Financial Development and the Allocation of External Finance ☆

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Abstract

We examine whether financial markets development facilitates the efficient allocation of resources. Using European micro-level data for 1996-2005, we show that firms in industries with growth opportunities use more external finance in financially more developed countries. This result is particularly strong for firms that are more likely to be financially constrained and dependent on domestic financial markets, such as small and young firms. Our findings are robust to controlling for technological determinants of external finance needs and to using different proxies for growth opportunities. Interestingly, the explanatory power of the measures of technological determinants identified in prior work decreases significantly once growth opportunities are controlled for.

Key words: Financial development, External finance, Allocative efficiency
JEL: F3, O16, G3

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1. Introduction

The key role of a financial system is to acquire information about investment opportunities and facilitate the allocation of resources into viable projects.[1] Recent empirical work uses aggregate data to present indirect evidence that more developed financial markets allocate capital more efficiently. Wurgler (2000) estimates the effect of financial development on the elasticity of aggregate investment with respect to growth opportunities. Fisman and Love (2004) measure the effect of financial development on the growth of industries with positive opportunities.[2] If more developed financial markets allocate capital more efficiently, it must be that they are able to identify firms with growth opportunities and to channel external finance towards these firms when they need it.

In this paper, we use micro-level data to examine whether financial markets development has a direct positive impact on individual firms by improving the allocation of capital. Specifically, we ask whether firms that operate in industries with positive growth shocks are more able to exploit the new opportunities by increasing their external financing in countries with higher levels of financial markets development. If external finance is more costly than internal finance, firms will turn to financial markets only after they have exhausted their internal funds. We show to what extent such firms' demand for external finance is satisfied by financial markets of different depth and institutional quality.

Using a large cross-section of manufacturing firms from European countries, we find that financial development improves the allocation of capital by channeling external finance to firms that operate in industries with better growth prospects. This result is obtained using two alternative proxies for the global component of industry growth opportunities: (i) industry value-added growth in the U.S. and (ii) the change in the global industry price-to-earnings (PE) ratio. Both proxies rely on the assumption that there exists a global

[1] See the survey by Levine (2005) for a summary of financial systems' functions.

[2] We discuss how our study fits into this literature in detail in Section 2.

component in the industry specific growth opportunities caused by demand and productivity shifts. For this reason, we focus our analysis on the manufacturing sector of a homogenous set of European countries with highly synchronized product markets and regulation, where the key underlying assumption of common shocks to industry growth is arguably most likely to hold. When we proxy growth opportunities by the growth of U.S. industries, the additional assumption is that firms in the U.S. are relatively financially unconstrained and are able to materialize the growth opportunities they encounter. When we proxy growth opportunities by the global industry PE ratio, we assume that financial markets are integrated to the extent that the common component of growth opportunities is priced in global industry portfolios.

Despite relying on different assumptions, both proxies yield estimates of similar economic magnitude. For example, the difference in external finance use between (otherwise comparable) firms that operate in an industry ranked at the 75th as opposed to the 25th percentile by the U.S. growth is 0.7 percentage points (on average per annum) larger in the Netherlands than it is in Bulgaria. When we approximate growth opportunities by global PE growth, we obtain the analogous estimate of 0.6 percentage points.[3] The effect is three to four times larger if we instrument to correct for measurement error in growth counterfactuals.

Our results also suggest that small and young firms—which are less likely to be able to access public financial markets and are also more likely to depend on domestic financial markets—are able to raise larger amounts of external finance in response to growth opportunities in financially more developed countries in comparison to large and old firms. This supports the view that domestic financial markets development alleviates the financial constraints of small and young firms by more. We also find that the degree of domestic financial markets development is a much more important determinant of the ability to raise external finance for firms with highly concentrated ownership structures, when compared to firms

[3]The sample mean of external finance use is 0.4 percent and its standard deviation is 3.8 percent.

with dispersed ownership.

We contribute to the literature on the finance-growth nexus. This literature is founded on the argument that the technology used by firms in a given industry is the same across countries and it thus creates an industry-specific dependence on external finance (Rajan and Zingales, 1998). We show that the ability of more developed financial markets to provide external finance to firms in industries with strong growth opportunities still holds when we control for technological determinants of external finance. Interestingly, we find that the estimated effect of the measures of technological determinants of external finance decreases by 10 to 50% once proxies for growth opportunities are included in our regressions. This is most pronounced when we include a proxy based on the value-added growth in the U.S. This suggests that the widely used measures of technological determinants of external finance are partly driven by growth opportunities that were financed and hence realized in countries with high financial development (such as the U.S.).

The structure of the paper is as follows: Section 2 relates our work to the literature; Section 3 presents the methodology; Section 4 contains the description of the data; Section 5 presents the results; Section 6 presents the robustness checks; and Section 7 concludes.

2. Related Literature

Theoretical models based on adverse selection or moral hazard imply that financial development improves screening of investment projects and/or enhances monitoring by external investors, which in turn leads to more efficient allocation of capital to investment projects.[4] This section summarizes the empirical literature that tests this broad prediction.

In his seminal paper, Wurgler (2000) estimates the country-specific elasticities of investment to value added in order to capture the country differences in the extent to which

[4] See for example Boyd and Prescott (1986) for adverse selection and Townsend (1979) for moral hazard arguments.

investment increases in growing industries and decreases in declining industries. He shows that the elasticity tends to be larger in countries with larger credit markets, more informative stock prices, less state-ownership of firms, and greater protection of minority investors. This important result suggests a causal link from financial development to more efficient reallocation of capital.

Wurgler (2000) uses industry-level gross fixed capital formation as the dependent variable as his focus is on the aggregate impact of financial system development. In our analysis, instead, we investigate the process of capital allocation at the micro-level which yields a direct test of the capital allocation efficiency hypothesis. There are two key differences. First, our dependent variable is the amount of dollars raised rather than investment, so we do not make any assumptions about how is a dollar of external finance utilized inside a firm. Second, we do not aim to explain the entire corporate investment, but only the part that is financed using external funds.

Wurgler (2000) uses realized industry-country level value added growth as a proxy for industry growth opportunities. He shows that this proxy can be justified as it is significantly positively correlated with more traditional measures of growth opportunities: average Tobin's Q, price-to-earnings ratio, and sales growth. Indeed, in a country with a perfectly developed financial market, realized growth is aligned with demand and productivity shocks and hence reflects growth opportunities. Also, if latent industry growth opportunities are positively autocorrelated, it is possible to use current realized growth to approximate future growth opportunities. However, it is less clear whether potential-to-realized growth correspondence holds in countries where opportunities anticipated in the past are not reflected in current growth due to financial or labor market frictions. Therefore, we digress from Wurgler (2000) and use realized growth in the U.S. (a country with high financial market development and low frictions) and price-to-earnings ratios of global industry portfolios as proxies for industry-level growth opportunities.

The reasons for choosing U.S. growth as a measure of latent global growth opportunities are similar to country-level studies of Fisman and Love (2007) and Ciccone and Papaioannou (2006), who test whether investment opportunities caused by global demand and productivity shifts lead to higher growth in financially more developed countries.[5] Unlike these two papers, we focus our analysis on manufacturing sectors of a homogenous set of European countries on a comparable level of economic development and with highly synchronized product markets where the key underlying assumption of global shocks to industry growth is arguably most likely to hold.

Alternatively, to capture the global component of growth opportunities, we use price-to-earnings (PE) ratios of world-wide industry portfolios. In contrast to the realized U.S. industry growth, global industry PE ratio is forward-looking, based on ex-ante expectations of future growth. A high PE ratio means that investors are willing to pay a high multiple of current earnings for stocks in a given industry, which happens if they expect dividend growth.

Bekaert et al. (2007) show that under the stock market integration hypothesis, the global component of growth opportunities of a given industry should be competitively priced and reflected in the global industry's PE ratio. As a result, a country with a large share of industries with high global PE ratios should grow faster than the world economy. On the other hand, the local industry PE ratios would add information about the country's future growth only if markets are not fully integrated and the opportunities are priced locally rather than globally. The authors provide evidence in support of the hypothesis of market integration by showing that a country's industry-weighted global PE ratios predict future real GDP growth, while the industry-weighted difference of local and global PE ratios doesn't have

[5] Ciccone and Papaioannou (2006) further recognize that relying on country-specific growth measures may lead to spurious conclusions due to measurement error and the possibility of systematic correlation of the country-specific component of growth opportunities with financial development.

any predictive power for relative economic growth. Importantly, their analysis suggests that the PE ratio of a global industry portfolio is a valid exogenous measure of growth opportunities as it does not use local price information that could be potentially contaminated by the local level of financial development.[6]

Our finding that firms with positive growth prospects receive more external finance in financially more developed countries directly verifies that financial development alleviates credit constraints. This result relates our work to firm-level structural investment model studies. Here, the optimal investment decision follows the Euler equation that trades off marginal benefits of investing today with discounted marginal costs of postponing investment to the next period. In the absence of financial constraints, the only relevant factor affecting a firm's investment decision is a project's growth potential. However, one would observe positive elasticity of investments to cash-flow if firms experience difficulties in obtaining external finance. Love (2003) and Islam and Mozumdar (2007) show that this elasticity is decreasing with financial development, which indirectly suggests a positive role of financial development in alleviating credit constraints.

Alternative tests of the role of financial system in the improvement of allocative efficiency are based on the neoclassical argument that capital should be allocated such that its marginal product is equalized across projects. This insight underlies two studies that investigate the impact of financial liberalization on capital allocation. Galindo et al. (2007) argue that a suitable approximation for marginal product of capital is either the sales to capital ratio (appropriate in the case of the Cobb-Douglas production function) or the ratio of operating profit to capital (valid under constant returns-to-scale production technology and perfect competition in output markets). They use firm-level panel data for 12 countries

[6] As all European countries in our sample have their stock and banking sectors liberalized in our sample period, we do not formally test for market integration in our sample and rely on the result of Bekaert et al. (2007).

to create proxies for marginal product of capital and construct the efficiency index of capital allocation. Using the index, they show that efficiency increases in periods following financial liberalization. Abiad et al. (2008) approximates the expected marginal product of capital by the market-to-book ratio of publicly listed firms, the empirical equivalent of Tobin's Q. Next, he follows a difference-in-differences methodology to assess whether the dispersion in Qs decreases in the period following liberalization. The advantage of both studies is that they aim to test simple predictions of neoclassical theory. On the other hand, the assumptions needed to form empirical proxies for the theoretical concepts are rather strong. In this respect, we complement these neoclassical approaches by avoiding an empirical approximation of marginal product of capital and focusing instead on the degree of alignment between growth opportunities and external finance use.

3. Methodology

We test the hypothesis that financial development improves efficiency of capital allocation by channeling external finance towards firms in industries with the best growth opportunities. Our main regression specification is

$$EFU_{fic} = \alpha + \beta\ FD_c \times GO_i + \gamma\ GO_i + \sum_i \lambda_i D_i + \sum_c \lambda_c D_c + X'_{fic}\ \zeta + \varepsilon_{fic}, \quad (1)$$

where EFU_{fic} is the period-average external finance use of firm f from industry i and country c over the period 1996-2005. FD_c denotes the country-level indicator of financial development measured as of the beginning of our sample period. GO_i proxies global industry growth opportunities. D_i and D_c are industry and country fixed effects, respectively. X_{fic} is a vector of firm-level control variables.

External Finance Use (EFU) is computed as the net increase in the use of external finance in a given year divided by the total assets as of the beginning of the year (see equation (B.4)) in Appendix B).[7] A measure of external financing analogous to our EFU has been used in firm-level panel setting by Baker et al. (2003). The summary statistics for EFU are given in Table 1. The median and the mean EFU in the sample are close to zero. This is consistent with the fact that, at the firm-level over time, issuance and repayments of debt and equity should be balanced on average.

To proxy for growth opportunities GO_i, we use the period-average value-added growth rates of industries in the U.S. Alternatively, we use price-to-earnings (PE) ratios of global industry portfolios. As there are no clear predictions whether it is the level of PE ratio or the change in the level of PE ratio that capture growth opportunities better, we use the period-averages of both. Given that our dependent variable captures the average net additions to external finance, a change in the level of PE ratio seems more appropriate. In the case of a balanced panel, GO_i would be computed over the whole period and applied to all firm observations. However, as our panel is unbalanced, the period over which we compute EFU is different across firms. To mitigate the measurement error in capturing growth opportunities, for every firm, the period used to compute the growth opportunities counterfactual matches the period over which EFU is computed.

In all our specifications, we control for a set of firm-level variables, measured as of the first year a firm enters the sample. This is to eliminate the initial differences in the within-industry distributions of firms along characteristics that have potentially different effect on the use of external finance. Effectively, we are thus able to compare differences in EFU of

[7] In Appendix B, we show that the numerator of EFU is the balance sheet approximation of the numerator of the external finance dependence measure used by Rajan and Zingales (1998). While Rajan and Zingales (1998) use capital expenditures in the denominator, we use total assets to scale the net flow of external finance. The reason is largely technical. Capital expenditure is a flow measure and as such it can take values very close to zero. For example, Nilsen and Schiantarelli (2003) show that around 30% of Norwegian plants and 6% of firms have zero capital expenditure in an average year. Rajan and Zingales (1998) use the value of external finance dependence of the industry median firm to characterize industry specific external finance dependence and, thus, they implicitly assume that capital expenditures of the median firm are positive. In the context of our firm-level regression with external finance use on the left-hand side, scaling by a variable that takes values close to zero would lead to excessive outliers.

highly comparable firms operating in environments with varying financial development and facing different growth opportunities. The set of firm-level characteristics included in our regression contains size, age, leverage, asset tangibility, the extent to which a firm's assets can be collateralized, and cash. Finally, we include industry and country dummies to control for time-invariant unobservable industry- and country-level factors affecting EFU.

Rajan and Zingales (1998) examine the impact of financial development on growth by investigating whether industries with higher need for external finance grow faster in financially more developed countries. Presumably, the underlying mechanism behind this result is that financial development relaxes financial constraints, which matters the most for those firms that are highly dependent on external finance due to specific technology used in their type of business. Using our measure of external finance use, we are ready to directly test this mechanism. We estimate

$$EFU_{fic} = \alpha + \beta\ FD_c \times Tech_i + \sum_i \lambda_i D_i + \sum_c \lambda_c D_c + X'_{fic}\,\zeta + \varepsilon_{fic}, \tag{2}$$

where $Tech_i$ denotes industry-specific technological determinants of external finance needs.

