Essays in Financial Economics

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Declaration

I certify that the thesis I have presented for examination for the PhD degree of the London Business School is solely my own work other than where I have clearly indicated that it is the work of others (in which case the extent of any work carried out jointly by me and any other person is clearly identified in it).

I warrant that this authorization does not, to the best of my belief, infringe the rights of any third party.

Abstract

This thesis examines how product and input markets interact with firms' financial and real decisions and thus impact corporate policies. The first part of the thesis documents empirically how strategic considerations provided by product markets affect firms' investment decisions. It shows that firms react to actions taken by competitors when these indicate a competitive threat. Using news from restructuring announcements of manufacturing sites in the UK, it shows that other locally competing firms respond to the news by increasing their investment in capital if the restructuring action improves the competitive position of the announcing site. It also demonstrates the importance of financial constraints, showing that their existence dampens firms' ability to respond to the news. The fact that all restructuring announcements involve layoffs, and therefore impact firms' input markets, allows studying further responses by competitors, and namely their wages and hiring policies. The remaining part of the thesis focuses on how labor markets affect firms' capital structure and real activities. First, it examines the effect of labor regulation on firms' ability to access external finance. Exploiting changes in employment protection laws in 21 OECD countries, it shows that worker-friendly labor laws are negatively associated with firm leverage. In terms of firms' real activities, increases in employment protection legislation lead to lower firm investment and growth and this effect is more pronounced for firms which depend more on external capital. These findings suggest a supply-side channel through which labor regulation hinders growth, that is, labor crowds out external finance. Finally, this part of the thesis examines the effect of labor bargaining power on firm leverage. It revisits the existing dominant paradigm that firms use debt to improve their bargaining position against labor and identifies an alternative channel which uncovers a negative relation between bargaining power of labor and firm leverage.

This work is dedicated to my mother, Eftychia Simintzi, who never gave up on me, and to the many others, though unnamed, who helped me in the completion of this task.

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Chapter 1

1.1 Introduction

Corporate Finance has traditionally examined firms' financial and real decisions without explicitly considering how firms' interactions with their product and input markets affect corporate activities. Recently there has been, however, a growing literature in economics and finance bridging aspects of industrial organization with corporate finance. Product markets and firms' interactions with their rivals has been identified to be of primary importance and has been in the epicenter of recent developments in that literature.[1] Another important aspect of industrial organization which has been brought in the forefront of recent academic research is the interaction between labor and finance.[2] This thesis adds to the literature which crosses the borders between industrial organization and finance and attempts to show that surpassing the boundaries between seemingly unrelated fields can further our understanding of firms' financial decisions and real activities.

Chapter 2 examines empirically how firms' strategic considerations provided by their product markets affect their investment decisions. The standard empirical corporate finance literature examines the determinants of firms' investment, but

[1] Philips in his 2010 keynote address to the Brazilian and Nordic Finance Associations, highlights the need for industrial organization foundations in Finance, and in particular the need to take into account the industry structure and competition when studying firms' activities.

[2] Pagano in his 2010 keynote lectures on Labor and Finance emphasizes the importance of labor in understanding firms' economic life.

there is scarce empirical evidence in that literature documenting that these are taken for strategic reasons. Philips (2010) has recently drawn attention to this by arguing that it is very common in empirical work to use competitor firms as "controls" or "benchmarks", making the implicit assumption that firms will not react to a change of a competitor firm.[3]

Using news about restructuring actions of UK manufacturing sites involving layoffs, Chapter 2 documents that strategic considerations affect firm investments. It shows that announcements which indicate an improvement in the competitive position of the restructuring sites are associated with a notably robust and large increase in capital investments of other locally competing firms, while there is no such effect at the industry level. Focusing on the announcing firms' local competitors (firms in the same industry and region) and employing a difference-in-differences methodology allows to disentangle firms' strategic reactions to the news from potential reactions to aggregate industry or macroeconomic changes. It is worth mentioning, however, that when the corporate restructurings are bad news for the announcing company (for example firms are in difficulty and they lay off people, namely, the announcing firm is not becoming more competitive) there is no effect on local competitors' investment, which helps rule out some alternative stories. These results are interpreted to suggest that the increase in investment is a reaction to the competitive threat given in the announcement. A further important contribution of this study is that it demonstrates the importance of financial constraints, showing that their existence dampens firms' ability to respond to the news: the financially unconstrained firms are the ones which increase investments and not the financially constrained ones.

