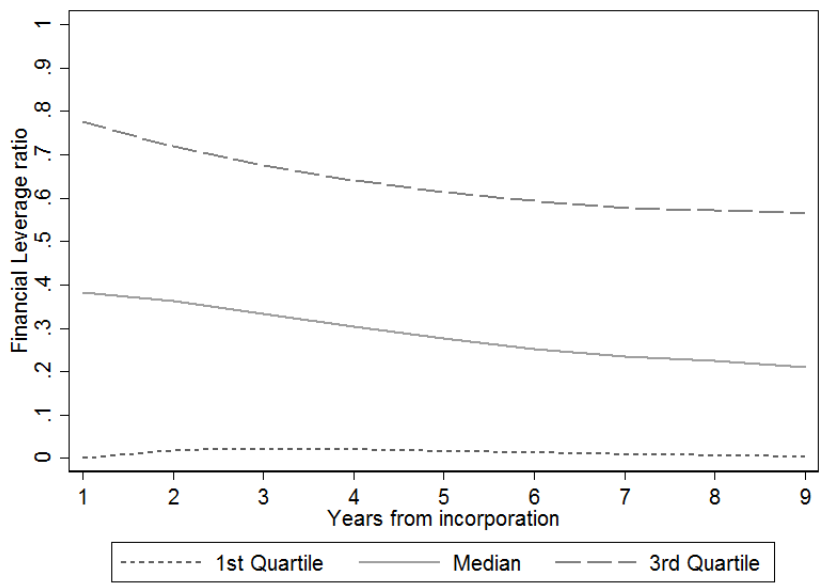


Figure 2. Distribution of $FinLev$ and $TotLev$ over time

Panel A shows the distribution of financial leverage ($FinLev$) for the whole sample over time, from the first to the ninth year after incorporation. Panel B shows the distribution of total leverage ($TotLev$) for the whole sample over time, from the first to the ninth year after incorporation. We restrict the analysis to the subset of firms that report information on Leverage ratios for all nine years after incorporation (85,740 firms for $FinLev$, and 84,969 firms for $TotLev$).

Panel A. Distribution of $FinLev$



Panel B. Distribution of $TotLev$

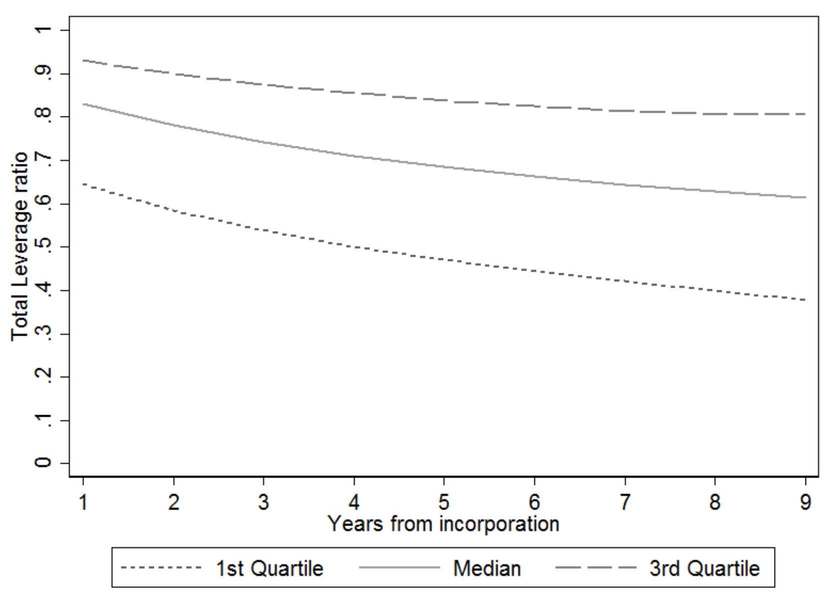


Figure 3. Predicted $Size_{t+9}$ for different levels of initial size ($Size_{t+1}$) and initial financial leverage ($FinLev_{t+1}$)

This figure shows the predicted values for $Size_{t+9}$ as a function of initial financial leverage ($FinLev_{t+1}$), for three different levels of initial size ($Size_{t+1}$): the first quartile (Q1), the median, and the third quartile (Q3). The figure is based on estimates from Table 11, column (i).