We consider three measures of the technological determinants. The first is the external finance dependence, measured as in Rajan and Zingales (1998). This is an all-encompassing measure of demand for external finance that is based on the assumption that in highly developed financial markets, such as the U.S., industry differences in the observed proportion of capital expenditures financed from external sources reflect underlying technological differences among industries.

In choosing the other two measures, we follow Ilyina and Samaniego (2008) who suggest R&D intensity and investment lumpiness as more explicit technological determinants of external finance need. The R&D Intensity is approximated by the average share of R&D expenditures on capital expenditures of a median firm in each U.S. industry. Firms operating in R&D intensive sectors may be in greater need for external finance, because R&D investments are often relatively large at the outset and may be associated with longer gestation periods, and it is likely that profits from R&D projects materialize over a long-term horizon.

Lastly, investment lumpiness is a proxy for the degree of mismatch between cash inflows and cash outflows. Firms that experience large cash-flow mismatches are more likely to seek outside financing due to a shortage of internal resources. One reason for the existence of cash-flow misalignment are investment 'spikes,' which are periods in which capital expenditures exceed their usual levels. Doms and Dunne (1998) show that more than one half of 12,000 U.S. manufacturing plants in their sample experience a year in which capital stock increases by over 35% and often the spikes occur in consecutive years. From the perspective of a structural investment model, this empirical pattern suggests the existence of important non-convexities in the adjustment costs. Assuming that these non-convexities are driven by industry-specific technological factors, we calculate Investment Lumpiness as the average number of investment spikes in relatively frictionless U.S. industries over a given period.

The proxies for technological determinants of external finance are calculated using U.S. data over the period under investigation, and thus they may as well be capturing underlying growth opportunity shocks specific to that period. To verify this, we estimate regressions where we interact financial development with growth opportunities as well as with technological determinants

$$EFU_{fic} = \alpha + \beta_1 \; FD_c \times GO_i + \beta_2 \; FD_c \times Tech_i + \gamma \; GO_i + \sum_i \lambda_i D_i + \sum_c \lambda_c D_c + X'_{fic} \; \zeta + \varepsilon_{fic}. \quad (3)$$

If measures of technological determinants are significantly contaminated by growth opportunity shocks, we would expect β_2 to be smaller than its counterpart in regression (2). The magnitude of this decrease should be larger when GO_i is approximated by value-added growth in the U.S., because it contains U.S.-specific growth shocks which are largely absent from the proxies based on the PE ratio.

4. Data

4.1. Sample

Firm-level panel data are obtained from Amadeus (Analyse MAjor Databases from EUropean Sources), which contains balance sheet and income statement information for a large set of private and public firms spanning all of Europe. We use the 'TOP 200 thousand' module of this database, which contains a subsample of the largest firms.[8] The coverage is incomplete before 1996 and we use data till 2005. We exclude Romania from the sample due to large inconsistencies in the accounting data of its firms. Denmark and Norway have only few firms in the final sample and have been dropped too. Since private firms are likely to rely more on domestic financial markets, while public firms are more likely to be in a position to raise external finance in international bond and equity markets, we include only private firms in our sample.

Our data-cleaning procedure is in line with the previous research utilizing this database. First, as in Bena and Jurajda (2011), in order to decrease the noise in average external finance use, we drop all firms for which less than 5 annual observations of external finance use is available. As Klapper et al. (2006), we use unconsolidated financial statements to avoid double counting and exclude firms that only report consolidated statements. Further, we exclude firm-years with very small total assets (less than EUR 1,000), very high leverage (long-term debt more than double the total assets), and very large profit/loss (absolute value more than ten times the total assets). Additionally, we drop the bottom and top percentile of year-on-year changes in total assets in order to avoid the influence of extreme events such as mergers, acquisitions, or spinoffs. We deflate all financial variables by the producer price index defined over year-country-industry triple, where industry is defined by the ISIC 2-digit

[8]Specifically, for a firm to be included in this module, at least one of the following criteria must be met: For UK, Germany, France and Italy, an operating revenue at least 15 million Euro, total assets at least 30 million Euro or number of employees at least 150. For all other countries, operating revenue at least 10 million Euro, total assets at least 20 million Euro, or the number of employees at least 100.

level. Lastly, to minimize the impact of long tails of firm size and age distributions, we exclude firms in the top percentile of the distribution by total assets, age, and employment measured as of the first year the firm appears in the sample.

4.2. Country-level Indicators of Financial Development

First, we use three traditional measures of depth of credit and stock markets: private credit by deposit banks and other financial institutions to GDP (Private Credit), stock market capitalization to GDP (Market Capitalization), and stock market total value traded to GDP (Market Value Traded). These data are taken from the 2006 version of World Bank's Financial Structure and Economic Development Database described in detail in Beck et al. (2000). We complement measures of financial depth by a proxy for the institutional quality of financial markets as measured by the Accounting Standards index.[9]

For robustness, we use measures of the extent of bank ownership by governments (Government Bank Ownership and Government Bank Control) from La Porta et al. (2002), measures of efficiency and competition in the banking sector (Overhead Costs and Net Interest Margin) from Beck et al. (2000), and Control Premium estimated by Dyck and Zingales (2004). Finally, we add two indexes constructed by Barth et al. (2004) that capture regulatory environment in which the banking sector operates.

Table 2 presents summary statistics for financial development indicators and Panel B of Appendix Table A.1 presents complete definitions and sources of these variables. The cross-country standard deviation is of the same order as the mean for all volume-of-financial-activity measures as well as for the measures of government ownership of banks and the measures of banking sector's efficiency, which suggests a substantial variation in financial

[9] Accounting Standards index is constructed based on rating annual reports of companies in 1990 according to the inclusion of 90 items in their balance sheets and as such it is an indicator of the quality of accounting standards. The index is produced by International Accounting and Auditing Trends (Center for International Financial Analysis and Research, Inc.) and it ranges from 0 to 90. We scale it down by 100 before using it in regressions.

development. The variation in Accounting Standards is smaller, which is most likely caused by the lack of data for Ireland and all countries of Central and Eastern Europe in our sample.

4.3. Industry-level Data

The value-added data for the U.S. used to compute our first proxy for growth opportunities are taken from OECD STAN database downloaded in 2009. We use the index of volume of value-added (VALK) for industries on the 2-digit level of ISIC rev 3.1. In some cases, the volume index of value added and corresponding value-added deflator is available only for a group of two or three industries.[10] In these instances we use the corresponding group deflator (VALP) to adjust nominal value-added (VALU), which is available for all industries.[11]

The data for the monthly series of global PE ratios are obtained from Datastream. As of March 2008, Datastream uses the Industry Classification Benchmark (ICB) created by FTSE Group and Dow Jones Indexes to classify companies into 114 sub-sectors. Following the approach of Bekaert et al. (2007), we link ICB sub-sectors into 22 manufacturing 2-digit ISIC industries.[12] Whenever more than one ICB sub-sector is linked to a given 2-digit ISIC industry, we calculate the weighted average of the PE ratios of entering sub-sectors using their market values as weights. Finally, for every industry, we compute yearly values of the PE ratios by taking the simple mean for all months in a given year.

Following Rajan and Zingales (1998) and Ilyina and Samaniego (2008), we use Compustat to compute industry-level technological determinants of the need and ability to raise external finance. Instead of using values tabulated in these papers, we re-calculate proxies using ISIC rev. 3.1 industry classification in order to be able to match them with the Amadeus data.[13]

[10]Specifically, these ISIC 2-digit categories are: 15-16, 17-19, 32-33.

[11]For categories '36 - Manufacturing n.e.c.' and '37 - Recycling,' neither volume nor nominal value-added data is available.

[12]We obtained the concordance table used in Bekaert et al. (2007) from the authors. We adjust their concordance table as the ICB classification has been expanded since their work, and also because Bekaert et al. (2007) link ICB sub-sectors to the SIC classification while we link them to the ISIC classification.

[13]We use the concordance table constructed by the U.S. Census Bureau to link the NAICS 2002 classifi-

In line with Rajan and Zingales (1998), we compute External Finance Dependence (EFD) as the share of capital expenditures not financed by the cash-flow from operations. Capital expenditures is item 128 in Compustat and cash-flow from operations is defined as cash-flow from operations (item 110 or sum of items 123, 125, 126, 106, 213 and 217 if unavailable) plus change in payables (item 70 or 304 if unavailable) minus change in receivables (item 2 or 302 if unavailable) plus change in inventories (item 3 or 303 if unavailable). We sum both capital expenditures and cash-flows from operations over the 1996-2005 period for each firm and compute the firm-level dependence. The industry level external finance dependence is then dependence of the median firm.

Following Ilyina and Samaniego (2008), we compute R&D Intensity as the share of R&D expenditures (item 46) in capital expenditures. We sum both the nominator and denominator over the 1996-2005 period for each firm and compute firm-level R&D intensity. Again, each industry is characterized by a median firm. Investment Lumpiness is computed as the average number of investment spikes experienced by firms in a given industry over the 1996-2005 period, where an investment spike is defined as annual capital expenditure in excess of 30% of the firm's fixed assets (item 8).

The summary statistics for the industry-level proxies for growth opportunities and technological determinants of external finance are presented in Table 3. Complete definitions and sources of these variables are provided in Panel C of Appendix Table A.1.

5. Results

5.1. Financial Development and External Finance Use

We present basic estimates of regression (1) in Table 4. In all specifications, we control for 3-digit ISIC industry and country dummies and firm-level control variables that are

cation used in Compustat to 3-digit ISIC industries.

measured as of the first year a firm enters the sample (detailed definitions of these variables are provided in Panel A of Table A.1). The estimates in Table 4 suggest that financial development improves allocation of external finance by channeling it to firms in industries with strong growth prospects.

To inspect the economic magnitude of our estimates, we consider the effect of financial development in increasing the average use of external finance for firms operating in industries at the bottom and top quartile of the industry distribution by the real value-added growth in the U.S. Thus, using our estimated coefficients of the interaction terms $\hat{\beta}$, we compute

$$\hat{\beta} \times (FD_{max} - FD_{min}) \times (USGrowth_{75p} - USGrowth_{25p}), \tag{4}$$

where FD_{max} (FD_{min}) are the sample maximum (minimum) of the financial development indicator, and $USGrowth_{75p}$ ($USGrowth_{25p}$) are the sample top (bottom) quartiles of the real value-added growth in the U.S. (equal to 3.3 percentage points in the sample). The impact of the increase of Total Capitalization from its sample minimum to its sample maximum on EFU is then 0.38 percentage points. Thus, the difference in EFU between firms operating in the industries ranked at 75th and 25th percentiles of the U.S. real value-added growth is 0.38 percentage points higher in Netherlands than in Latvia, the countries with the highest and the lowest Total Capitalization in our sample, respectively. Using Private Credit, Market Capitalization, Market Value Traded, and Accounting Standards we obtain economic effects of 0.58, 0.16, 0.31, and 0.23 percentage points, respectively.[14] For the comparison, the sample mean and standard deviation of EFU are 0.4 percent and 3.8 percent, respectively.

In Panel A of Table 5, we complement estimates reported in Table 4 with the estimates

[14]By approximating only for the industry-specific component of growth opportunities we are very restrictive. On the one hand, we alleviate endogeneity concerns, but on the other, we introduce measurement error which typically leads to an attenuation bias.

obtained using the time-average of the level and growth of global PE ratios as alternative proxies for growth opportunities. We include both average level and growth in global PE ratios to investigate whether financial development improves channeling of external finances to industries with high expectations of future growth (high level of global PE ratio) or to industries in which the growth prospects increase over the investigated period (high growth of global PE ratio). Financial development makes no difference in allocating external finance to industries which differ in their average level of expected growth opportunities. On the other hand, our results suggest that financial development helps to facilitate financing of industries with growing market expectations as measured by the growth of global PE ratios. Thus, we choose Global PE Growth to be the alternative proxy for growth opportunities. The economic significance of estimates obtained with Global PE Growth is higher when compared to the case of US Growth. Specifically, the quantity (4) is calculated as 0.86, 0.90, 0.53, 0.42, and 0.39 percentage points if financial development is measured by Total Capitalization, Private Credit, Market Capitalization, Market Value Traded, and Accounting Standards, respectively.

The regression specifications in Panel A of Table 5 characterize each firm by the time-average of its external finance use. While this allows us to investigate the allocation of external finance across industries over a longer period, it creates the problem of averaging net external finance to zero. We would expect firms to obtain external finance in periods of positive shocks and pay it back when returns from investments are realized, which would show as a negative autocorrelation in time series of external finance use with the implication of the time average converging to zero with the length of time period. To bypass this issue, we consider a panel regression specification

$$EFU_{fict} = \alpha + \beta \ FD_c \times GO_{it} + \gamma \ GO_{it} + \sum_i \lambda_i D_i + \sum_c \lambda_c D_c + \sum_t \lambda_t D_t + X'_{fic} \, \zeta + \varepsilon_{fict}, \quad (5)$$

where EFU_{fict} is the external finance use of firm f from industry i and country c in year t.

FD_c denotes the country-level indicator of financial development measured as of the beginning of our sample period. GO_{it} proxies global industry growth opportunities in year t. D_i, D_c, and D_c are industry, country, and year fixed effects, respectively. X_{fic} is a vector of firm-level control variables, which we measure as of the first year a firm enters the sample.

The estimates of regression (5) are reported in Panel B of Table 5.[15] We use all three proxies for growth opportunities. The estimated coefficients on the interaction terms 'FD × US Growth' and 'FD × Global PE Growth' reported in Panel B are positive and, with the exception of the coefficient on 'Private Credit × US Growth,' are significant at conventional levels. Note that the estimated coefficients on the interaction terms 'Total Capitalization × Global PE Level' and 'Market Capitalization × Global PE Level' are significant in Panel B, while they were not significant in Panel A. The coefficients in Panel B are smaller in magnitude, which is likely due to the fact that our growth proxies measure year-on-year changes in growth opportunities with an error, which leads to an attenuation bias. Overall, our panel data analysis suggest that financial development improves the allocation of external finance by channeling it to industries with high growth prospects, and confirms our conclusions obtained using cross-sectional regression analysis.