The fact that all restructuring announcements involve layoffs, and therefore impact firms' input markets, allows studying further responses by competitors, and namely their wages and hiring policies. Indeed, labor force in the region becomes cheaper as suggested by a (small) reduction in the average wage competitors pay

[3] www.rhsmith.umd.edu/faculty/gphillips/Papers/Industrial_Organization_Foundations_for_Finance.pdf

per employee. Moreover, for the unconstrained firms employment increases. These results suggest that the unconstrained firms can hire cheaper workers. A possible interpretation of these findings could be that the increase in investment is due to the cheaper labor available. However, the fact that there is no increase in investment following the "bad news" cases rules out that there is only the labor channel driving the results.

So far, Chapter 2 has focused on firms' competitive interactions with rival firms. Chapters 3 and 4 (co-authored with Vikrant Vig and Paolo Volpin)[4] are part of the same research agenda and discuss labor markets as another source of strategic incentives which affect corporate policies. Since Coase (1937) a firm is often viewed as a "nexus of contracts": long-term contracts are set up with providers of capital (shareholders and creditors) and suppliers of labor (employees) and other inputs, and further contracts (typically short term) are set up with customers. Because the firm is a common counterparty, these contracts are interconnected. Thus, when the power of one of these groups of stakeholders changes, strategic incentives may be created that will lead to altering the agreements with other stakeholders. In this way, shocks to individual stakeholders affect the contractual arrangements of other stakeholders. The remaining of the thesis examines how strategic incentives provided by firms' labor markets affect firms' capital structure and real activities.

Chapter 3 examines the effect of labor regulation on firms' ability to access external finance. Exploiting inter-temporal variations in employment protection laws across 21 OECD countries, it shows that labor friendly reforms are associated with a reduction in firms' debt. The negative effect of labor protection on leverage is more pronounced in firms that rely more on labor, are subject to more frequent hiring and firing, and have lower liquidation value. In addition, increases in employment protection impact negatively firms' profitability, investment and growth. These findings indicate that the enactment of employment friendly legislation reduces the supply of credit or, put differently, stronger labor protection

[4] *London Business School.*

restricts firms' ability to raise external capital.

These findings provide also new insights to a growing literature in Law and Economics which investigates the effect of labor laws on economic growth (Besley and Burgess, 2004; Botero, et al., 2004). While the emerging consensus from this literature is that labor protection stifles growth and employment, little attention has been given to the precise mechanism through which this happens. The knowledge of the channel at work is critical to help designing economic policies that are effective in fostering growth.

Finally, Chapter 4 revisits the existing dominant paradigm in the literature which supports the strategic use of debt by firms to lower the bargaining power of labor. This view relies on several critical assumptions, such as for example that debt is a hard claim and cannot be renegotiated. Chapter 4 shows that relaxing these assumptions reverses the relation between labor bargaining and leverage. Empirically, this negative relation is examined by using union coverage data in 21 OECD economies as a proxy for labor bargaining power, as well as exploiting cross-sectional and time-series changes in labor regulations in the US, UK, France and Germany. It is worth mentioning that on disaggregating the labor law indicator, the components characterizing collective bargaining power, and thus the most relevant components determining labor bargaining, are shown to be the most important. The basic economic intuition for this negative relation comes from a crowding out effect: when debt is renegotiable, an increase in labor bargaining power increases operating leverage and crowds out financial leverage.