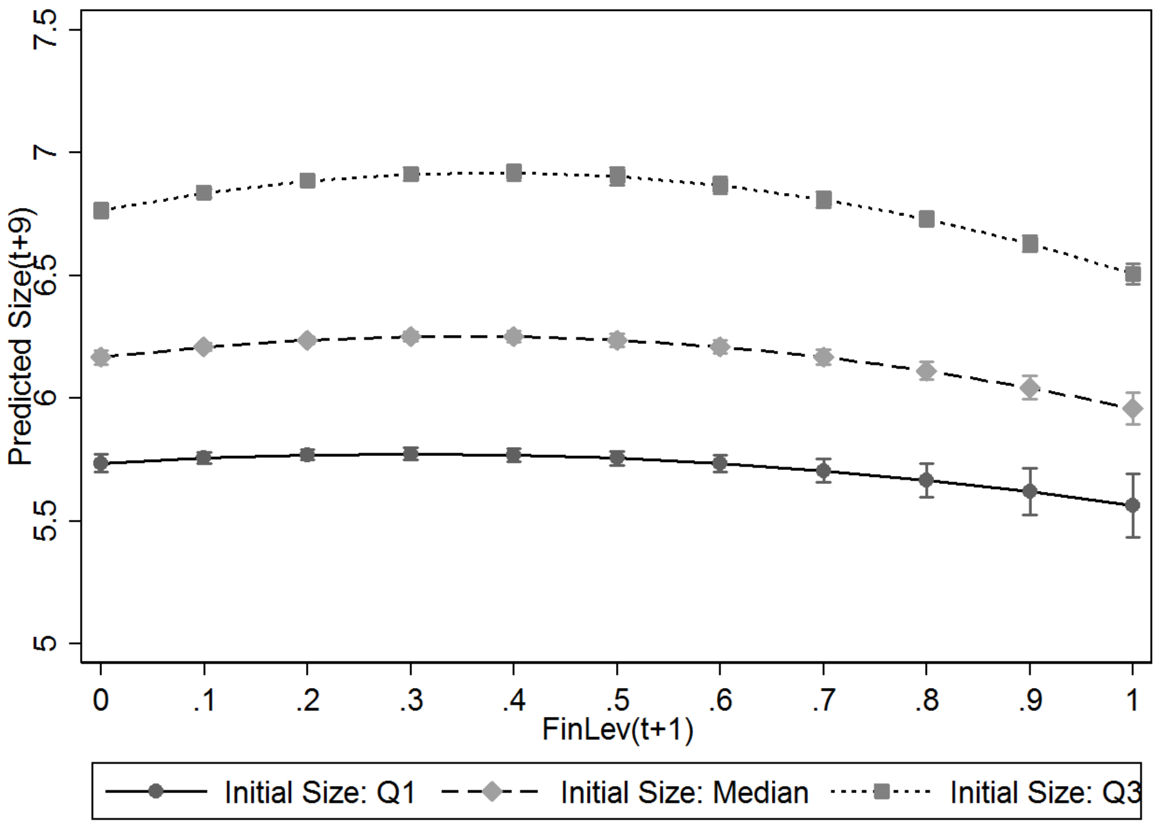


Figure 4. Predicted $Size_{t+9}$ for different levels of initial size ($Size_{t+1}$), initial financial leverage ($FinLev_{t+1}$), and creditors' rights.

This figure shows the predicted values for $Size_{t+9}$ as a function of initial financial leverage ($FinLev_{t+1}$), for three different levels of initial size ($Size_{t+1}$): the first quartile (Q1), the median, and the third quartile (Q3). The left panel reports values for low creditor rights countries, and the right panel reports values for high creditor rights countries. The figure is based on estimates from Table 11, column (iii).