5.2. Differences across Firms

To explore what mechanism underlies the positive link from financial development to external finance use in industries with strong growth opportunities, we check whether the degree of financial development matters more for those types of firms that are more likely to have limited access to public financial markets and/or those that cannot tap international bond and equity markets. We investigate this conjecture by focusing on subsamples of

[15]We also use two alternative specifications of panel regression (5). First, we allow the firm-level control variables to vary over time. Second, we include firm fixed-effects instead of the firm-level control variables in the regression. With both approaches, we find similar results too those reported in Panel B of Table 5.

small/large and young/old firms.[16]

First, we estimate regression (1) on a subsample of 'small' and 'large' firms. These results are reported in Panels A and B of Table 6.[17] In Panel A (B) of Table 6, a firm is defined to be small (large) if its size, measured by total assets, is less or equal to (greater than) the median value of total assets taken across all firms in the same country–2-digit ISIC industry cell. In all specifications we consider, the estimated coefficients on the interaction terms 'FD $\times$ US Growth' and 'FD $\times$ Global PE Growth' reported in Panel A of Table 6 are always bigger when compared to the analogous estimates reported in Panel B. Moreover, the estimates reported in Panel A of Table 6 are always significant, while those in Panel B of Table 6 are almost never significant. Finally, the estimated coefficients on the interaction terms reported in Panel A of Table 6 are bigger in magnitude in comparison to the estimates reported in Panel A of Table 5 that are based on the full sample. This evidence suggest that small firms in particular are able to raise more external finance in response to growth shocks in more developed financial systems. This supports the view that more developed financial systems alleviate the financial constraints of small firms more.

Second, we estimate regression (1) on a subsample of 'young' and 'old' firms. These results are reported in Panels C and D of Table 6. In Panel C (D) of Table 6, a firm is defined to be young (old) if its age, measured in years since incorporation as of the first year a firm enters the sample, is less or equal to (greater than) the median value of age taken across all firms in the same country–2-digit ISIC industry cell. We show that the estimated coefficients on the interaction terms 'FD $\times$ US Growth' and 'FD $\times$ Global PE Growth' reported in Panel C of

[16]Small and young firms are likely to exhibit a higher degree of informational opaqueness and thus end up more financially constrained than their larger and older counterparts. In surveys, small and young companies report having less access to external finance than larger and older companies (Beck et al. (2006), Angelini and Generale (2008)). Beck et al. (2008) find that industries which are naturally composed of firms with small size are more likely to grow disproportionally faster than industries with high share of large companies in countries with high level of financial development.

[17]In order to keep Table 6 parsimonious, we do not report coefficients on the base effects of US Growth and Global PE Growth as well as on the firm-level controls, but they are included in all regression specifications.

Table 6 are always bigger (and are significant at the same or lower levels) in comparison to the analogous estimates reported in Panel D. This evidence confirms our findings obtained using subsamples of small/large firms. In sum, more developed financial systems are better able to allocate external finance as a response to growth shocks through alleviating financial constraints associated with small and young firms.

An important determinant of a firm's ability to raise external finance is its corporate governance. For example, Leuz et al. (2009) find that U.S. investors do hold fewer shares in foreign firms where managers and their families have high levels of control, i.e., in firms with ownership structures that are more conductive to expropriation by controlling insiders. Motivated by these findings, we have collected data on ownership structures of the firms in our sample from the Amadeus ownership database.[18] Using the detailed data on firms' shareholders, we define firm-level variable Ownership Concentration to be the sum of squares (Herfindahl-Hirschman index) of direct stakes of all reported shareholders in the year that is the closest to the first year a firm enters the sample, and it remains fixed over time. Concentrated ownership structures indicate the presence of controlling owners who might be in a position to expropriate minority shareholders. According to Leuz et al. (2009), such firms should find it more difficult to raise external finance from outside investors in less developed financial systems as they may not be able to prevent expropriation.

We estimate regression (1) on a subsample of 'closely held firms' as well as on a subsample of 'firms with dispersed ownership.' These results are reported in Panels E and F, respectively, of Table 6. In Panel E (F), a firm is defined to be closely held (have dispersed

[18]For each firm, Amadeus identifies the shareholders and reports their ownership stakes. Each Amadeus update provides the ownership information as of the most recent date the data provider (Bureau van Dijk - BvD) was able to verify it. To cover as many firms as possible, we use seven Amadeus DVD updates: May 2001, May 2002, July 2003, May 2004, October 2005, September 2006, and May 2007. We supplement this data with more recent updates of Amadeus downloaded from WRDS in July 2007 and April 2008. Finally, we also use ownership data from Orbis, BvDs product with world-wide coverage, which was issued in November 2008. The resulting ownership dataset gives a unique breadth of cross-sectional coverage.

ownership) if its Ownership Concentration is greater than (less or equal to) the median value of Ownership Concentration variable taken across all firms in the same country–2-digit ISIC industry cell.

The estimated coefficients on the interaction terms 'FD × US Growth' and 'FD × Global PE Growth' reported in Panel E of Table 6 are always more significant and in almost all cases they are also bigger in magnitude when compared to the analogous estimates reported in Panel F. This suggests that firms with dispersed ownership structures are better able to satisfy their external finance needs independently of the degree of domestic financial markets development. In contrast, for firms with highly concentrated ownership structures, the degree of domestic financial markets development is a much more important determinant of whether such firms are able to raise external finance in response to growth shocks. These results are consistent with the findings in Leuz et al. (2009) that foreign investors avoid investing in firms with dominant owners and, as a result, such firms need to rely more on the domestic financial markets.

5.3. Growth Opportunities and Technological Characteristics

The extensive literature on finance-growth nexus uses the insight of Rajan and Zingales (1998) that the causal link from finance to growth can be identified by investigating the access to finance by industries differing in their natural external finance dependence (EFD). Ilyina and Samaniego (2008) further show that the strongest technological factors underlying cross-sectional variation in EFD are R&D Intensity and Investment Lumpiness. In line with these results, it is important to check whether industries dependent on external finance are actually using more of it in financially more developed countries. The results in Panel A of Table 7 suggest that this is indeed the case. The coefficient on the interaction of financial development and the technological measure is positive and significant with the exception of Accounting Standards. Interestingly, interactions with R&D Intensity and Investment

Lumpiness are statistically more significant in explaining improvements in the allocation of external finance caused by financial development than EFD.

As discussed in Section 3, the differences in estimates of industrial technological determinants of dependence on external finance can be partially driven by the differences in growth opportunities over the period of their estimation. Specifically, the U.S. specific component of growth opportunities may be the common factor driving the differences in the estimates of R&D Intensity, Investment Lumpiness, EFD as well as realized value-added growth. This would empirically translate into higher correlation between real growth of U.S. industries and technological determinants of finance and the decrease in the coefficients on their interactions with financial development in the regressions on actual use of external finance. For the Global PE Growth proxy for growth opportunities, this should be less of a worry as the influence of the U.S. growth component should be limited.[19]

The results in Panel B of Table 7 are in line with the hypothesis of the existence of a common factor of U.S. growth opportunities in technological determinants.[20] The estimated coefficients on interactions of financial development and R&D Intensity and EFD drops to almost half once interactions with US Growth are included. However, we actually observe a drop in the estimated coefficient on the interaction of financial development with US Growth once corresponding interaction with Investment Lumpiness is included in the specification.

The picture is different when we use Global PE Growth as a proxy for growth opportunities (Panel C of Table 7). The estimated coefficients on the interaction terms of financial development with Global PE Growth are statistically significant and very similar in magni-

[19]The spearman rank correlations between US Growth and technological determinants of finance are much higher than their counterparts for Global PE Growth. For example, the rank correlation of R&D Intensity and US growth is 0.42 with p-value 0.06 while the correlation of R&D Intensity and Global PE Growth is only 0.06 with p-value 0.80. A similar result is obtained for Investment Lumpiness and EFD, although in the case of the latter, the correlation with Global PE Growth rises to 0.29.

[20]In order to keep Table 7 parsimonious, we do not report coefficients on the base effects of US Growth and Global PE Growth as well as on the firm-level controls, but they are included in all regression specifications.

tudes to their counterparts in specifications which exclude technological interactions (Panel A of Table 5). Overall, our evidence suggests that the role of financial development with respect to allocation of external financing is two-fold. On the one hand, it helps to channel external finance to industries which are presumably more dependent on it due to technological reasons. On the other hand, more developed financial markets are better in providing finance to industries with global growth opportunities.[21]

6. Additional Investigations and Robustness

6.1. Capital Expenditures Not Financed by Internal Funds

Our measure of net external finance use does not distinguish between external finance used for capital expenditures and external finance used for other purposes. As an alternative, we use capital expenditures not financed by internal funds (as in Rajan and Zingales (1998)), which is, in our case, given by equation (B.3) in Appendix B. Table 8 is based on this alternative external finance use measure, while being otherwise (sample and regression specifications) identical to Table 5. The table shows that all estimated coefficients on the interaction terms of interest are bigger in magnitude and have the same significance (are often significant at lower thresholds) in comparison to the results reported in Table 5. This suggests that the conclusions of our analysis are robust to changing the definition of the dependent variable.

6.2. Decomposing External Finance Use

In Appendix B, we show that our EFU measure can be decomposed into the amount of equity raised/repurchased, the amount of long-term debt issued/repaid, and the change in other non-current liabilities. As there exist major contractual and institutional differences

[21]The results reported in Panels B and C of Table 7 are robust to using panel regression specifications similar to equation (5). See Table OA.4 in Online Appendix C.

among these components of external finance, it is important to assess what is the role of financial development in the improvement of their allocation with respect to growth opportunities. To do so, we run a set of regressions equivalent to specification (1) separately using each component of external finance use as a dependent variable. We present the results of this exercise in Table 9.

Panels A and B document that financial development improves the allocation of both equity and long-term debt. When compared to the basic results in Panel A of Table 5, the estimated coefficients on the interaction terms suggest that around one third of the improvement in the allocation of external finance comes in the form of shareholder's equity, while the remaining two-thirds can be explained by long-term debt. This pattern is roughly consistent for both proxies for growth opportunities and all measures of financial development.

With respect to changes in other non-current liabilities, our results suggest that financial development makes no improvement in their alignment with growth opportunities. This result is in line with the expectations given that other non-current liabilities usually consists of items such as retirement benefit obligations, deferred tax liabilities, or long-term trade debts, and thus they are components of liabilities driven primarily by factors other than the need to finance growth opportunities.

6.3. Error in Measurement of Growth Opportunities

In our analysis, we use real US Growth and Global PE Growth in 2-digit ISIC industries as proxies for the global component of growth opportunities, which introduces measurement error to our analysis. The noise present in any proxy may lead us to underestimate the coefficient of interest due to classical measurement error bias. We investigate the magnitude of the bias in two ways. First, having two different proxies for growth opportunities allows us to use two-stage least-squares (2SLS) approach. Under the assumption of the orthogonality of measurement errors in the two proxies for growth opportunities, we can use one as the instrument for the other, which allows us to use only the variation common to both of them to estimate the coefficient of interest. We use the interaction of financial development with Global PE Growth (US Growth) and Global PE Growth (US Growth) as instruments for the interaction of financial development with US Growth (Global PE Growth) and US Growth (Global PE Growth). The results for both directions are presented in Table 10. Compared to the basic estimates, there is a significant increase in the estimated coefficients for all measures of financial development. In general, the order of increase of the estimates is between 1.7 to 7.2, which suggests that the impact of the measurement error may be large.[22]

Second, we use a simple version of simulation-extrapolation (SIMEX) method proposed by Cook and Stefanski (1994) to assess the magnitude of attenuation bias by comparing the estimates obtained by using the set of proxies created by adding white noise of varying precision to the base measure. Specifically, for each level of standard deviation ranging from 0.005 to 0.05, we simulate 100 draws from a multi-variate normal distribution and add them to a given proxy for growth opportunities. The newly created variable is then used as a proxy for growth opportunities in the interaction with the Total Capitalization in specification (1). Then, for each level of added noise, we compute the average of 100 obtained estimates and plot it against the standard deviation of added noise. The results obtained using US Growth are plotted in Figure 1.[23] The figure allows us to evaluate the magnitude of the attenuation bias caused by the random error. Extrapolating back the relationship between standard error of added noise and the average estimate provides a guess of how the estimate would look like if the measurement error was less severe. For example, given that the standard deviation of the US Growth proxy is 0.041, then under the assumption that the measurement error

[22] Ciccone and Papaioannou (2006) carry out similar 2SLS exercise. In the industry-level growth regressions, they instrument growth opportunities approximated by the U.S. growth with the world-average value-added growth by industry controlling for the effects of financial underdevelopment. They obtain an increase in coefficients of the magnitude ranging between 3 to 6.

[23] Figure 1 is practically unchanged when we use Global PE Growth instead.

is responsible for half of this variation, the quadratic extrapolation of the simulation results would suggest that the estimated coefficient would be approximately 0.035, which is about 25% larger than our basic estimate.

The results obtained from the 2SLS and SIMEX exercises suggest that there indeed is attenuation bias caused by measurement error and the two methods indicate somewhat different levels of the bias. Naturally, we don't have any estimate of the proportion of variance of US Growth or Global PE Growth caused by the measurement error. However, Figure 1 suggests that even if the measurement noise accounted for a very large proportion in the variation of US Growth, the resulting attenuation bias is not likely to be of larger magnitude than 2, which is low compared to the results obtained in the 2SLS exercise. A possible explanation for this discrepancy is a poor extrapolating performance of quadratic fit in the SIMEX exercise, or the existence of non-standard upward bias common to both proxies for growth opportunities, which would imply the violation of the assumption of the orthogonality of measurement errors in the 2SLS exercise.[24]

6.4. Alternative Measures of Financial Development

We check robustness of our results by investigating the effect of other dimensions of financial development on the allocation of external finance (Table 11). First, we test the hypothesis that the higher the involvement of government in the banking sector, the lower the efficiency of allocation of finance to firms in growing industries. To the extent that incentives of government as the owner of banks may not be fully in line with profit maximization, the government banks may be more distorted when allocating credit. Thus, we would expect that interaction of the government bank ownership and growth opportunities would be negative. We find that this is the case for both the level of Government Bank Ownership and the level

[24] An upward bias common to both proxies may arise if they both approximate growth opportunities more precisely in more financially developed countries.

of Government Bank Control in the top 10 banks in 1995 as calculated by La Porta et al. (2002).