Chapter 2

Strategic Investments: Evidence from Restructuring Announcements

2.1 Introduction

Competitors are fundamental in shaping a variety of corporate policies. Firms are often believed to behave "strategically", in other words, their choices depend on their competitors' actions and in turn determine their future position in the market. Although the notion of firms' strategic responses to competitors is well established in theory, there is limited empirical work studying how competitor firms' actions determine certain corporate activities such as firms' investment decisions.[1] Ignoring these "strategic" effects may shade our understanding of what determines the observed equilibria. It is therefore important to empirically study how, and to what extent, "strategic" incentives provided by both product and input market

[1]In the empirical corporate finance literature, for example, it is common to use competitor firms as "benchmarks" or as "controls" when studying financial or real decisions of firms. This is the underlying idea in a recent paper by Hoberg and Phillips (2011). They emphasize that we should not view competitors simply as "benchmarks" in empirical work, and generate a new set of industries based on the premise that product markets are central to defining the boundaries of firms' activities. The same idea is discussed here: www.rhsmith.umd.edu/faculty/gphillips/Papers/Industrial_Organization_Foundations_for_Finance.pdf

competition impact firms' corporate policies.

The main contribution of this chapter is to empirically document that competitive threats due to actions taken by firms affect the investment decisions of their competitors. Using news about restructuring actions of UK manufacturing sites involving layoffs, I show that announcements which indicate an improvement in the competitive position of the announcing firm are associated with an increase in capital investments of their local industry peers. I further document that financial constraints play a fundamental role since they determine firms' ability to invest strategically. The idea that firms make investments as a response to competitive threats is central in industrial organization. In an influential paper, Fudenberg and Tirole (1983) argue that firms invest strategically to deter "mobility" of competitors. The term "mobility deterrence" in their context denotes the deterrence of expansion of competitors or strengthening of their position within their market.[2] In the same paper, they argue that, due to its commitment value, capital investment is the most appropriate variable to look at when studying "strategic investments", instead of prices or quantities. Strategic models are difficult to test because it is difficult to isolate the strategic reactions to the news from reactions to other factors, observable or not, that might affect firms' activities. These factors, such as changes in investment opportunities, industry changes or changes in the macroeconomic environment, are likely to confound the estimates.

In this chapter, I construct a unique dataset of announcements of corporate restructurings. I use this to overcome the challenge described above and provide novel empirical evidence that firms make investments as a strategic response to threats presented by competing firms, the announcing firms in this setting.[3] The

[2]It is used to generalize the idea of "entry deterrence". Fudenberg and Tirole (1983) emphasize that entry is accomplished in stages and therefore "mobility deterrence", i.e., strategic actions taken by competitors as a reaction to a competitive threats to create barriers, is an ongoing process.

[3]A few early Industrial Organization papers provide some evidence of strategic investments in capital, but this evidence is either indirect (showing how investment can affect competition and therefore implying that these actions should be strategic as in Gilbert and Lieberman (1987)) or suffers from an omitted variable bias (since evidence for example that there is significant excess capacity in concentrated industries following entry can be driven by an increase in investment

announcements, which span the period 2002 to 2009, concern manufacturing firms in the UK, and include all restructuring activities involving significant layoffs. They cover a variety of actions, such as offshoring of production, outsourcing, closure of a plant, bankruptcy, or downsizing. The dataset has two features which play an important role for the identification strategy.

First, these announcements can have different implications about firms' product markets: some announcements refer to restructurings intended to improve firms' competitive position and others reveal bad news about the firm. Detailed information about the restructuring is available describing its rationale. This information allows me to distinguish the cases which describe an action intended to improve the competitive position of the announcing firm from those which reveal bad news. An example of the first group is an announcement that a firm is modernizing its technology and in that context is laying off some workers: *"The company says it plans to invest more than £4 million in the Lackenby site, which employs* 517 *people, but that modernization will require job losses."* This example shows an aggressive action a firm takes which may improve its competitive position, intensifying product market competition. This set of announcements is the one used in the main empirical analysis of the chapter to test the "strategic" effects. An example of the second group of announcements is that of a firm going bankrupt. These are used to create falsification tests for my findings, ruling out alternate stories.