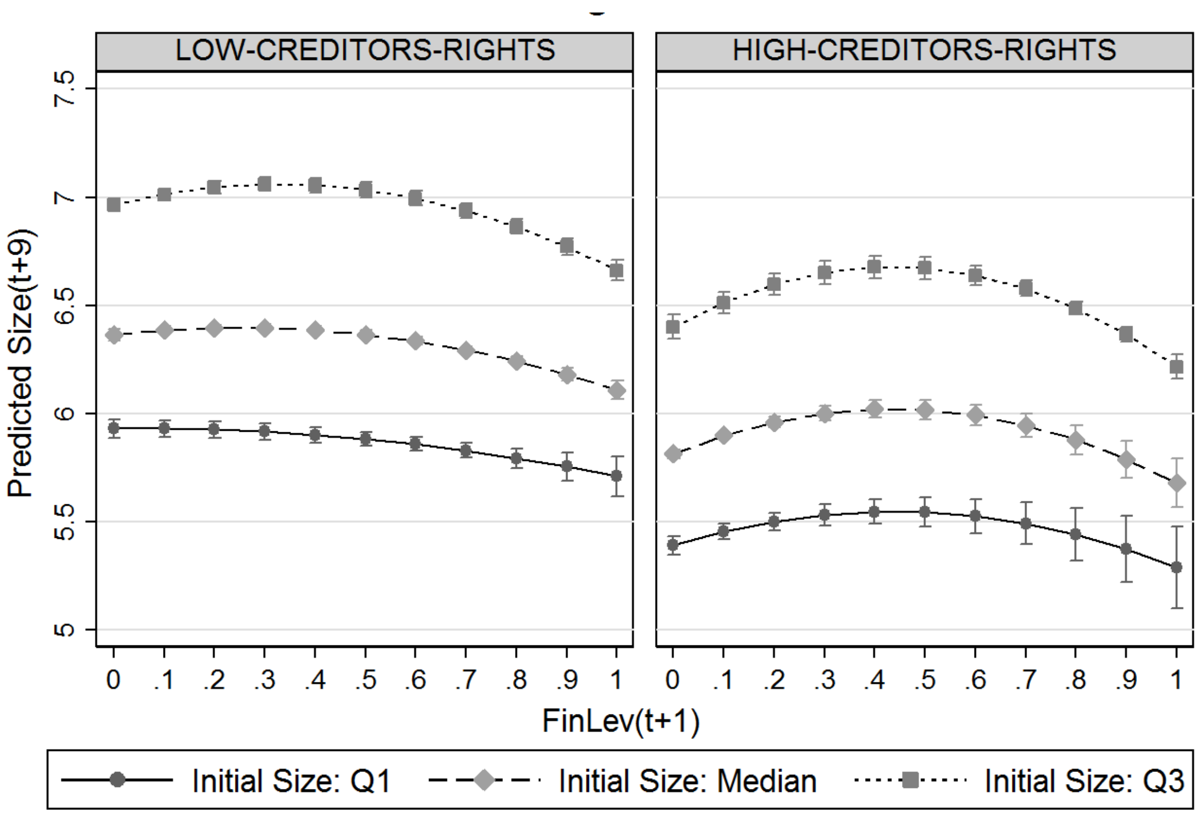


Figure 5. Predicted $Size_{t+9}$ for different levels of initial size ($Size_{t+1}$), initial financial leverage ($FinLev_{t+1}$), and transparency.

This figure shows the predicted values for $Size_{t+9}$ as a function of initial financial leverage ($FinLev_{t+1}$), for three different levels of initial size ($Size_{t+1}$): the first quartile (Q1), the median, and the third quartile (Q3). The left panel reports values for low transparency countries, and the right panel reports values for high transparency countries. The figure is based on estimation results from Table 11, column (v).

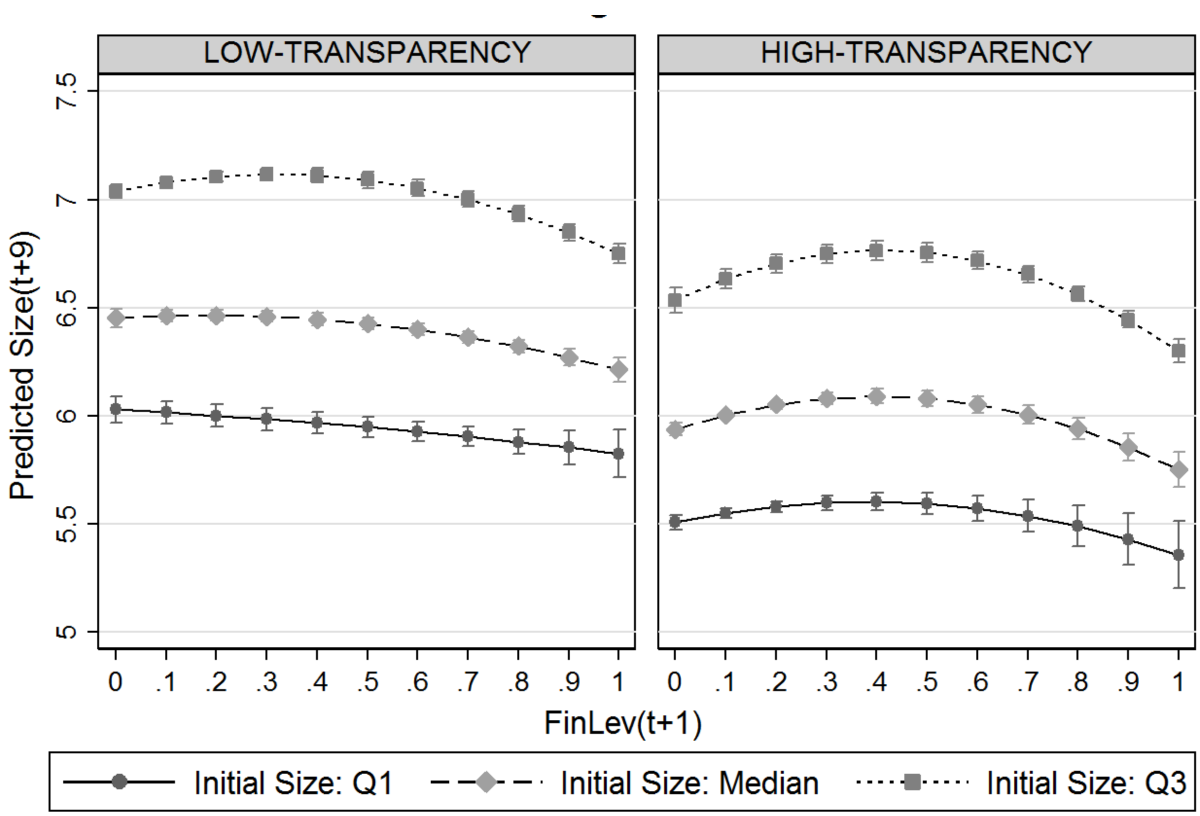


Table 1. Sample construction

This table shows the count of companies at different steps in the sample construction, as described in Section 2. Variables are defined in Sections 2.2 and 2.3. 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).