Second, we investigate whether the operational efficiency of the banks and the level of competition in the banking sector increase allocative efficiency. To the extent the competition among banks increases the quality of the financial sector, it may comparatively improve the chance of obtaining credit for firms operating in industries with potential growth prospects. In line with Demirguc-Kunt et al. (2004), we approximate operational efficiency and competitiveness of banking sector by the Overhead Costs and the Net Interest Margin. The former reflects operational cost inefficiencies possibly associated with the market power while the later measures the mark-up between the interest received from borrowers and the interest paid to savers and thus it effectively approximates the degree of competition in traditional operations of the bank. Our findings suggest that higher mark-ups and cost inefficiencies are related to less efficient allocation of external finance.

Third, we use an all-encompassing market-based approximation of the country-level institutional quality, namely the control premium estimated by Dyck and Zingales (2004). The private control premiums correspond to the benefits enjoyed by the controlling shareholder and not shared by other shareholders. They arise as a consequence of the lack of limits to the extraction of private benefits, and they reflect the inverse of the level of investor protection in the country. Dyck and Zingales (2004) show that the control premiums are higher in countries with less deep financial markets, more concentrated ownership, less protected minority shareholders and weaker law enforcement. Our results are in line with the hypothesis that low quality of institutions is related to lower allocative efficiency.

Lastly, we use measures of bank regulation and supervisory practices which, as showed by Barth et al. (2004), affect the development and performance of the banking sector. First, the banking sector development is significantly negatively associated with the restrictions on bank commercial activities, which we capture using the Restrictions on Bank Activities

Index. Second, bank development and performance are positively associated with regulations that promote private monitoring of banks, which we capture using the Private Monitoring Index. Both indexes are constructed following methodology in Barth et al. (2004). Our results suggest that firms raise more external finance in response to growth shocks in financial systems that feature fewer restrictions on the activities of banks.

6.5. Robustness Checks

We check for the robustness of our results across several dimensions.[25] First, as argued in Klapper et al. (2006), there exists substantial diversity in the legal forms of incorporation in Europe. The comparability of firms across countries can thus be increased by narrowing the sample to the forms of incorporation equivalent to limited liability companies. Our results hold for this subsample.

Second, in our difference-in-differences model, we regress firm-level external finance use on the industry-country group term that applies to all firms in the group. Effectively, we investigate conditional industry-country averages in external finance use and to the extent that the efficiency of this average is driven by the number of individual firms within each group, the potential concern is that our results may be affected by the industries with a small number of firms. The results are qualitatively unaffected and the investigated effect is economically stronger when we estimate our basic specification on the sample constrained to industry-country groups with at least 20 firms.

Third, we account more carefully for the unbalanced nature of our panel when estimating our cross-sectional regressions. If industry-specific factors affecting external finance use have been changing rapidly over time, controlling only for industry fixed effects can be insufficient. Thus, we amend our baseline specification (1), by interacting industry fixed effects with period fixed effects. A period dummy is equal to 1 for a given firm if its external finance use

[25] The results presented in this section are available in Online Appendix C.

is computed as an average over a given period. Our results are not affected.

Fourth, we run median regressions which are robust to outliers and allow us to investigate industry-country median external finance use. The conditional median effects are economically smaller and in many cases statistically insignificant, but they always hold proper sign.

Fifth, we also estimate regression (1) in which we, in addition to our standard set of firm-level control variables, control for Ownership Concentration and Ownership Concentration squared. The sample formation and regression specifications are otherwise identical to those in Table 4. The coefficients on the interaction term 'FD $\times$ US Growth' are bigger in magnitude and are more significant compared to those reported in Table 4.

Last, we check whether our results change if we use a sub-sample of EU-15 countries. Excluding countries from Central and East Europe (CEE) is justified by two reasons. First, CEE countries were still in the process of transition to a market economy and the resulting resource reallocation has been affected by their specific structure of growth opportunities. Second, EU-15 countries engaged in the single product market in 1993, which presumably brought higher degree of similarity in the growth opportunities of firms operating in the same industry across different countries. Our results show that leaving out CEE countries does not affect our findings.[26]

7. Conclusion

The most important role of a financial system is to provide external finance to viable firms so that they can exploit growth opportunities. The primary focus of this paper is to study whether the financial markets development improves the efficiency of the capital allocation. Using two alternative proxies for the global industry-specific component of growth opportunities, we show that comparable firms with growth opportunities obtain significantly

[26] Additionally, our results are robust to excluding Bulgaria and the Netherlands, which are countries with the lowest and highest levels of financial development in our sample.

more external finance in countries with more developed financial markets. We find the effect to be economically important. Given that our sample consists of relatively large and well-established firms, which are shown to be less affected by financial development, it is likely that the economic significance of our results in the overall population is even larger.

Table 1: External Finance Use: Firm Data by Country, 1996-2005

Country	N	Mean	S.D.	Percentile 25th	50th	75th
Austria	129	-0.020	0.062	-0.060	-0.004	0.022
Belgium	1,630	0.000	0.037	-0.012	0.000	0.016
Bulgaria	113	0.023	0.057	-0.001	0.015	0.055
Czech Republic	1,033	-0.007	0.046	-0.027	-0.005	0.014
Estonia	119	0.009	0.046	-0.013	0.002	0.032
Finland	670	-0.007	0.037	-0.024	-0.005	0.011
France	4,629	0.002	0.032	-0.008	0.002	0.015
Germany	539	-0.008	0.059	-0.034	0.002	0.028
Greece	615	0.024	0.034	0.006	0.022	0.041
Hungary	104	-0.011	0.050	-0.039	-0.010	0.019
Ireland	168	0.002	0.044	-0.007	0.000	0.015
Italy	4,941	0.008	0.029	-0.004	0.008	0.022
Latvia	151	0.023	0.054	-0.005	0.014	0.054
Lithuania	54	0.053	0.054	0.022	0.054	0.087
Netherlands	425	-0.005	0.041	-0.019	-0.003	0.006
Poland	1,290	0.000	0.052	-0.024	-0.001	0.022
Portugal	510	0.008	0.039	-0.009	0.006	0.027
Slovakia	64	-0.013	0.049	-0.042	-0.012	0.007
Spain	3,026	0.007	0.033	-0.005	0.003	0.020
Sweden	1,351	-0.006	0.041	-0.023	-0.002	0.013
UK	3,177	0.006	0.038	-0.006	0.003	0.019
Total	24,738	0.004	0.038	-0.010	0.003	0.020

Note: The number of observations in the sample, N, corresponds to the number of firms with non-missing average External Finance Use (EFU) calculated based on at least 5 annual EFU values within the 1996-2005 period. Annual EFU is defined as change in shareholders' capital plus change in a firm's long-term debt plus change in a firm's other non-current liabilities divided by total assets. Before computing the statistics we remove EFU outliers (we use the 1-to-99 percentile range of annual EFU values). See Panel A of Appendix Table A.1 for detailed definition of EFU.

Table 2: Financial Development: European Countries

	Mean	S.D.	Min	Max	Min Country	Max Country	N
Total Capitalization	1.05	0.94	0.08	4.21	Latvia	Netherlands	20
Private Credit	0.70	0.68	0.06	3.31	Latvia	Netherlands	21
Market Capitalization	0.32	0.34	0.00	1.33	Bulgaria	UK	20
Market Value Traded	0.19	0.21	0.00	0.82	Bulgaria	Netherlands	20
Accounting Standards	0.64	0.13	0.36	0.83	Portugal	Sweden	12
Government Bank Ownership	0.37	0.28	0.00	0.86	UK	Bulgaria	18
Government Bank Control	0.38	0.31	0.00	0.92	UK	Bulgaria	18
Overhead Costs	3.69	2.19	0.25	9.45	Ireland	Bulgaria	19
Net. Int. Margin	3.65	1.92	1.18	7.28	Netherlands	Latvia	19
Control Premium	0.17	0.19	0.01	0.58	Netherlands	Czech Republic	11
Private Monitoring Index	5.62	1.02	4.00	8.00	Slovakia	Finland	21
Restrictions on Bank Activities Index	7.90	1.67	5.00	10.00	UK	Bulgaria	21

Note: We present the Min, Max, Mean, and Standard Deviation of country-level financial development measures across Europe. Accounting Standards are as of 1990, Control Premium is estimated for the 1990-2000 period, Government Bank Ownership and Government Bank Control are as of 1995, Private Monitoring Index and Restrictions on Bank Activities Index are calculated using responses obtained over 1998-2000, and all remaining measures are as of 1996. Total Capitalization, Market Capitalization, and Market Value Traded are missing for Estonia. Accounting Standards are missing for Bulgaria, Czech Republic, Estonia, Hungary, Ireland, Lithuania, Latvia, Poland, and Slovakia. Government Bank Ownership and Government Bank Control are missing for Estonia, Lithuania, and Latvia. Overhead Costs and Net Interest Margin are missing for Finland and Sweden. Control Premium is missing for Belgium, Bulgaria, Estonia, Greece, Hungary, Ireland, Lithuania, Latvia, Poland, and Slovakia. See Panel B of Appendix Table A.1 for complete definitions and sources of variables.

Table 3: Growth Opportunities and Technological Characteristics: Industry Data, 1996-2005

		US Growth	Global PE Level	Global PE Growth	R&D Intensity		Investment Lumpiness		External Finance Dependence	
	ISIC rev. 3.1	Mean	Mean	Mean	N	Median	N	Median	N	Median
15	Food products and beverages	-1.5%	23.87	2.3%	81	0.154	327	0.694	251	-0.117
16	Tobacco products	-2.0%	13.95	2.8%	10	0.245	23	1.043	16	-0.124
17	Textiles	-2.3%	19.41	0.8%	23	0.434	118	0.517	69	0.204
18	Wearing apparel	-7.7%	19.41	0.8%	5	0.000	58	1.759	50	-0.382
19	Leather	-4.9%	17.24	-2.1%	14	0.789	41	1.902	31	-1.548
20	Wood and cork	0.2%	20.52	3.1%	14	0.077	71	0.465	48	-0.061
21	Pulp and paper products	-0.2%	20.65	2.4%	59	0.146	143	0.476	120	-0.020
22	Publishing and printing	4.8%	24.67	1.5%	47	0.745	239	1.490	172	-0.217
23	Coke and refined petroleum	4.9%	18.92	1.2%	54	0.060	146	0.849	109	0.658
24	Chemical products	1.9%	19.56	1.9%	1,197	4.171	1,573	2.254	1,300	1.821
25	Rubber and plastic	2.3%	16.98	0.7%	90	0.257	212	0.675	138	-0.082
26	Other non-metallic mineral products	1.8%	13.87	0.4%	49	0.157	120	0.792	85	-0.101
27	Basic metals	0.7%	17.58	-0.8%	58	0.131	186	0.538	139	0.073
28	Fabricated metal products	0.4%	27.17	-0.1%	57	0.215	198	0.429	114	-0.320
29	Machinery and equipment	0.8%	23.27	0.0%	397	0.836	705	1.216	482	-0.117
30	Office machinery and computers	14.5%	38.45	1.5%	322	3.970	512	2.621	336	0.886
31	Electrical machinery and apparatus	-0.6%	31.29	2.2%	237	1.363	371	1.733	269	0.417
32	Radio, television and communication equipment	14.7%	41.13	1.2%	400	2.405	611	2.373	439	0.840
33	Medical, precision and optical instruments	17.7%	29.76	2.8%	673	2.933	1,008	2.144	711	0.665
34	Motor vehicles	2.1%	16.86	3.0%	65	0.392	115	1.200	90	0.170
35	Other transport equipment	2.3%	20.90	2.6%	94	0.617	174	0.954	129	-0.117
36	Manufacturing n.e.c.	NA	20.66	-0.3%	91	0.537	238	1.403	166	-0.141

Note: US Growth, Global PE Level, and Global PE Growth are the average growth rate of real value added in the U.S., the average world price-to-earnings ratio, and the average growth rate of the world price-to-earnings ratio, respectively, computed for each 2-digit ISIC industry over the 1996-2005 period. R&D Intensity is the time average of R&D to capital expenditure ratios of a median firm for each U.S. 3-digit ISIC industry over the 1996-2005 period. Investment Lumpiness is the number of investment spikes experienced by a median firm in each U.S. 3-digit ISIC industry over the 1996-2005 period. The investment spike is an event when annual capital expenditure exceeds 30 percent of the firm's stock of fixed assets. External Finance Dependence (EFD) is the share of capital expenditures not financed by cash flow from operations of a median firm for each U.S. 3-digit ISIC industry over the 1996-2005 period. N stands for the number of Compustat firms used to find the median values. All statistics are reported at 2-digit ISIC level, but we use 3-digit ISIC level industries for R&D Intensity, Investment Lumpiness, and External Finance Dependence in our regressions. See Panel C of Appendix Table A.1 for complete definitions and sources of variables.