Second, the announcements provide information about the industry and location affected. From the information provided, I can determine the competitors of the announcing firms operating in the same industry and located in the same region. Therefore, I am able to examine the effect of the announced actions on the announcing firms' "closest" competitors and study how they react. This feature of "local" competition is the key for the identification. I employ, essentially, a difference-in-differences (DID) methodology which exploits cross-sectional varia-

opportunities in the industry and not by strategic incentives as in Lieberman (1987)).

tion, since the announcement-events affect firms in specific industries and regions, and time-series variation, since the announcements are made at different points in time. Thus, changes in the investment opportunities in an industry, for example, would affect all firms in the industry irrespective of their location and would be differenced out in the estimation. This setting allows me to disentangle firms' strategic reactions from reactions to aggregate changes in their environment.

The main empirical finding of the chapter is that competitors in the same industry and region as the announcing firms increase investment following announcements which indicate that product market competition intensifies. The increase in investment is statistically significant and empirically robust to different specifications. The economic magnitudes are also quite large: depending on definitions and on measures, I find that competitors respond by increasing their investments by 9% to 27%. In the main specification, I find that a restructuring action involving 200 layoffs in an industry-region leads to competitors increasing investment by 12% on average relative to the mean. This evidence is consistent with the group of theoretical models which suggest that firms will use investment strategically as a reaction to competitive threats presented in the product markets (e.g., Caves and Porter (1977); Spence (1979); Dixit (1980); Fudenberg and Tirole (1983)).

Next, I study heterogeneity in responses of local competitors. According to an important theoretical and empirical literature, tighter financial constraints are likely to restrict firms' ability to respond. Therefore, I explore how competitors invest depending on how financially constrained they are. I find that financially unconstrained firms increase their capital expenditures more aggressively. These results are also economically larger: the effect on investment almost doubles when I consider only financially unconstrained competitors.

My empirical findings rely on the assumption that to some extent firms compete locally.[4] This assumption can be rationalized on the basis that firms in the same

[4]The results hold at the industry-region level but not at the industry level. This is also in line with the fact that the results are not driven by firms' responses to industry changes.

industry and region are more likely to share the same customer and supplier base. This is consistent with anecdotal and survey evidence discussed later. Nevertheless, I also provide empirical support for this assumption. I show that more "locally" focused competitors react more aggressively to the restructurings. I further show that the strategic effects are more pronounced in more concentrated industries locally; instead, I find that the degree of industry concentration is not relevant when it is examined at the industry level and not at the industry-region level.

The DID strategy addresses concerns regarding omitted variables. However, a remaining concern is that industry shocks at the local level could lead to both the restructurings and the subsequent investment by local competitors. If this were the case for all the announcement-events in the sample, one would incorrectly attribute the observed responses to a change in local competition intensity rather than the true causal event. My empirical analysis helps address this concern. First, exploiting cross-sectional heterogeneity between local firms helps differencing out local industry factors. In addition, in this setup, I include interacted region, industry and year fixed effects, which is a way of controlling for industry-local specific shocks. Interestingly, these controls do not attenuate the estimated coefficients, suggesting that industry-local shocks are not a concern. Furthermore, I find no significant effect on profitability and cashflow-to-sales ratio around the event dates. Finding such an effect would indicate the presence of a local shock in the industry. Finally, I find no pre-treatment trends in firms' asset and sales growth; however, these variables increase following the announcements, which is consistent with competitors behaving aggressively in response to competitive threats.