Number of Firms:	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
$TotLev_{t+1}$	37,380	46,615	56,010	60,309	200,314
$TotLev_{t+9}$	20,371	21,118	23,449	20,031	84,969

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). Final sample refers to the third line of Table 1 (250,814 companies).

	All entrants		Final sample	
Country	Firms	%	Firms	%
Austria	12,202	*1.01*	19	*0.01*
Belgium	55,750	*4.60*	22,684	*9.04*
Denmark	28,075	*2.32*	0	*0.00*
Finland	14,432	*1.19*	305	*0.12*
France	125,830	*10.39*	46,574	*18.57*
Germany	156,044	*12.89*	1,003	*0.40*
Greece	4,184	*0.35*	2,996	*1.19*
Ireland	23,361	*1.93*	5,435	*2.17*
Italy	144,501	*11.93*	14,116	*5.63*
Luxembourg	2,008	*0.17*	99	*0.04*
Netherlands	40,919	*3.38*	9,299	*3.71*
Portugal	57,923	*4.78*	4,018	*1.60*
Spain	201,808	*16.67*	59,609	*23.77*
Sweden	30,625	*2.53*	11,030	*4.40*
UK	313,169	*25.86*	73,627	*29.36*
Total	1,210,831	*100*	250,814	*100*

Table 3. Summary statistics

This table reports summary statistics for our final sample of entrants. Variables are defined in Sections 2.2 and 2.3. $Size_{t+1}$ and $Size_{t+9}$ are measured in thousand euros, deflated by Eurostat CPI (base year 2005), and they are trimmed above the 99th percentile.

	Mean	St.Dev.	Q1	Median	Q3	Obs.
$FinLev_{t+1}$	0.414	0.380	0	0.370	0.800	205,618
$TotLev_{t+1}$	0.763	0.249	0.665	0.854	0.947	200,314
$Size_{t+1}$	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
$Tangibility_{t+1}$	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
$Carryforward_{t-1}$	10.645	4.417	5	10	15	205,618

Table 4. Distribution of leverage at entry

This table reports summary statistics for the distribution of $FinLev_{t+1}$ and $TotLev_{t+1}$. Leverage measures are defined in Section 2.2.1 and are computed at the end of the first fiscal year after incorporation. We split the sample of entrants by year of incorporation.

	Mean	St.Dev.	Q1	Median	Q3	Obs.
			$FinLev_{t+1}$			
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
			$TotLev_{t+1}$			
1998	0.756	0.251	0.652	0.845	0.943	37,380
1999	0.761	0.250	0.662	0.853	0.945	46,615
2000	0.757	0.253	0.654	0.849	0.945	56,010
2001	0.775	0.241	0.684	0.864	0.952	60,309
Total	0.763	0.249	0.665	0.854	0.947	200,314

Table 5. Persistence of leverage over time

This table reports the number of firms and the fraction of companies that report a value of leverage below the sample median up to nine years from incorporation. Leverage measures are defined in Section 2.2.1. We restrict the analysis to the subset of firms that report information on Leverage ratios for all nine years after incorporation: 85,740 firms for $FinLev$, and 84,969 firms for $TotLev$.

Years from	$FinLev$		$TotLev$	
incorporation	Firms	%	Firms	%
1	42,869	*100*	42,494	*100*
2	36,497	*85.1*	35,796	*84.2*
3	34,058	*79.5*	33,380	*78.6*
4	32,349	*75.5*	31,639	*74.5*
5	30,960	*72.2*	30,348	*71.4*
6	29,796	*69.5*	29,405	*69.2*
7	28,963	*67.6*	28,553	*67.2*
8	28,416	*66.3*	27,927	*65.7*
9	27,978	*65.3*	27,390	*64.5*

Table 6. Leverage equation

This table reports results of the estimation of equation (1), discussed in Section 4.1. The dependent variable is $FinLev_{t+1}$. All variables are defined in Sections 2.2 and 2.3. 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. Standard errors are clustered at country-industry level.