Table 4: Financial Development and External Finance Use: Basic Estimates

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
FD × US Growth	0.028**	0.055***	0.038*	0.115***	0.151*
	(0.011)	(0.016)	(0.021)	(0.041)	(0.085)
US Growth	-0.011	-0.019	0.007	-0.003	-0.074
	(0.043)	(0.043)	(0.042)	(0.042)	(0.071)
log(Total Assets)	-0.219***	-0.224***	-0.219***	-0.219***	-0.170***
	(0.041)	(0.041)	(0.041)	(0.041)	(0.041)
log(Total Assets) Squared	-2.463***	-2.420***	-2.456***	-2.459***	-3.901***
	(0.843)	(0.842)	(0.844)	(0.844)	(0.886)
log(Employees)	-0.455***	-0.451***	-0.454***	-0.455***	-0.583***
	(0.099)	(0.099)	(0.099)	(0.099)	(0.103)
log(Employees) Squared	4.374***	4.353***	4.367***	4.379***	6.447***
	(1.150)	(1.147)	(1.149)	(1.150)	(1.211)
Age	-0.006	-0.008	-0.006	-0.006	0.014
	(0.032)	(0.032)	(0.032)	(0.032)	(0.033)
Age Squared	-0.032	-0.012	-0.038	-0.035	-0.133
	(0.373)	(0.373)	(0.373)	(0.373)	(0.390)
Leverage	-0.019***	-0.018***	-0.019***	-0.019***	-0.018***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Tangibility	-0.013***	-0.013***	-0.013***	-0.013***	-0.012***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Collateral	0.004*	0.003	0.004*	0.004*	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Cash	-0.008***	-0.009***	-0.008***	-0.008***	-0.009***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Constant	0.023***	0.023***	0.023***	0.023***	0.022***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Country, Industry FEs	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.081	0.081	0.081	0.081	0.080
N	24,619	24,738	24,619	24,619	21,642

Note: The table reports results of OLS regressions on the sample of European private firms. The dependent variable is the time average of annual firm-level External Finance Use (EFU) defined as change in shareholders' capital plus change in a firm's long-term debt plus change in a firm's other non-current liabilities divided by total assets. The average is taken over years in which a firm is present in the sample within the 1996-2005 period. US Growth is the time average of the real value-added growth of US 2-digit ISIC industries calculated, for each firm, over the same years for which EFU is computed. Country-level measures of Financial Development (FD) are predetermined. Firm-level control variables come from the first year a firm enters the sample and remain fixed over time. Logarithm of Total Assets (in EUR millions) is divided by 100. Logarithm of Employment is divided by 100. Age is the number of years since a firm's incorporation and it is divided by 1,000. Leverage is the ratio of long- plus short-term debt to total assets. Tangibility is the ratio of fixed assets to total assets. Collateral is measured as fixed assets plus inventories plus receivables divided by total assets. Cash is the ratio of cash holdings to total assets. See Appendix Table A.1 for complete definitions and sources of variables. All specifications are linear regressions with outliers removed (we use the 1-to-99 percentile range of the dependent variable). We always control for country and 3-digit ISIC industry dummies. Robust standard errors (clustered at the industry-country level) are reported in parentheses; *, **, and *** denote significance at the 10%,5 %, and 1% levels, respectively.

Table 5: Financial Development and External Finance Use

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
			Panel A: Cross-sectional Regressions		
FD × US Growth	0.028**	0.055***	0.038*	0.115***	0.151*
	(0.011)	(0.016)	(0.021)	(0.041)	(0.085)
US Growth	-0.011	-0.019	0.007	-0.003	-0.074
	(0.043)	(0.043)	(0.042)	(0.042)	(0.071)
Adjusted R^2	0.081	0.081	0.081	0.081	0.080
N	24,619	24,738	24,619	24,619	21,642
FD × Global PE Level	0.002	0.002	0.003	0.001	0.002
	(0.002)	(0.003)	(0.003)	(0.008)	(0.015)
Global PE Level	0.021*	0.021*	0.021*	0.022*	0.035**
	(0.012)	(0.012)	(0.012)	(0.012)	(0.015)
Adjusted R^2	0.082	0.081	0.082	0.081	0.080
N	25,703	25,835	25,703	25,703	22,579
FD × Global PE Growth	0.054***	0.072***	0.104***	0.131**	0.216*
	(0.012)	(0.021)	(0.023)	(0.051)	(0.115)
Global PE Growth	-0.053***	-0.043**	-0.034**	-0.018	-0.117
	(0.020)	(0.020)	(0.017)	(0.018)	(0.079)
Adjusted R^2	0.082	0.082	0.082	0.082	0.080
N	25,703	25,835	25,703	25,703	22,579
			Panel B: Panel Regressions		
FD × US Growth	0.021**	0.019	0.048***	0.080**	0.127*
	(0.009)	(0.015)	(0.016)	(0.032)	(0.066)
US Growth	-0.026**	-0.015	-0.023**	-0.019*	-0.088*
	(0.013)	(0.013)	(0.011)	(0.011)	(0.045)
Adjusted R^2	0.016	0.016	0.016	0.016	0.015
N	181,070	181,838	181,070	181,070	161,593
FD × Global PE Level	0.006**	0.005	0.013**	0.014	0.017
	(0.003)	(0.004)	(0.005)	(0.010)	(0.020)
Global PE Level	-0.008**	-0.005	-0.007**	-0.004	-0.012
	(0.003)	(0.003)	(0.003)	(0.003)	(0.012)
Adjusted R^2	0.016	0.016	0.016	0.016	0.015
N	189,805	190,674	189,805	189,805	169,281
FD × Global PE Growth	0.011***	0.012**	0.023***	0.028**	0.047*
	(0.003)	(0.005)	(0.006)	(0.013)	(0.028)
Global PE Growth	-0.004	0.001	-0.001	0.003	-0.021
	(0.005)	(0.005)	(0.004)	(0.004)	(0.019)
Adjusted R^2	0.016	0.016	0.016	0.016	0.015
N	189,341	190,829	189,341	189,341	168,360

Note: The table reports results of OLS regressions on the sample of European private firms. Panel A reports results of cross-sectional regressions, where the dependent variable is the time average of annual firm-level External Finance Use, defined as in Table 4, and US Growth, Global PE Level, and Global PE Growth are time averages calculated, for each firm, over the same years for which EFU is computed. Panel B reports results of regressions on the panel of firm-year observations that corresponds to the sample used in Panel A. The dependent variable is the annual firm-level External Finance Use and growth opportunities proxies US Growth, Global PE Level, and Global PE Growth are allowed to vary over years. All specifications are linear regressions with outliers removed (observations outside the 1-to-99 percentile range of the dependent variable), include a constant and predetermined firm-level controls (see Table 4 notes for their definitions). Specifications in Panel A include country and 3-digit ISIC industry dummies, while specifications in Panel B include country, 3-digit ISIC industry, and year dummies. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively, based on robust standard errors clustered at the industry-country level.

Table 6: Differences across Firms

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
			Panel A: Small Firms		
FD × US Growth	0.037***	0.069***	0.057***	0.138***	0.243***
	(0.010)	(0.021)	(0.018)	(0.040)	(0.093)
Adjusted R^2	0.074	0.074	0.074	0.074	0.074
N	12,455	12,517	12,455	12,455	11,140
FD × Global PE Growth	0.072***	0.108***	0.126***	0.222***	0.294*
	(0.017)	(0.030)	(0.034)	(0.068)	(0.150)
Adjusted R^2	0.076	0.075	0.075	0.075	0.074
N	13,005	13,073	13,005	13,005	11,617
			Panel B: Large Firms		
FD × US Growth	0.022	0.043	0.026	0.111*	0.080
	(0.018)	(0.028)	(0.033)	(0.064)	(0.124)
Adjusted R^2	0.065	0.065	0.065	0.065	0.065
N	12,164	12,221	12,164	12,164	10,502
FD × Global PE Growth	0.030*	0.023	0.079**	0.021	0.114
	(0.018)	(0.026)	(0.037)	(0.074)	(0.165)
Adjusted R^2	0.066	0.065	0.066	0.066	0.065
N	12,698	12,762	12,698	12,698	10,962
			Panel C: Young Firms		
FD × US Growth	0.031**	0.058**	0.043*	0.124**	0.223*
	(0.013)	(0.024)	(0.024)	(0.051)	(0.120)
Adjusted R^2	0.099	0.099	0.099	0.099	0.100
N	11,974	12,036	11,974	11,974	10,306
FD × Global PE Growth	0.067***	0.087***	0.140***	0.164**	0.402**
	(0.019)	(0.029)	(0.041)	(0.078)	(0.181)
Adjusted R^2	0.101	0.100	0.101	0.100	0.100
N	12,515	12,583	12,515	12,515	10,756
			Panel D: Old Firms		
FD × US Growth	0.024*	0.050**	0.031	0.102**	0.063
	(0.013)	(0.021)	(0.025)	(0.052)	(0.100)
Adjusted R^2	0.069	0.069	0.069	0.069	0.065
N	12,645	12,702	12,645	12,645	11,336
FD × Global PE Growth	0.033**	0.046*	0.059*	0.073	-0.029
	(0.016)	(0.026)	(0.031)	(0.063)	(0.133)
Adjusted R^2	0.069	0.069	0.069	0.069	0.065
N	13,188	13,252	13,188	13,188	11,823

Table 6 (cont.): Differences across Firms

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
	Panel E: Closely Held Firms				
FD × US Growth	0.044***	0.076***	0.061***	0.199***	0.325***
	(0.011)	(0.018)	(0.022)	(0.047)	(0.111)
Adjusted R^2	0.069	0.069	0.068	0.069	0.064
N	13,446	13,513	13,446	13,446	12,092
FD × Global PE Growth	0.058***	0.068***	0.118***	0.160***	0.365**
	(0.015)	(0.024)	(0.030)	(0.062)	(0.154)
Adjusted R^2	0.069	0.069	0.070	0.069	0.064
N	14,055	14,129	14,055	14,055	12,635
	Panel F: Firms with Dispersed Ownership				
FD × US Growth	0.007	0.022	0.006	0.002	-0.084
	(0.021)	(0.039)	(0.037)	(0.067)	(0.130)
Adjusted R^2	0.107	0.107	0.107	0.107	0.106
N	9,645	9,695	9,645	9,645	8,467
FD × Global PE Growth	0.065**	0.117**	0.106**	0.123	0.010
	(0.026)	(0.046)	(0.047)	(0.094)	(0.197)
Adjusted R^2	0.108	0.108	0.108	0.107	0.105
N	10,029	10,085	10,029	10,029	8,790

Note: The table reports results of OLS regressions analogous to those presented in Panel A of Table 5. The dependent variable is the time average of annual firm-level External Finance Use. Panel A uses the sample of small firms, where a firm is defined to be small if its size measured by Total Assets is less or equal to the median value taken across all firms in the same country and 2-digit ISIC industry cell (the country-industry median). Panel B uses the sample of large firms, where a firm is defined to be large if its Total Assets are greater than the corresponding country-industry median. Panel C uses the sample of young firms, where a firm is defined to be young if its age since incorporation as of the first year the firm enters the sample is less or equal to the country-industry median. Panel D uses the sample of old firms, where a firm is defined to be old if its age is greater than the country-industry median. Panel E uses the sample of closely held firms, where a firm is defined to be closely held if its Ownership Concentration, measured by Herfindahl-Hirschman Index of direct shareholders' stakes, is greater than the country-industry median. Panel F uses the sample of firms with dispersed ownership, where firm is defined to have dispersed ownership if its Ownership Concentration is less or equal to the country-industry median. All specifications are linear regressions with outliers removed (observations outside the 1-to-99 percentile range of the dependent variable), include a constant, the corresponding growth opportunity proxy as a base effect, firm-level controls (see Table 4 notes for their definitions), and country and 3-digit ISIC industry dummies. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively, based on robust standard errors clustered at the industry-country level.

Table 7: Growth Opportunities and Technological Characteristics

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
	Panel A: Technological Characteristics				
FD × R&D Intensity	0.083***	0.152***	0.107*	0.263**	0.161
	(0.028)	(0.055)	(0.060)	(0.121)	(0.278)
Adjusted R^2	0.081	0.081	0.081	0.081	0.079
N	23,756	23,862	23,756	23,756	20,921
FD × Investment Lumpiness	0.261***	0.490***	0.339***	0.796***	0.676
	(0.058)	(0.127)	(0.113)	(0.239)	(0.525)
Adjusted R^2	0.082	0.082	0.082	0.082	0.080
N	25,692	25,824	25,692	25,692	22,571
FD × EFD	0.096**	0.169**	0.140*	0.285	0.484
	(0.039)	(0.068)	(0.085)	(0.183)	(0.440)
Adjusted R^2	0.081	0.081	0.081	0.081	0.079
N	25,441	25,567	25,441	25,441	22,362

Table 7 (cont.): Growth Opportunities and Technological Characteristics

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
			Panel B: US Growth		
FD × US Growth	0.025**	0.049***	0.033	0.109**	0.178*
	(0.012)	(0.018)	(0.024)	(0.047)	(0.104)
FD × R&D Intensity	0.054**	0.102**	0.062	0.125	-0.076
	(0.025)	(0.045)	(0.053)	(0.126)	(0.294)
Adjusted R^2	0.081	0.081	0.080	0.081	0.079
N	22,672	22,765	22,672	22,672	19,984
FD × US Growth	0.011	0.024	0.016	0.068	0.124
	(0.011)	(0.018)	(0.022)	(0.044)	(0.087)
FD × Investment Lumpiness	0.239***	0.435***	0.314***	0.648**	0.418
	(0.061)	(0.134)	(0.118)	(0.251)	(0.530)
Adjusted R^2	0.082	0.082	0.081	0.082	0.080
N	24,608	24,727	24,608	24,608	21,634
FD × US Growth	0.024**	0.047***	0.033	0.105**	0.136
	(0.011)	(0.017)	(0.022)	(0.044)	(0.090)
FD × EFD	0.062	0.106*	0.098	0.138	0.283
	(0.039)	(0.060)	(0.082)	(0.196)	(0.452)
Adjusted R^2	0.081	0.081	0.081	0.081	0.080
N	24,357	24,470	24,357	24,357	21,425
			Panel C: Global PE Growth		
FD × Global PE Growth	0.054***	0.068***	0.108***	0.138**	0.252*
	(0.013)	(0.022)	(0.025)	(0.056)	(0.133)
FD × R&D Intensity	0.050*	0.112**	0.034	0.175	-0.003
	(0.028)	(0.055)	(0.058)	(0.126)	(0.295)
Adjusted R^2	0.082	0.081	0.082	0.081	0.080
N	23,756	23,862	23,756	23,756	20,921
FD × Global PE Growth	0.043***	0.053***	0.092***	0.098*	0.195
	(0.012)	(0.020)	(0.025)	(0.051)	(0.118)
FD × Investment Lumpiness	0.201***	0.421***	0.204*	0.666***	0.435
	(0.060)	(0.131)	(0.114)	(0.244)	(0.543)
Adjusted R^2	0.083	0.083	0.083	0.082	0.080
N	25,692	25,824	25,692	25,692	22,571
FD × Global PE Growth	0.050***	0.065***	0.098***	0.123**	0.214*
	(0.013)	(0.022)	(0.025)	(0.055)	(0.126)
FD × EFD	0.059	0.117*	0.072	0.184	0.296
	(0.040)	(0.068)	(0.085)	(0.189)	(0.458)
Adjusted R^2	0.082	0.081	0.082	0.081	0.080
N	25,441	25,567	25,441	25,441	22,362

Note: The table reports results of OLS regressions on the sample of European private firms. The dependent variable is the time average of annual firm-level External Finance Use defined as in Table 4. Panel A reports estimates from specifications that include interactions of financial development proxies (FD) with technological characteristics. R&D Intensity is the time average of R&D to capital expenditure ratios of a median firm for each U.S. 3-digit ISIC industry over the 1996-2005 period. Investment Lumpiness is the number of investment spikes experienced by a median firm in each U.S. 3-digit ISIC industry over the 1996-2005 period. The investment spike is an event when annual capital expenditure exceeds 30 percent of the firm's stock of fixed assets. External Finance Dependence (EFD) is the share of capital expenditures not financed by cash flow from operations of a median firm for each U.S. 3-digit ISIC industry over the 1996-2005 period. Panel B reports estimates from specifications that include interactions of financial development proxies with US Growth as well as interactions of financial development proxies with technological characteristics presented in Panel A. Panel C reports estimates from specifications that include interactions of financial development proxies with Global PE Growth as well as interactions of financial development proxies with technological characteristics presented in Panel A. All specifications are linear regressions with outliers removed (observations outside the 1-to-99 percentile range of the dependent variable), include a constant, the corresponding growth opportunity proxy as a base effect, firm-level controls (see Table 4 notes for their definitions), and country and 3-digit ISIC industry dummies. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively, based on robust standard errors clustered at the industry-country level.