Another concern is that layoffs due to firms restructuring their operations may result in cheaper labor being available to local competitors. If labor and capital are complements, competitors would also increase investment. Therefore, my results would be explained by the complementarity in the inputs of production. My empirical setting allows me to create falsification tests for my findings and rule out this story. I consider announcements which do not indicate an improvement in

operations, but instead, reveal bad news such as the firm going bankrupt. Contrary to the announcements used in the main empirical analysis, there is no indication of a competitive threat in those cases. According to a complementarity story, firms should increase investment following also these announcements that do not reveal any increase in competition. However, I observe no differential effect on competitors' investment in this setting, which indicates that complementarity in the inputs of production is unlikely to drive the results.

The nature of the restructurings and the information provided allow me to study further responses by firms. All announcements in the dataset involve layoffs. Clearly, apart from the implications on product markets, the announcements have a direct impact on firms' input markets. Therefore, I study how the restructurings affect local competitors' employment decisions and show how product markets can interact with labor markets. Across all announcements, I find that competitor firms reduce the average wage they pay their employees. This suggests that local competitors exploit workers' lower outside option when bargaining with them on wages. Consistent with the idea that financial constraints interact with employment decisions, I find that the mechanism that drives down the average wage per employee differs between financially constrained and unconstrained firms.[5] Unconstrained firms reduce wages per employee but increase employment, suggesting lower entry wages. Instead, the constrained firms do not increase employment and, thus, seem to be renegotiating down current employee wages. These findings are in line with Benmelech, Bergman, and Seru (2011) and support the notion that financial constraints should affect both inputs of production - and not only capital.[6] These findings require that labor markets be segmented. This assumption is plausible if we believe workers to be relatively immobile. However, I also confirm

[5]See for example, Nickell and Nicolitsas (1995) in the labor literature and Pagano (2010), Benmelech, Bergman, and Seru (2011) in a recent literature in finance which relates financial constraints to labor.

[6]Further survey-based evidence consistent with these findings is provided in the recent studies by Campello, Graham, and Harvey (2010) and Campello, Giambona, Graham, and Harvey (2010). Benmelech, Bergman, and Enriquez (2010) provide evidence from the airline industry that workers renegotiate wages down in cases of financial distress.

empirically that this is indeed the case.

The cheaper labor made available locally by the layoffs can further justify why the identification works at the industry-region level. Considering the announcements which indicate that competition intensifies, I explore the differential effect of the news on investments by financially unconstrained competitors depending on (levels and growth rates of) wages they pay to their workers. I find that unconstrained competitors invest more following the announcements, the lower the (levels and growth rate of) wages. This can be best understood by the argument that competitors will invest more knowing that they can take advantage of the cheaper labor available in the region. To the extent that investments are lumpy, projects now become more valuable and, therefore, unconstrained competitors are more likely to undertake them.

This chapter connects several strands of literature. The empirical evidence that firms use investment to alter future competitive conditions addresses a well-established and mostly theoretical literature in industrial organization (e.g., Fudenberg and Tirole (1983)). The same idea is also prevalent in the real options literature, which shows that firms' strategic interactions affect their investment decisions.[7]

This chapter also builds on the empirical literature examining new entry as a competitive threat. Khanna and Tice (2000) examine the change in the number of stores that local retail chains operate in the super-market industry following Wal-Mart's entry and show how several firm and market-specific characteristics matter, while Matsa (2010b) examines product quality in the super-market industry after Wal-Mart enters the local markets. Ellison and Ellison (2007) consider advertising practices of pharmaceutical firms, and Goolsbee and Syverson (2008) analyze pricing policies in the airline industry as a response to the threat of entry

[7]Grenadier (2002), for example, shows that competition erodes option premia, reducing firms' investment delays. Conversely, Novy-Marx (2007) argues the opposite, namely that firms actually delay investment in a competitive environment, not undertaking some positive NPV projects, since the option premia remain significant.

by competitors. This chapter complements this literature by documenting that some investments are driven by actions taken by competitors when these improve their competitive position.