	(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 FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
(a) Distribution of Marginal Effects for $EATR_{t-1}$ - Fractional Probit				
Mean	0.0302	0.0270	0.0178	0.0139
Std. Dev.	0.0039	0.0040	0.0123	0.0117
Q1	0.0279	0.0246	0.0070	0.0051
Median	0.0298	0.0264	0.0185	0.0093
Q3	0.0331	0.0300	0.0259	0.0211
(b) Marginal Effects for $EATR_{t-1}$ - OLS Estimates				
Mean	0.0319	0.0273	0.0197	0.0150

Table 7. Leverage equation: Total leverage measure

This table reports results of the estimation of equation (1), discussed in Section 4.1. The dependent variable is $TotLev_{t+1}$. All variables are defined in Sections 2.2 and 2.3. In columns (i) and (ii) $EATR_{t-1}$ enters linearly, while in columns (iii) and (iv) $EATR_{t-1}$ enters also squared ($EATR_{t-1} - SQ$). Two sets of marginal effects for $EATR$ are computed: (a) using the fractional Probit estimates, as in Papke and Wooldrige, 1996); (b) using OLS estimates. Standard errors are clustered at country-industry level.

	(i)	(ii)	(iii)	(iv)
Dep. Variable:	$TotLev_{t+1}$			
$Size_{t+1}$	-0.025*	-0.068***	-0.025*	-0.069***
	(0.01)	(0.02)	(0.01)	(0.02)
$EATR_{t-1}$	2.787**	3.177**	15.554	15.081
	(1.24)	(1.24)	(10.00)	(9.47)
$EATR_{t-1} - SQ$			-1.935	-1.807
			(1.58)	(1.48)
$Tangibility_{t+1}$		-0.152		-0.154
		(0.17)		(0.17)
$Profitability_{t+1}$		-0.809***		-0.811***
		(0.11)		(0.11)
Constant	-9.245**	-9.449**	-30.267*	-29.056*
	(4.29)	(4.14)	(15.99)	(15.40)
Observations	200,314	147,552	200,314	147,552
Country-Year FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
(a) Distribution of Marginal Effects for $EATR_{t-1}$ - Fractional Probit				
Mean	0.0270	0.0293	0.0221	0.0241
Std. Dev.	0.0054	0.0068	0.0078	0.0087
Q1	0.0238	0.0249	0.0173	0.0189
Median	0.0266	0.0286	0.0207	0.0228
Q3	0.0298	0.0336	0.0260	0.0275
(b) Marginal Effects for $EATR_{t-1}$ - OLS Estimates				
Mean	0.0282	0.0320	0.0229	0.0264

Table 8. Augmented Leverage equation: Creditor Rights and Transparency

This table reports results of the estimation of equation (1), discussed in Section 4.1. The dependent variable is $FinLev_{t+1}$. All variables are defined in Sections 2.2 and 2.3, except $HIGH-CREDITOR-RIGHTS$ and $HIGH-TRANSPARENCY$, which are defined in section 5.1.2. Countries with strong creditor rights are: Austria, Germany, Luxembourg, Netherlands and UK. Countries with high transparency are: Finland, France, Germany, Netherlands, Sweden and UK. Standard errors are clustered at country-industry level.

	(i)	(ii)	(iii)	(iv)
Dep. Variable:		$FinLev_{t+1}$		
$Size_{t+1}$	0.057***	0.055***	0.055***	0.055***
	(0.01)	(0.01)	(0.01)	(0.01)
$EATR_{t-1}$	2.404***	26.325***	-0.181	32.567**
	(0.89)	(8.89)	(0.82)	(14.86)
$EATR_{t-1}-SQ$		-3.623***		-4.689**
		(1.36)		(2.16)
$EATR_{t-1} \times HIGH-CREDITOR-RIGHTS$	1.881*	-12.356		
	(1.04)	(17.80)		
$EATR_{t-1}-SQ \times HIGH-CREDITOR-RIGHTS$		2.065		
		(2.69)		
$EATR_{t-1} \times HIGH-TRANSPARENCY$			2.903***	-37.916**
			(0.70)	(17.72)
$EATR_{t-1}-SQ \times HIGH-TRANSPARENCY$				5.895**
				(2.61)
$Tangibility_{t+1}$	0.632***	0.629***	0.634***	0.636***
	(0.21)	(0.21)	(0.21)	(0.21)
$Profitability_{t+1}$	-0.793***	-0.798***	-0.808***	-0.809***
	(0.09)	(0.09)	(0.10)	(0.10)
Constant	-14.722***	-29.679	-9.485***	4.015
	(4.92)	(26.87)	(2.87)	(20.67)
Observations	150,155	150,155	148,990	148,990
Country-Year FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Wald Statistics	3.278	2.449	17.035	9.291
p-value [degrees of freedom]	0.07 [1]	0.29 [2]	0.00 [1]	0.01 [2]
Distribution of Marginal Effects for $EATR_{t-1}$ - Fractional Probit				
	Low CREDITOR-RIGHTS - Low TRANSPARENCY			
Mean	0.0279	0.0145	-0.0019	-0.0067
Std. Dev.	0.0042	0.0118	0.0002	0.0051
Q1	0.0256	0.0063	-0.0021	-0.0088
Median	0.0273	0.0094	-0.0020	-0.0073
Q3	0.0310	0.0216	-0.0019	-0.0048
	High CREDITOR-RIGHTS - High TRANSPARENCY			
Mean	0.0518	0.0411	0.0350	0.0354
Std. Dev.	0.0076	0.0076	0.0043	0.0036
Q1	0.0463	0.0360	0.0337	0.0347
Median	0.0542	0.0427	0.0354	0.0368
Q3	0.0578	0.0470	0.0367	0.0376