Table 8: Capital Expenditures Not Financed by Internal Funds

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
			Panel A: Cross-sectional Regressions		
FD × US Growth	0.062***	0.113**	0.088**	0.260***	0.600***
	(0.023)	(0.045)	(0.042)	(0.092)	(0.218)
US Growth	0.022	0.002	0.059	0.038	-0.226
	(0.090)	(0.092)	(0.088)	(0.088)	(0.171)
Adjusted R^2	0.078	0.078	0.078	0.078	0.077
N	24,489	24,609	24,489	24,489	21,493
FD × Global PE Level	0.008*	0.014*	0.010	0.023	0.053
	(0.004)	(0.008)	(0.008)	(0.018)	(0.038)
Global PE Level	0.006	0.003	0.011	0.009	0.022
	(0.023)	(0.023)	(0.023)	(0.023)	(0.035)
Adjusted R^2	0.077	0.077	0.077	0.077	0.075
N	25,566	25,700	25,566	25,566	22,422
FD × Global PE Growth	0.083***	0.134***	0.131***	0.304***	0.529**
	(0.024)	(0.040)	(0.048)	(0.105)	(0.249)
Global PE Growth	-0.119***	-0.119***	-0.075**	-0.088***	-0.333**
	(0.038)	(0.038)	(0.033)	(0.033)	(0.167)
Adjusted R^2	0.077	0.077	0.077	0.077	0.075
N	25,566	25,700	25,566	25,566	22,422
			Panel B: Panel Regressions		
FD × US Growth	0.064***	0.088***	0.118***	0.236***	0.385***
	(0.016)	(0.026)	(0.032)	(0.061)	(0.127)
US Growth	-0.076***	-0.066***	-0.052***	-0.053***	-0.256***
	(0.023)	(0.023)	(0.018)	(0.019)	(0.085)
Adjusted R^2	0.027	0.027	0.027	0.027	0.028
N	179,997	180,785	179,997	179,997	160,582
FD × Global PE Level	0.014***	0.016**	0.028***	0.039**	0.081**
	(0.004)	(0.007)	(0.008)	(0.016)	(0.032)
Global PE Level	-0.015***	-0.011*	-0.011***	-0.008*	-0.051**
	(0.005)	(0.006)	(0.004)	(0.005)	(0.020)
Adjusted R^2	0.027	0.027	0.027	0.027	0.028
N	188,670	189,564	188,670	188,670	168,202
FD × Global PE Growth	0.025***	0.027***	0.055***	0.092***	0.187***
	(0.006)	(0.009)	(0.010)	(0.022)	(0.047)
Global PE Growth	-0.012	-0.002	-0.007	-0.003	-0.106***
	(0.008)	(0.008)	(0.006)	(0.007)	(0.032)
Adjusted R^2	0.028	0.028	0.028	0.028	0.029
N	188,211	189,089	188,211	188,211	167,287

Note: The table uses the sample, variables, and specifications as Table 5 except that the firm-level External Finance Use variable is calculated as the time average of annual changes in shareholders' capital plus changes in a firm's long-term debt plus changes in a firm's other non-current liabilities minus profits/losses from operations plus changes in other shareholders' funds, all divided by total assets. The average is taken over years in which a firm is present in the sample within the 1996-2005 period.

Table 9: Decomposing External Finance Use

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
			Panel A: Changes in Shareholders' Equity		
FD × US Growth	0.008**	0.010*	0.017**	0.028*	0.063**
	(0.004)	(0.006)	(0.008)	(0.015)	(0.031)
US Growth	0.015	0.018	0.018	0.019	-0.010
	(0.016)	(0.016)	(0.016)	(0.016)	(0.025)
Adjusted R^2	0.067	0.067	0.067	0.067	0.066
N	23,862	23,978	23,862	23,862	21,188
FD × Global PE Growth	0.010**	0.011*	0.022**	0.018	0.051
	(0.005)	(0.006)	(0.011)	(0.018)	(0.038)
Global PE Growth	-0.008	-0.005	-0.006	-0.000	-0.023
	(0.008)	(0.008)	(0.007)	(0.008)	(0.027)
Adjusted R^2	0.066	0.066	0.066	0.066	0.064
N	24,907	25,036	24,907	24,907	22,099
			Panel B: Changes in Long-term Debt		
FD × US Growth	0.015***	0.026**	0.026**	0.060***	0.096*
	(0.005)	(0.010)	(0.011)	(0.022)	(0.055)
US Growth	0.014	0.013	0.022	0.019	-0.030
	(0.030)	(0.031)	(0.031)	(0.031)	(0.047)
Adjusted R^2	0.095	0.095	0.095	0.095	0.089
N	23,862	23,978	23,862	23,862	21,188
FD × Global PE Growth	0.025***	0.033**	0.054***	0.042	0.049
	(0.009)	(0.013)	(0.018)	(0.037)	(0.085)
Global PE Growth	-0.021	-0.018	-0.014	-0.001	-0.018
	(0.013)	(0.013)	(0.012)	(0.011)	(0.058)
Adjusted R^2	0.095	0.095	0.095	0.094	0.088
N	24,907	25,036	24,907	24,907	22,099
			Panel C: Changes in Other Non-current Liabilities		
FD × US Growth	0.002	0.012	-0.009	0.010	-0.037
	(0.005)	(0.011)	(0.008)	(0.020)	(0.036)
US Growth	0.006	-0.001	0.011	0.006	0.026
	(0.024)	(0.024)	(0.023)	(0.023)	(0.036)
Adjusted R^2	0.039	0.039	0.039	0.039	0.035
N	23,859	23,975	23,859	23,859	21,187
FD × Global PE Growth	0.013*	0.022*	0.013	0.040	0.018
	(0.007)	(0.013)	(0.010)	(0.026)	(0.050)
Global PE Growth	-0.019*	-0.019*	-0.009	-0.013	-0.012
	(0.010)	(0.011)	(0.008)	(0.009)	(0.034)
Adjusted R^2	0.040	0.040	0.040	0.040	0.035
N	24,904	25,033	24,904	24,904	22,098

Note: The table uses the sample, variables, and specifications as Panel A of Table 5 except that the dependent variables are, one at a time, individual components of the External Finance Use measure. The dependent variable in Panel A, B, and C is the time average of annual firm-level changes in shareholders' capital, in a firm's long-term debt, and in a firm's other non-current liabilities, respectively. All variables are scaled by total assets and then averaged over years in which a firm is present in the sample within the 1996-2005 period.

Table 10: Error in Measurement of Growth Opportunities

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
			Panel A : Instrumenting by Global PE Growth		
FD × US Growth	0.168***	0.260***	0.275***	0.438**	0.846*
	(0.050)	(0.094)	(0.102)	(0.179)	(0.432)
US Growth	-0.022	0.076	0.079	-0.022	-0.101
	(0.292)	(0.283)	(0.281)	(0.292)	(0.381)
Adjusted R^2	0.069	0.072	0.070	0.077	0.068
N	24,619	24,738	24,619	24,619	21,642
			First-stage Regression Statistics		
F-statistics	58.497	57.283	58.614	57.176	64.252
			Panel B : Instrumenting by US Growth		
FD × Global PE Growth	0.128**	0.240***	0.175*	0.547***	0.793*
	(0.050)	(0.079)	(0.096)	(0.203)	(0.457)
Global PE Growth	-0.142	-0.056	-0.095	-0.142	-0.496
	(0.113)	(0.103)	(0.101)	(0.113)	(0.326)
Adjusted R^2	0.080	0.077	0.082	0.077	0.078
N	24,619	24,738	24,619	24,619	21,642
			First-stage Regression Statistics		
F-statistics	66.947	66.44	67.124	65.554	75.511

Note: The table reports results of two-stage least-squares regressions. The sample, variables, and specifications are as in Panel A of Table 5. In Panel A, 'FD × US Growth' and 'US Growth' are instrumented using 'FD × Global PE Growth' and 'Global PE Growth.' In Panel B, 'FD × Global PE Growth' and 'Global PE Growth' are instrumented using 'FD × US Growth' and 'US Growth.' F-statistic we report for the first-stage regression is heteroskedasticity-robust Kleibergen-Paap rk Wald F-statistic for the test of weak instruments.

Table 11: Alternative Measures of Financial Development

	Gov. Bank Ownership	Gov. Bank Control	Overhead Costs	Net Interest Margin	Control Premium	Private Monitoring Index	Restrictions on Bank Activities Index
FD × US Growth	-0.029	-0.015	-0.013	-0.004	-0.096**	0.003	-0.012***
	(0.043)	(0.043)	(0.009)	(0.009)	(0.042)	(0.008)	(0.004)
US Growth	0.031	0.027	0.057	0.031	0.010	0.008	0.113**
	(0.044)	(0.044)	(0.051)	(0.053)	(0.046)	(0.061)	(0.052)
Adjusted R^2	0.077	0.077	0.078	0.078	0.072	0.081	0.081
N	24,414	24,414	22,717	22,717	20,430	24,738	24,738
FD × Global PE Growth	-0.165***	-0.153***	-0.043***	-0.029***	-0.130**	0.002	-0.017***
	(0.047)	(0.047)	(0.009)	(0.007)	(0.058)	(0.010)	(0.005)
Global PE Growth	0.063***	0.059***	0.157***	0.111***	0.046***	-0.002	0.143***
	(0.018)	(0.018)	(0.034)	(0.031)	(0.016)	(0.059)	(0.038)
Adjusted R^2	0.079	0.079	0.080	0.079	0.073	0.081	0.082
N	25,483	25,483	23,742	23,742	21,339	25,835	25,835

Note: The table uses the sample, variables, and specifications as Panel A of Table 5 except that we use alternative country-level measures of Financial Development (FD). See Panel B of Table A.1 for their complete definitions and sources.

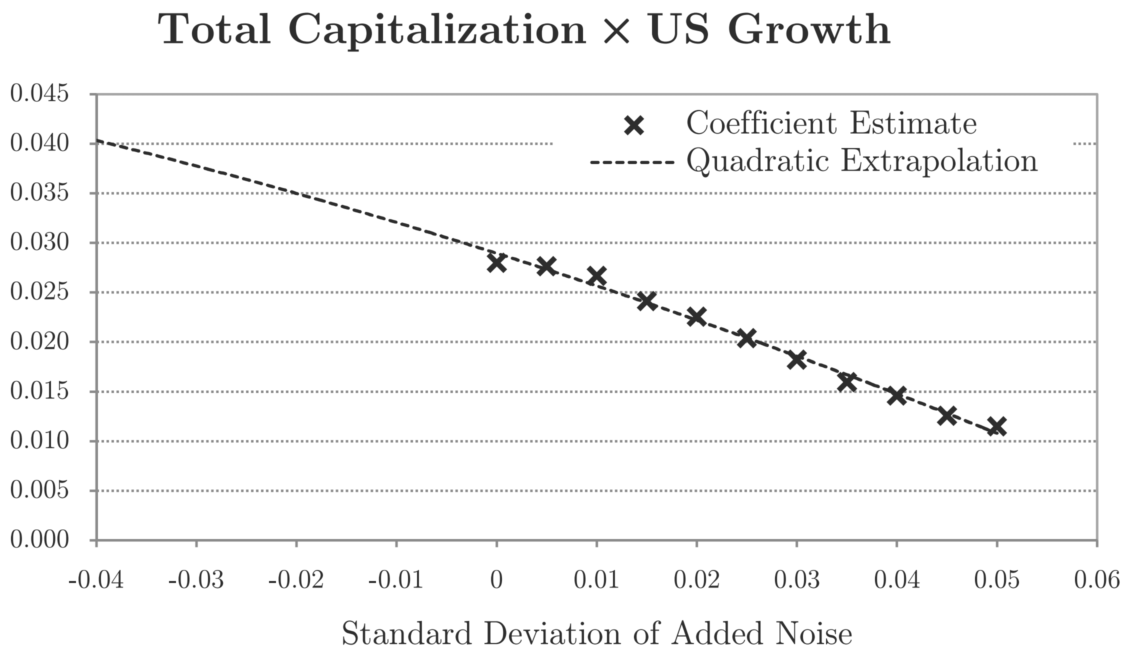

Figure 1: Sensitivity of estimates to added noise in GO_i

A. Definitions and Sources of Variables

Table A.1: Definitions and Sources of Variables

Name	Definition and Source
	Panel A: Firm-level Variables
Total Assets	Firm's total assets (TOAS) in billions of Euro. We use the value from the first year a firm enters the sample within the 1996-2005 period. Source: Amadeus.
Employees	Number of employees (EMPL). We use the value from the first year a firm enters the sample within the 1996-2005 period. Source: Amadeus.
Age	The number of years since a firm's incorporation, scaled down by 1,000. We use the value from the first year a firm enters the sample within the 1996-2005 period. Source: Amadeus.
External Finance Use	First, we sum the year-on-year change in shareholders' capital ($CAPI_t - CAPI_{t-1}$), the year-on-year change in a firm's long-term debt ($LTDB_t - LTDB_{t-1}$), and the year-on-year change in a firm's other non-current liabilities ($ONCLI_t - ONCLI_{t-1}$). The result is divided by total assets from the beginning of each year ($TOAS_{t-1}$). Second, we compute the time average of annual measures from the first step over the years in which a firm is present in the sample within the 1996-2005 period. Source: Amadeus.
Leverage	Long-term debt (LTDB) plus current liabilities (CULI) divided by total assets (TOAS). We use the value from the first year a firm enters the sample within the 1996-2005 period. Source: Amadeus.
Tangibility	Fixed assets (FIAS) divided by total assets (TOAS). We use the value from the first year a firm enters the sample within the 1996-2005 period. Source: Amadeus.
Collateral	Fixed assets (FIAS) plus inventories (STOK) plus accounts receivables (DEBT) divided by total assets (TOAS). We use the value from the first year a firm enters the sample within the 1996-2005 period. Source: Amadeus.
Cash	Cash holdings (CASH) divided by total assets (TOAS). We use the value from the first year a firm enters the sample. Source: Amadeus.
Ownership Concentration	The sum of squares of direct stakes of all reported shareholders (Herfindahl-Hirschman index). We use the value from the the year that is the closest to the first year a firm enters the sample. Source: Amadeus.