This chapter contributes to a broader literature on competition, providing evidence on how competition affects corporate policy. For example, considerable evidence shows that competition has an impact on firms' financing decisions (Mackay and Phillips (2005); Hoberg, Phillips, and Prabhala (2011)), managerial incentives and corporate governance (Servaes and Tamayo (2009); Giroud and Mueller (2010)), firms' contracting (Allen and Phillips (2000); Fee, Hadlock, and Thomas (2006)), firms' risk (Hou and Robinson (2006); Ortiz-Molina and Phillips (2011)), synergy creation and likelihood of merging (Hoberg and Phillips (2010)).

The chapter proceeds as follows. Section 2.2 presents the restructuring announcements. Section 2.3 describes the data. Section 2.4 lays out the empirical methodology, and Section 2.5 reports the results. Section 2.6 concludes.

2.2 Restructuring Announcements

I construct a unique dataset of announcements of restructuring actions firms decide to take which involve layoffs of workers for the empirical analysis. I hand-collect these announcements for manufacturing firms in the UK and for the years 2002 to 2009.

This information is initially collected by the Industrial Relations Research Unit in the UK and is then provided to the European Union for monitoring purposes.[8] The primary sources of these announcements are daily newspapers, the business press, specialized economic press and other online sources. Some regular sources are for example, The Observer, The Guardian, The Financial Times. To complete the information provided, information is also extracted by other sources such as

[8]European Union collects this information to monitor the extent of restructuring activities in European countries and their consequences in the labor markets since 2002. UK is one of the countries with the most intensive restructuring activity among the European countries monitored.

firms' websites, unions' websites etc.

The information is formatted in separate standardized fact sheets, available online, which provide the same type of information for all cases. This allows the collection of the information in a systematic manner and the compilation of comparable statistics. The factsheets include all announcements of restructuring activities of manufacturing firms in the UK during that period which involve workers' layoffs. An announcement is eligible to be part of these factsheets if it entails an announced or an actual reduction of 100 jobs or if it involves sites employing more than 250 people and at least 10% of their workforce is affected by the layoffs.[9,10]

I collect the following information from the fact sheets: the name of the company which makes the announcement, the date of the announcement (the date the restructuring was announced for the first time), the exact geographic location of the industrial units restructuring in the UK, a broad description of the industry sector of the restructuring site (NACE codes are used to classify the economic activity), the number of job losses announced due to the restructuring, the type of action announced and a summary of additional important information, which is relevant for a contextual understanding of each restructuring case, such as the reason why firms decided to proceed to the relevant action. The type of the action announced is classified in the factsheets in specific categories: these include firms' offshoring their production, outsourcing, i.e., subcontracting their activity to another company, closure of an industrial site, restructuring plans of firms' downsizing in terms of personnel, cases of bankruptcy.

As already mentioned, the hand-collected data provide information about the exact geographic location of the industrial units affected by the restructuring decision (eg. Sheffield) as well as a description of the business activity of the re-

[9]The cutoff of 100 workers refers to the total layoffs a company may announce which could affect industrial sites in more than one location. Information on the number of workers laid off in different units would then be provided.

[10]The criterion of layoffs provides a unified framework in terms of which restructurings are included in the dataset, thus avoiding selection issues.

structuring site (classified in 9 NACE broad categories). From this information, I can track the industries and the locations affected. First, I map the specific locations into 12 regions in the UK.[11] These are the regions in the UK which are used officially in UK-wide statistical comparisons and for which regional data are available. Second, I identify the 3-digit SIC codes for the announcements which give much more precise information of the business activity of the restructuring units.[12]

Overall, there are 362 announcements which affect industrial sites in the UK. I identify the three-digit SIC codes in which these sites operate as well as the region they are located in. The announcements are dispersed across different industries and different regions. Table 2.1 shows the distribution of the announcements across different three-digit SIC industries. Similarly, Table 2.2 shows the distribution of the announcements across the 12 regions in the UK. I look at the different combinations of industry-regions and I consider how the competitor firms in these industry-regions react to the news. The restructuring actions announced may vary in size. Therefore, I use the number of workers announced to be laid off to proxy for the size of the announced restructuring. The median number of workers announced to be laid off is 200 workers.