Table 9. Growth equation

This table reports estimation results for equation (2) in columns (i) to (iv), and for equations (2) and (3) in columns (v) and (vi). These models are discussed in Section 4.2. The dependent variable is $Size_{t+9}$. All variables are defined in Sections 2.2 and 2.3. Standard errors are clustered at country-industry level in columns (i)-(iv), and are bootstrapped with 1,000 replications in columns (v)-(vi).

	(i)	(ii)	(iii)	(iv)	(v)	(vi)
	OLS	*OLS*	*OLS*	*OLS*	*Heckman*	*Heckman*
Dep. Variable:			$Size_{t+9}$			
$FinLev_{t+1}$	-0.167***	-0.207***	-0.156***	-0.199***	-0.167***	-0.207***
	(0.03)	(0.02)	(0.02)	(0.03)	(0.01)	(0.01)
$Size_{t+1}$	0.771***	0.784***	0.763***	0.776***	0.771***	0.784***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.00)	(0.00)
$Tangibility_{t+1}$		0.095***		0.089***		0.094***
		(0.03)		(0.03)		(0.02)
$Profitability_{t+1}$		0.228***		0.223***		0.228***
		(0.06)		(0.06)		(0.02)
Constant	1.174***	1.167***	1.145***	1.090***	0.965**	1.166***
	(0.14)	(0.13)	(0.14)	(0.13)	(0.44)	(0.05)
			Selection Equation			
AIR_{t+9}					-0.025***	-0.024***
					(0.00)	(0.00)
$FinLev_{t+1}$					-0.010	-0.029***
					(0.01)	(0.01)
$Size_{t+1}$					-0.045***	-0.031***
					(0.00)	(0.00)
$Tangibility_{t+1}$						0.261***
						(0.01)
$Profitability_{t+1}$						0.510***
						(0.02)
Constant					1.392***	-5.086***
					(0.33)	(0.11)
R^2	0.35	0.41	0.35	0.42		
Mills' lambda					0.031	0.003
					(0.05)	(0.05)
ρ					0.03	0.00
Observations	134,429	96,363	134,429	96,363	205,616	150,174
Observations censored					71,189	53,811
Country FE	No	No	No	No	Yes	Yes
Country-Year FE	Yes	Yes	No	No	No	No
Industry-Year FE	Yes	Yes	No	No	Yes	Yes
Country-Year-Industry FE	No	No	Yes	Yes	No	No

Table 10. Growth equation: Total leverage measure and alternative functional forms

Columns (i) - (ix) of this table report estimation results for equation (2), discussed in Section 4.2. The dependent variable is $Size_{t+9}$. The estimation method is OLS in columns (i)-(viii). Column (ix) reports the 2SLS where $FinLev_{t+1}$ and $FinLev_{t+1} - SQ$ are instrumented by the two instrumental variables $UK - LargeFirms - FinLev \times Transparency$, and $UK - LargeFirms - FinDep \times Transparency$. Column (x) reports estimation results for the first stage of the 2SLS in column (ix). The dependent variable in column (x) is $FinLev_{t+1}$. All variables are defined in Sections 2.2 and 2.3, except for the two instrumental variables, $UK - LargeFirms - FinLev \times Transparency$, and $UK - LargeFirms - FinDep \times Transparency$, which are defined in Section 5.1.2. Standard errors are clustered by country-industry in all columns.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
	OLS	*OLS*	*OLS*	*OLS*	*OLS*	*OLS*	*OLS*	*OLS*	*2SLS*	*First Stage*
Dep. Variable:					$Size_{t+9}$					$FinLev_{t+1}$
$TotLev_{t+1}$	-0.176**	-0.308***								
	(0.08)	(0.02)								
$FinLev_{t+1}$			-0.162***	-0.203***			0.604***	0.356***	23.404*	
			(0.03)	(0.03)			(0.10)	(0.06)	(12.42)	
$CredAcc_{t+1}$					0.023	-0.035				
					(0.02)	(0.02)				
$FinLev_{t+1} - SQ$							-0.843***	-0.612***	-24.057*	
							(0.09)	(0.06)	(12.43)	
$FinLev_{t+1} \times IY1998$			0.021	0.023						
			(0.03)	(0.03)						
$FinLev_{t+1} \times IY1999$			0.022	0.010						
			(0.02)	(0.03)						
$FinLev_{t+1} \times IY2000$			-0.017	-0.013						
			(0.03)	(0-03)						
$Size_{t+1}$	0.755***	0.766***	0.763***	0.776***	0.754***	0.774***	0.763***	0.776***	0.656***	0.045**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.09)	(0.01)
$Profitability_{t+1}$		0.178***		0.224***		0.282***		0.191***		
		(0.05)		(0.06)		(0.06)		(0.06)		
$Tangibility_{t+1}$		0.018		0.089***		0.049		0.087***		
		(0.03)		(0.03)		(0.04)		(0.03)		
UK-LargeFirms-FinLev × *Transparency*										0.049***
										(0.02)
UK-LargeFirms-FinDep × *Transparency*										0.005
										(0.005)
Constant	1.282***	1.308***	1.146***	1.092***	1.141***	1.040***	1.115***	1.065***	1.141 ***	-0.209*
	(0.16)	(0.13)	(0.14)	(0.13)	(0.14)	(0.13)	(0.14)	(0.13)	(0.22)	(0.110)
R^2	0.35	0.42	0.35	0.42	0.35	0.41	0.35	0.42	0.30	0.10
Observations	134,429	96,363	134,429	96,363	134,429	96,363	134,429	96,363	132,393	132,393
F test of excluded instruments [p-val] (non robust s.e.)										146.6 [0.00]
F test of excluded instruments [p-val] (robust s.e.)										144.4 [0.00]
F test of excluded instruments [p-val] (clustered s.e.)										5.12 [0.01]
Country-Year-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Country-Year FE	No	No	No	No	No	No	No	No	Yes	Yes
Industry-Year FE	No	No	No	No	No	No	No	No	Yes	Yes