Table A.1 (cont.): Definitions and Sources of Variables

Name	Definition and Source
	Panel B: Country-level Variables
Total Capitalization	Private credit by deposit money banks and other financial institutions plus stock market capitalization divided by GDP in 1996. Source: Beck et al. (2000).
Private Credit	Private credit by deposit money banks and other financial institutions divided by GDP in 1996. Source: Beck et al. (2000).
Market Capitalization	Stock market capitalization divided by GDP in 1996. Source: Beck et al. (2000).
Market Value Traded	Stock market total value traded divided by GDP in 1996. Source: Beck et al. (2000).
Accounting Standards	Index created by examining and rating companies' 1990 annual reports on their inclusion or omission of 90 items in balance sheets and income statements and published by the Center for International Financial Analysis & Research, Inc. The maximum is 90, the minimum 0, and we scaled it down by 100. Source: The Center for International Financial Analysis & Research.
Government Bank Ownership	Share of the top 10 banks' assets owned by a country's government in 1995. The percentage of the assets owned by the government in a given bank is calculated by multiplying the share of each shareholder in that bank by the share the government owns in that shareholder, and then summing the resulting ownership stakes. Source: La Porta et al. (2002).
Government Bank Control	Share of the top 10 banks' assets controlled by a country's government at the 50 percent level in 1995. The percentage of assets owned by the government in a given bank is calculated following the same methodology outlined for Government Bank Ownership. Source: La Porta et al. (2002).
Overhead Costs	Accounting value of banks' overhead costs as a share of their total assets. Scaled up by 100. Source: Beck et al. (2000).
Net Interest Margin	Accounting value of banks' net interest revenue as a share of their interest-bearing assets. Scaled up by 100. Source: Beck et al. (2000).
Control Premium	Control premium estimated by Dyck and Zingales (2004) using the sample of 393 controlling blocks sales in 1990-2000 period. We use the estimated country fixed effects from Table III, column (1).
Private Monitoring Index	Index of regulatory measures that promote private monitoring of banks constructed by Barth et al. (2004) using information on: (a) whether an outside licensed audit is required of the financial statements issued by a bank; (b) The percentage of the top 10 banks that are rated by international credit-rating agencies; (c) whether there is an explicit deposit insurance scheme; (d) wether the income statement includes accrued or unpaid interest or principal on nonperforming loans and whether banks are required to produce consolidated financial statements; (e) wether off-balance sheet items are disclosed to the public; (f) wether banks must disclose risk management procedures to the public; and (g) wether subordinated debt is allowable (required) as a part of regulatory capital. Higher values indicate more private monitoring. See Barth et al. (2004) for the exact formula for calculating the index.
Restrictions on Bank Activities Index	Index of regulatory measures that allow banks to engage in other than traditional interest-spread-based activities constructed by Barth et al. (2004) using information on: (a) the ability of banks to own and control non-financial firms; (b) the ability of banks to engage in the business of securities underwriting, brokering, and dealing; (c) the ability of banks to engage in insurance underwriting and selling; and (d) the ability of banks to engage in real estate investment, development, and management. Higher values indicate more restrictions on non-traditional activities. See Barth et al. (2004) for the exact formula for calculating the index.

Table A.1 (cont.): Definitions and Sources of Variables

Name	Definition and Source
	Panel C: Industry-level Variables
R&D Intensity	First, for each Compustat firm, we compute the time average of R&D expenditures and capital expenditures over the 1996-2005 period and take the ratio of the two averages. Second, we take the ratio from the first step of the median U.S. firm for each 3-digit ISIC industry. Source: Compustat.
Investment Lumpiness	First, for each Compustat firm, we compute the average number of investment spikes it experienced over the 1996-2005 period. An investment spike is defined as an event when annual capital expenditure exceeds 30 percent of the firm's stock of fixed assets. Second, we take the average of the statistic computed in the first step for each U.S. 3-digit ISIC industry Source: Compustat.
External Finance Dependence	First, for each Compustat firm, we sum capital expenditures and cash flows from operations over the 1996-2005 period. Second, for each Compustat firm, we compute the ratio of capital expenditures minus cash flows from operations over capital expenditures using the sums obtained in the first step. Third, we take the ratio from the second step of the median U.S. firm for each 3-digit ISIC industry. Source: Compustat.
US Growth	First, we compute year-on-year growth rates by taking the difference of natural logarithms of annual real value added for each U.S. 2-digit ISIC industry. Second, for each firm in our sample, we compute the time average of year-on-year growth rates over the same years for which External Finance Use is computed. Source: OECD STAN.
Global PE Level	First, we take the world price-to-earnings ratios of industry portfolios as they are defined in Datastream. Second, for each firm in our sample, we compute the time average of the world price-to-earnings ratios over the same years for which External Finance Use is computed. Finally, we match Datastream industries into 2-digit ISIC. Source: Datastream.
Global PE Growth	First, we compute year-on-year growth rates of the world price-to-earnings ratio of industry portfolios as they are defined in Datastream. Second, for each firm in our sample, we compute the time average of the year-on-year growth rates over the same years for which External Finance Use is computed. Finally, we match Datastream industries to 2-digit ISIC. Source: Datastream.

B. Balance Sheet Definition of External Finance Use

Rajan and Zingales (1998) define external finance dependence (EFD) as the share of capital expenditure (CE) not financed by cash flow (CF)

$$EFD_t = \frac{CE_t - CF_t}{CE_t}.$$

To measure external finance use, we find an analogy to their definition using balance sheet data that are available for most firms in our sample. In a panel of annual firm balance sheet items, we can approximate capital expenditure by the change in fixed assets ($FIAS$) plus depreciation ($DEPRE$)

$$\begin{aligned} CE_t &= (FIAS_t - FIAS_{t-1}) + DEPRE_t \\ &= \Delta FIAS_t + DEPRE_t. \end{aligned} \tag{B.1}$$

Cash flow is approximated by firm's operating profit (PL) increased by depreciation (depreciation is cost but not cash outflow) and adjusted for the change in the net working capital. An increase in current assets ($CUAS$, i.e., inventories and accounts receivables) uses cash, while an increase in current liabilities ($CULI$, i.e., short-term loans and accounts payables) releases cash

$$\begin{aligned} CF_t &= PL_t + DEPRE_t - (CUAS_t - CUAS_{t-1}) + (CULI_t - CULI_{t-1}) \\ &= PL_t + DEPRE_t - \Delta CUAS_t + \Delta CULI_t. \end{aligned} \tag{B.2}$$

Next, we show how is difference $CE_t - CF_t$ related to the amount of external finance raised. The fundamental balance sheet identity necessitates that change in total assets equals change in equity plus change in liabilities. Decomposing total assets into fixed assets ($FIAS$), current assets ($CUAS$), and cash ($CASH$); and decomposing total liabilities into shareholders' equity ($CAPI$), other shareholders' funds ($OSFD$, i.e., reserves and retained earnings), long-term debt ($LTDB$), other non-current liabilities ($ONCLI$, i.e., provisions), and current liabilities ($CULI$), the balance sheet identity becomes

$$\Delta FIAS_t + \Delta CUAS_t + \Delta CASH_t = \Delta CAPI_t + \Delta OSFD_t + \Delta LTDB_t + \Delta ONCLI_t + \Delta CULI_t.$$

Using the above equations we can rewrite difference $CE_t - CF_t$ as

$$\begin{aligned} CE_t - CF_t &= \Delta FIAS_t + DEPRE_t - PL_t - DEPRE_t + \Delta CUAS_t - \Delta CULI_t \\ &= \Delta FIAS_t + \Delta CUAS_t - PL_t - \Delta CULI_t \\ &= \Delta CAPI_t + \Delta LTDB_t + \Delta ONCLI_t - \underbrace{(PL_t - \Delta OSFD_t)}_{=DIV_t(Dividends)} - \Delta CASH_t. \end{aligned} \quad \text{(B.3)}$$

We define External Finance Use (EFU) as

$$EFU_t = \frac{\Delta CAPI_t + \Delta LTDB_t + \Delta ONCLI_t}{TOAS_{t-1}}. \quad \text{(B.4)}$$

The numerator of EFU_t stands for the amount of equity raised/repurchased ($\Delta CAPI_t$) plus the amount of long-term debt issued/repaid ($\Delta LTDB_t$) plus the change in other forms of long-term financing ($\Delta ONCLI_t$). (We verify that equation (B.3) holds in our data when we use (B.1) and (B.2) to compute the left-hand side.) We scale the net flow of external finance by total assets as of the beginning of each year ($TOAS_{t-1}$). The reason is that capital expenditure is close to zero for many firms, which makes division impossible. We scale by total assets because it proxies for firm size and it is a measure that is the most comparable across firms in our sample.[27]

[27] Note that if a firm pays a dividend (DIV_t), the corresponding change in other shareholders' funds is $OSFD_t - OSFD_{t-1} = PL_t - DIV_t$, and thus term $PL_t - \Delta OSFD_t$ in equation (B.3) is equal to a dividend paid to shareholders. If a firm does not pay any dividend, $DIV_t = 0$, and the stock of cash does not change, $\Delta CASH_t = 0$, the difference between capital expenditure and cash flow from operations is equal to the amount of equity and long-term financing raised $CE_t - CF_t = \Delta CAPI_t + \Delta LTDB_t + \Delta ONCLI_t$.

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C. Online Appendix Tables

Table OA.1: Growth Opportunities and Technological Characteristics: Descriptive Statistics

Panel A: Basic Statistics

	US Growth	Global PE Level	Global PE Growth	R&D Intensity	Investment Lumpiness	EFD
Mean	2.4%	22.55	1.3%	0.928	1.226	0.051
S.D.	6.3%	7.16	1.4%	1.478	0.723	0.885
N	21	22	22	58	58	58

Panel B: Rank Correlations

	US Growth	Global PE Level	Global PE Growth	R&D Intensity	Investment Lumpiness	EFD
US Growth	1					
Global PE Level	0.335	1				
	(0.138)					
	21					
Global PE Growth	0.165	0.153	1			
	(0.475)	(0.509)				
	21	21				
R&D Intensity	0.416	0.480	0.060	1		
	(0.061*)	(0.028**)	(0.795)			
	21	21	21			
Investment Lumpiness	0.342	0.327	0.059	0.653	1	
	(0.130)	(0.147)	(0.801)	(0.000***)		
	21	21	21	58		
EFD	0.552	0.281	0.293	0.216	0.255	1
	(0.010***)	(0.217)	(0.198)	(0.104)	(0.054*)	
	21	21	21	58	58	

Note: In Panel A, we present descriptive statistics for US Growth, Global PE Level, and Global PE Growth on 2-digit ISIC industries and R&D Intensity, Investment Lumpiness, and EFD on 3-digit ISIC industries over the 1996-2005 period (see Table 3 and Panel C of Table A.1 for definitions and sources of the variables). Panel B presents Spearman rank correlations with corresponding p-values in brackets and the number of observations used to estimate it.

Table OA.2: Controlling for Ownership Concentration

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
FD × US Growth	0.032***	0.061***	0.043**	0.127***	0.165*
	(0.011)	(0.016)	(0.020)	(0.040)	(0.087)
US Growth	-0.002	-0.011	0.018	0.007	-0.069
	(0.044)	(0.044)	(0.043)	(0.043)	(0.072)
log(Total Assets)	-0.208***	-0.214***	-0.208***	-0.208***	-0.154***
	(0.042)	(0.042)	(0.042)	(0.042)	(0.042)
log(Total Assets) Squared	-2.556***	-2.507***	-2.546***	-2.553***	-3.908***
	(0.859)	(0.857)	(0.859)	(0.859)	(0.892)
log(Employees)	-0.426***	-0.422***	-0.424***	-0.426***	-0.557***
	(0.102)	(0.102)	(0.102)	(0.102)	(0.106)
log(Employees) Squared	4.196***	4.166***	4.184***	4.199***	6.287***
	(1.190)	(1.187)	(1.189)	(1.189)	(1.235)
Age	-0.011	-0.012	-0.011	-0.010	-0.000
	(0.032)	(0.032)	(0.032)	(0.032)	(0.034)
Age Squared	0.104	0.125	0.096	0.099	-0.003
	(0.385)	(0.385)	(0.385)	(0.385)	(0.398)
Leverage	-0.018***	-0.018***	-0.018***	-0.018***	-0.018***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Tangibility	-0.012***	-0.012***	-0.012***	-0.012***	-0.011***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Collateral	0.003	0.003	0.003	0.003	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Cash	-0.008***	-0.009***	-0.008***	-0.008***	-0.009***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Ownership Concentration	0.013***	0.012***	0.013***	0.012***	0.012***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Ownership Concentration Squared	-0.012***	-0.012***	-0.012***	-0.012***	-0.013***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Constant	0.023***	0.023***	0.023***	0.023***	0.021***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Country, Industry FEs	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.082	0.082	0.082	0.082	0.081
N	23,091	23,208	23,091	23,091	20,559

Note: The table uses the sample, variables, and specifications as Table 4 except that we, in addition, control for Ownership Concentration and Ownership Concentration squared. Ownership Concentration is Herfindahl-Hirschman Index of direct shareholders' stakes. It is calculated as the sum of squares of direct stakes of all reported shareholders in the year that is the closest to the first year a firm enters the sample and it remains fixed over time.