Table 11. Augmented Growth equation: The role of Initial size, Creditor rights, and Transparency

This table shows estimation results for equation (2), discussed in Section 4.2. The dependent variable is $Size_{t+9}$. All variables are defined in Sections 2.2 and 2.3, except $HIGH-CREDITOR-RIGHTS$ and $HIGH-TRANSPARENCY$, which are defined in section 5.1.2. Countries with strong creditor rights are: Austria, Germany, Luxembourg, Netherlands and UK. Countries with high transparency are: Finland, France, Germany, Netherlands, Sweden and UK. Standard errors are clustered by country-industry.

	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Dep. Variable:			$Size_{t+9}$			
$FinLev_{t+1}$	-1.908***	-1.754***	-2.115***	-1.779***	-2.540***	-2.031***
	(0.52)	(0.35)	(0.43)	(0.37)	(0.52)	(0.39)
$FinLev_{t+1}-SQ$	2.070**	1.627***	2.216***	1.651***	2.666***	1.894***
	(0.81)	(0.48)	(0.70)	(0.49)	(0.80)	(0.50)
$Size_{t+1}$	0.744***	0.746***	0.747***	0.747***	0.729***	0.732***
	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
$FinLev_{t+1} \times Size_{t+1}$	0.403***	0.340***	0.399***	0.338***	0.450***	0.364***
	(0.08)	(0.06)	(0.07)	(0.06)	(0.08)	(0.06)
$FinLev_{t+1}-SQ \times Size_{t+1}$	-0.464***	-0.359***	-0.458***	-0.360***	-0.511***	-0.384***
	(0.13)	(0.07)	(0.11)	(0.08)	(0.12)	(0.08)
$FinLev_{t+1} \times HIGH-CREDITOR-RIGHTS$			0.688***	0.423***		
			(0.14)	(0.15)		
$FinLev_{t+1}-SQ \times HIGH-CREDITOR-RIGHTS$			-0.570***	-0.252		
			(0.14)	(0.18)		
$Size_{t+1} \times HIGH-CREDITOR-RIGHTS$			-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)
$Tangibility_{t+1}$		0.084***		0.083***		0.084***
		(0.03)		(0.03)		(0.03)
$Profitability_{t+1}$		0.195***		0.198***		0.207***
		(0.05)		(0.05)		(0.05)
Constant	1.230***	1.250***	1.267***	1.174***	1.215***	1.113***
	(0.08)	(0.11)	(0.19)	(0.22)	(0.15)	(0.15)
R^2	0.35	0.42	0.36	0.42	0.36	0.42
Observations	134,429	96,363	134,398	96,354	132,393	96,264
Country-Year-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Appendix: Additional empirical results

Amadeus Database Balance Sheet Structure

Amadeus format for balance sheet liabilities items is the following:

1. Total Shareholders Funds: Total equity (Capital + Other shareholders funds)
2. Non Current Liabilities: Long term liabilities of the company, whose sub-items are:
   - Long Term Debt: Long term financial debts (e.g. to credit institutions, loans and credits, bonds)
   - Other Non Current Liabilities: Other long term liabilities (trade debts, group companies, pension loans, etc.)
3. Current Liabilities: Current liabilities of the company, whose sub-items are:
   - Loans: Short term financial debts (e.g. to credit institutions + part of Long term financial debts payable within the year, bonds, etc.)
   - Creditors: Debts to suppliers and contractors (trade creditors)
   - Other Current Liabilities: Other current liabilities such as pension, personnel costs, taxes, intra-group debts, accounts received in advance, etc.

Table A1. Augmented Leverage equation: Loss Carryforward

This table reports results of the estimation of equation (1), discussed in Section 4.1. The dependent variable is $FinLev_{t+1}$. All variables are defined in Sections 2.2 and 2.3. In columns (i) and (ii) $EATR_{t-1}$ enters linearly, while in columns (iii) and (iv) $EATR_{t-1}$ enters also squared ($EATR{-}SQ_{t-1}$). Two sets of marginal effects for $EATR$ are computed: (a) using the fractional probit estimates (as in Papke and Wooldrige, 1996); (b) using OLS estimates. Standard errors are clustered at country-industry level.

	(i)	(ii)	(iii)	(iv)
Dep. Variable:	$FinLev_{t+1}$			
$Size_{t+1}$	0.119***	0.056***	0.118***	0.055***
	(0.02)	(0.01)	(0.02)	(0.01)
$EATR_{t-1}$	1.299***	1.222**	29.573***	27.532***
	(0.48)	(0.60)	(8.01)	(7.12)
$EATR - SQ_{t-1}$			-4.181***	-3.910***
			(1.17)	(1.05)
$Carryforward_{t-1}$	-0.098	-0.172**	0.008	-0.073
	(0.06)	(0.08)	(0.06)	(0.08)
$Tangibility_{t+1}$		0.637***		0.634***
		(0.21)		(0.21)
$Profitability_{t+1}$		-0.793***		-0.798***
		(0.09)		(0.09)
Constant	-5.412***	-4.997***	-53.474***	-49.509***
	(1.52)	(1.90)	(13.80)	(12.22)
Observations	205,618.	150,174	205,618	150,174
Country FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Distribution of Marginal Effects for $EATR_{t-1}$ - Fractional Probit				
Mean	0.0155	0.0143	0.0101	0.0062
Std. Dev.	0.0020	0.0021	0.0116	0.0114
Q1	0.0143	0.0130	-0.0001	-0.0024
Median	0.0152	0.0139	0.0108	0.0019
Q3	0.0169	0.0159	0.0177	0.0134
Average Marginal Effects for $EATR_{t-1}$ - OLS Estimates				
Mean	0.0163	0.0145	0.0109	0.0067

Table A2. Augmented Leverage equation: North and Core dummy variables

This table reports results of the estimation of equation (1), discussed in Section 4.1. The dependent variable is $FinLev_{t+1}$. All variables are defined in Sections 2.2 and 2.3. In columns (i) and (iii) $EATR_{t-1}$ enters linearly, while in columns (ii) and (iv) $EATR_{t-1}$ enters also squared ($EATR-SQ_{t-1}$). Countries in the North are: Austria, Belgium, Denmark, Finland, Germany, Ireland, Luxembourg, Nether- lands, Sweden, and UK. Countries in the core are: Austria, Belgium, Denmark, France, Germany, Italy, Luxembourg, Netherlands, and UK. Standard errors are clustered at country-industry level.

	(i)	(ii)	(iii)	(iv)
Dep. Variable:		$FinLev_{t+1}$		
$Size_{t+1}$	0.057***	0.056***	0.056***	0.055***
	(0.01)	(0.01)	(0.01)	(0.01)
$EATR_{t-1}$	2.372***	15.841	2.766***	20.781
	(0.86)	(14.72)	(0.87)	(13.42)
$EATR-SQ_{t-1}$		-2.054		-2.853
		(2.27)		(2.04)
$EATR-NORTH_{t-1}$	-0.152	12.934		
	(0.96)	(17.14)		
$EATR-SQ-NORTH_{t-1}$		-1.935		
		(2.58)		
$EATR-CORE_{t-1}$			-0.597	17.319
			(0.86)	(18.23)
$EATR-SQ-CORE_{t-1}$				-2.482
				(2.74)
$Tangibility_{t+1}$	0.637***	0.635***	0.636***	0.635***
	(0.21)	(0.21)	(0.21)	(0.21)
$Profitability_{t+1}$	-0.796***	-0.801***	-0.797***	-0.801***
	(0.09)	(0.09)	(0.09)	(0.09)
Constant	-7.803**	-51.995***	-7.633**	-68.129***
	(3.92)	(16.50)	(3.24)	(21.13)
N.obs	150,174	150,174	150,174	150,174
Country-Year FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Wald Statistics	0.025	0.573	0.479	1.598
P-value [degrees of freedom]	0.87 [1]	0.75 [2]	0.49 [1]	0.45 [2]