Table OA.3: Alternative Specifications of Panel Regressions

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
			Panel A: Time-varying Firm-level Controls		
FD × US Growth	0.021***	0.024*	0.043***	0.079***	0.112*
	(0.007)	(0.012)	(0.014)	(0.028)	(0.065)
US Growth	-0.011	-0.004	-0.005	-0.004	-0.061
	(0.012)	(0.012)	(0.010)	(0.010)	(0.046)
Adjusted R^2	0.019	0.019	0.019	0.019	0.018
N	158,240	158,971	158,240	158,240	143,214
FD × Global PE Level	0.005**	0.005	0.013***	0.011	0.029
	(0.002)	(0.003)	(0.004)	(0.008)	(0.019)
Global PE Level	-0.008***	-0.006*	-0.008***	-0.005	-0.021*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.012)
Adjusted R^2	0.019	0.019	0.019	0.019	0.018
N	165,028	165,843	165,028	165,028	149,228
FD × Global PE Growth	0.006*	0.006	0.015**	0.013	-0.006
	(0.003)	(0.005)	(0.006)	(0.013)	(0.028)
Global PE Growth	-0.003	-0.000	-0.003	0.001	0.008
	(0.005)	(0.005)	(0.004)	(0.004)	(0.019)
Adjusted R^2	0.019	0.019	0.019	0.019	0.018
N	165,028	165,843	165,028	165,028	149,228
			Panel B: Controlling for Firm Fixed Effects		
FD × US Growth	0.018***	0.013	0.044***	0.070***	0.131**
	(0.006)	(0.012)	(0.012)	(0.025)	(0.057)
US Growth	-0.010	0.002	-0.009	-0.005	-0.078**
	(0.009)	(0.010)	(0.008)	(0.008)	(0.038)
Adjusted R^2	0.005	0.005	0.005	0.005	0.005
N	184,607	185,402	184,607	184,607	164,784
FD × Global PE Level	0.009***	0.007	0.024***	0.032***	0.061***
	(0.002)	(0.005)	(0.004)	(0.009)	(0.018)
Global PE Level	-0.012***	-0.006	-0.012***	-0.008***	-0.041***
	(0.003)	(0.004)	(0.002)	(0.003)	(0.012)
Adjusted R^2	0.005	0.005	0.005	0.005	0.005
N	192,550	193,431	192,550	192,550	171,769
FD × Global PE Growth	0.006***	0.005	0.015***	0.012	0.006
	(0.002)	(0.004)	(0.004)	(0.008)	(0.017)
Global PE Growth	-0.001	0.002	-0.001	0.003	0.001
	(0.003)	(0.003)	(0.002)	(0.002)	(0.012)
Adjusted R^2	0.005	0.005	0.005	0.005	0.005
N	192,550	193,431	192,550	192,550	171,769

Note: The table uses the sample, variables, and specifications as Panel B of Table 5 with the following modifications: Panel A reports results obtained using specifications in which we allow the firm-level controls to vary over time. Panel B reports results obtained using specifications in which we include firm fixed effects.

Table OA.4: Growth Opportunities and Technological Characteristics: Panel Regressions

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
			Panel A: US Growth		
FD × US Growth	0.015*	0.010	0.039**	0.061*	0.121*
	(0.009)	(0.015)	(0.017)	(0.034)	(0.072)
FD × R&D Intensity	0.051*	0.127**	0.027	0.095	-0.032
	(0.029)	(0.052)	(0.058)	(0.128)	(0.293)
Adjusted R^2	0.016	0.016	0.016	0.016	0.015
N	166,797	167,398	166,797	166,797	149,261
FD × US Growth	0.016*	0.009	0.042**	0.067**	0.113*
	(0.009)	(0.016)	(0.017)	(0.034)	(0.068)
FD × Investment Lumpiness	0.217***	0.461***	0.227*	0.549**	0.711
	(0.066)	(0.138)	(0.127)	(0.258)	(0.550)
Adjusted R^2	0.016	0.016	0.016	0.016	0.015
N	180,996	181,764	180,996	180,996	161,544
FD × US Growth	0.019**	0.016	0.045***	0.073**	0.116*
	(0.009)	(0.015)	(0.016)	(0.033)	(0.066)
FD × EFD	0.055	0.132**	0.046	0.139	0.215
	(0.042)	(0.064)	(0.084)	(0.191)	(0.431)
Adjusted R^2	0.016	0.016	0.016	0.016	0.015
N	179,123	179,855	179,123	179,123	160,081
			Panel B: Global PE Growth		
FD × Global PE Growth	0.011***	0.012**	0.025***	0.029**	0.054*
	(0.003)	(0.006)	(0.006)	(0.014)	(0.030)
FD × R&D Intensity	0.054*	0.122**	0.045	0.141	0.095
	(0.028)	(0.048)	(0.058)	(0.123)	(0.284)
Adjusted R^2	0.016	0.016	0.016	0.016	0.015
N	174,719	175,406	174,719	174,719	156,284
FD × Global PE Growth	0.010***	0.010**	0.022***	0.025**	0.044
	(0.003)	(0.005)	(0.006)	(0.013)	(0.028)
FD × Investment Lumpiness	0.218***	0.440***	0.263**	0.619**	0.969*
	(0.060)	(0.121)	(0.116)	(0.241)	(0.533)
Adjusted R^2	0.016	0.016	0.016	0.016	0.015
N	189,249	190,106	189,249	189,249	168,299
FD × Global PE Growth	0.010***	0.011**	0.023***	0.025*	0.044
	(0.003)	(0.005)	(0.006)	(0.013)	(0.029)
FD × EFD	0.066*	0.135**	0.081	0.202	0.437
	(0.040)	(0.063)	(0.082)	(0.183)	(0.427)
Adjusted R^2	0.016	0.016	0.016	0.016	0.015
N	187,306	188,129	187,306	187,306	167,219

Note: The table uses the sample, variables, and specifications as Panel B and Panel C of Table 7 except that we use the panel of firm-year observations. To proxy for growth opportunities, Panel A uses time-varying US Growth, while Panel B uses time-varying Global PE Growth. All specifications are linear regressions with outliers removed (observations outside the 1-to-99 percentile range of the dependent variable), include a constant, the corresponding growth opportunity proxy as a base effect, predetermined firm-level controls, and country, 3-digit ISIC industry, and year dummies.

Table OA.5: Robustness Checks

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
	Panel A: Limited Liability Companies Only				
FD × US Growth	0.023**	0.047***	0.029	0.091**	0.109
	(0.011)	(0.017)	(0.020)	(0.044)	(0.083)
Adjusted R^2	0.075	0.074	0.075	0.075	0.072
N	16,398	16,516	16,398	16,398	14,629
FD × Global PE Growth	0.056***	0.070***	0.115***	0.190***	0.303**
	(0.013)	(0.021)	(0.025)	(0.054)	(0.125)
Adjusted R^2	0.076	0.075	0.076	0.075	0.072
N	17,158	17,289	17,158	17,158	15,303
	Panel B: Only Industries with at Least 20 Firms				
FD × US Growth	0.032**	0.096***	0.038*	0.121**	0.195**
	(0.014)	(0.030)	(0.023)	(0.047)	(0.096)
Adjusted R^2	0.065	0.065	0.065	0.065	0.065
N	23,284	23,284	23,284	23,284	20,900
FD × Global PE Growth	0.063***	0.109***	0.103***	0.134**	0.246*
	(0.014)	(0.026)	(0.024)	(0.057)	(0.128)
Adjusted R^2	0.066	0.066	0.066	0.065	0.065
N	24,288	24,288	24,288	24,288	21,780
	Panel C: Controlling for Industry-Period Fixed Effects				
FD × US Growth	0.025**	0.048**	0.036	0.103**	0.100
	(0.012)	(0.019)	(0.024)	(0.046)	(0.101)
Adjusted R^2	0.179	0.178	0.179	0.179	0.188
N	24,619	24,738	24,619	24,619	21,642
FD × Global PE Growth	0.119**	0.047***	0.056**	0.099***	0.231*
	(0.056)	(0.014)	(0.023)	(0.027)	(0.132)
Adjusted R^2	0.179	0.180	0.178	0.180	0.188
N	24,619	24,619	24,738	24,619	21,642
	Panel D: Median Regressions				
FD × US Growth	0.055*	0.006	0.015	0.01	0.043
	(0.031)	(0.007)	(0.014)	(0.015)	(0.072)
Adjusted R^2	0.038	0.038	0.037	0.038	0.036
N	24,619	24,619	24,738	24,619	21,642
FD × Global PE Growth	0.009	0.01**	0.017**	0.017	0.025**
	(0.0218)	(0.005)	(0.008)	(0.012)	(0.011)
Adjusted R^2	0.038	0.038	0.038	0.038	0.036
N	25,703	25,703	25,835	25,703	22,579

Note: The table reports results of OLS regressions in Panels A, B, and C and median regressions in Panel D. The sample, variables, and specifications are as in Panel A of Table 5 with the following modifications: In Panel A, we use the sub-sample of companies incorporated with limited liability legal form. In Panel B, we use the subsample of 2-digit ISIC industry-country pairs with at least 20 firms. Panel C reports estimates obtained while controlling for firm-specific industry-period dummies (instead of 3-digit ISIC industry dummies), where, for each firm, period is defined as a sequence of years for which the External Finance Use is available. Panel D reports estimates obtained using median regressions. Standard errors reported in Panel D are bootstrapped and clustered at the industry-country level.

Table OA.6: Using 2-digit ISIC Industry Fixed Effects

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
FD × US Growth	0.028**	0.055***	0.039*	0.116***	0.148*
	(0.011)	(0.017)	(0.022)	(0.042)	(0.088)
US Growth	-0.014	-0.021	0.005	-0.005	-0.075
	(0.044)	(0.043)	(0.043)	(0.043)	(0.072)
log(Total Assets)	-0.219***	-0.225***	-0.219***	-0.219***	-0.169***
	(0.041)	(0.041)	(0.041)	(0.041)	(0.041)
log(Total Assets) Squared	-2.411***	-2.377***	-2.404***	-2.405***	-3.870***
	(0.839)	(0.837)	(0.840)	(0.840)	(0.883)
log(Employees)	-0.455***	-0.451***	-0.454***	-0.455***	-0.582***
	(0.099)	(0.099)	(0.099)	(0.099)	(0.104)
log(Employees) Squared	4.360***	4.348***	4.353***	4.365***	6.441***
	(1.150)	(1.147)	(1.149)	(1.150)	(1.215)
Age	-0.007	-0.008	-0.007	-0.007	0.013
	(0.032)	(0.032)	(0.032)	(0.032)	(0.033)
Age Squared	-0.048	-0.032	-0.055	-0.051	-0.121
	(0.375)	(0.375)	(0.375)	(0.375)	(0.389)
Leverage	-0.019***	-0.018***	-0.019***	-0.018***	-0.018***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Tangibility	-0.012***	-0.013***	-0.012***	-0.012***	-0.012***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Collateral	0.004*	0.003	0.004*	0.004*	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Cash	-0.008***	-0.008***	-0.008***	-0.008***	-0.009***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Constant	0.023***	0.023***	0.023***	0.023***	0.023***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Country, Industry FEs	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.080	0.080	0.080	0.080	0.079
N	24,619	24,738	24,619	24,619	21,642

Note: The table uses the sample, variables, and specifications as Table 4 except that we include 2-digit ISIC industry dummies instead of 3-digit ISIC industry dummies in all specifications.

Table OA.7: Subsample of EU-15 Countries

	Total Capitalization	Private Credit	Market Capitalization	Market Value Traded	Accounting Standards
			Panel A: Growth Opportunities		
FD × US Growth	0.037***	0.072***	0.046**	0.138***	0.151*
	(0.011)	(0.015)	(0.021)	(0.040)	(0.085)
US Growth	-0.023	-0.036	0.004	-0.009	-0.074
	(0.046)	(0.046)	(0.045)	(0.045)	(0.071)
Adjusted R^2	0.081	0.081	0.080	0.080	0.080
N	21,810	21,810	21,810	21,810	21,642
FD × Global PE Level	0.002	0.002	0.003	-0.001	0.002
	(0.002)	(0.004)	(0.004)	(0.009)	(0.015)
Global PE Level	0.034***	0.035***	0.035***	0.037***	0.035**
	(0.012)	(0.012)	(0.011)	(0.011)	(0.015)
Adjusted R^2	0.080	0.080	0.080	0.080	0.080
N	22,753	22,753	22,753	22,753	22,579
FD × Global PE Growth	0.046***	0.057***	0.086***	0.084	0.216*
	(0.013)	(0.022)	(0.024)	(0.053)	(0.115)
Global PE Growth	-0.030	-0.016	-0.011	0.010	-0.117
	(0.022)	(0.022)	(0.018)	(0.018)	(0.079)
Adjusted R^2	0.081	0.080	0.081	0.080	0.080
N	22,753	22,753	22,753	22,753	22,579
			Panel B: Technological Characteristics		
FD × R&D Intensity	0.082***	0.143***	0.100*	0.247*	0.161
	(0.028)	(0.054)	(0.059)	(0.127)	(0.278)
Adjusted R^2	0.079	0.079	0.079	0.079	0.079
N	21,081	21,081	21,081	21,081	20,921
FD × Investment Lumpiness	0.223***	0.417***	0.269**	0.634***	0.676
	(0.054)	(0.112)	(0.108)	(0.243)	(0.525)
Adjusted R^2	0.080	0.080	0.080	0.080	0.080
N	22,745	22,745	22,745	22,745	22,571
FD × EFD	0.125***	0.199**	0.183*	0.375*	0.484
	(0.043)	(0.081)	(0.094)	(0.192)	(0.440)
Adjusted R^2	0.080	0.080	0.079	0.079	0.079
N	22,536	22,536	22,536	22,536	22,362

Note: The table reports results of OLS regressions on the sub-sample of EU-15 countries. Panel A uses specifications and variables as Panel A of Table 5, while Panel B uses specifications and variables as Panel A of Table 7.