The announcements announce actions that firms plan to take in order to restructure their operations. These restructurings can be designed to improve firms' operations and as a result improve their competitive position in the market. For example, the consolidation of firms'operations, cost reductions, or the simplification of their structures can be value-enhancing in terms of efficiency, profitability or flexibility. In my dataset, I am able to distinguish those cases by reading the additional information provided in the fact sheets. Thus, I can tell that one third of business restructurings can lead to strengthening the market position of the

[11]These regions include the 9 Government Office Regions (GORs) (which were established in 1994 across England), Wales, Scotland and Northern Ireland.

[12]To do this, I use Amadeus/Fame database, which is the database I also use for my analysis as well as various online sources to confirm or supplement the matching, such as the companies' websites.

firms. It is apparent that this set of announcements has a direct impact on firms' product markets and it is the one used in the main identification strategy of the chapter.

Some examples of announcements that will lead to a strengthening of the market position are the following: *"Almost 100 jobs are being lost at a Teesside steel-making plant...The company says it plans to invest more than £4 million in the Lackenby site, which employs 517 people, but that modernization will require job losses."*. Also, *"Battery manufacturer Duracell has announced that it is to close its plant in Wrexham, North Wales with the loss of 109 jobs...It plans to transfer the work to a new partner company...Duracell said in a statement: 'After careful consideration, it has been decided that the best strategy for continued success in the hearing aid market is for Duracell to partner with a qualified third party for manufacturing. This approach will enable the company to more quickly and efficiently deliver a broader and deeper range of batteries for hearing impaired consumers'..."*.

To further illustrate the content of those announcements, some more examples of expressions used are: *"improve performance, ensure the achievement of increased profitability and success in the long term, reduce costs and improve productivity, the company would be selling less stuff but making better profits out of it, strengthen its presence, provide our customers with a high quality product at a competitive price, improve competitiveness, improve the efficiency of our operations, sustaining business growth, improve the cost-effectiveness, a better commercial decision, ensure that it is competitive and fit for the future, to deliver value to customers, supply high-quality and competitive products, already invested £2m in the site with another £2.7m investment in production facilities and equipment planned, increase flexibility, a large-scale investment in upgrading, generate annual profits of 3.2 million GBP, increase quality standards"*.

One advantage of my dataset, as will be further explained later, is that it also contains announcements of a different nature which will help me test the robustness of my results by running falsification tests. These are announcements of restruc-

turing actions decided by firms which reveal bad news, and not an improvement in firms' competitive position like the ones described above. For instance, consider the following announcement: *"Lighthouse Caledonia, a fish processing company, has announced the closure of its plant at Marybank, near Stornaway, with the loss of 130 jobs. According to the BBC, Western Isles MP Angus MacNeil had stated that 'the company was in a weak financial position with a lot of debt and the company had also recently been fined £12000 for a fuel leak'. The plant will be closed by the end of 2008."*

One third of the announcements indicate that the announcing firms take actions which intensify competition and these are used in my main identification strategy presented in Section 2.5.1. The other two thirds reveal bad news for the announcing firms and are used in falsification tests presented in Section 2.5. These two sets of announcements refer to restructuring activities which are similar in terms of size, as it can be proxied by the number of layoffs announced. This can be seen in Figure 2.1, which presents the distribution of the number of workers announced to be laid off in the affected industry-region pairs. For example, the median number of people announced to be laid off is 200 and 210 respectively for the two sets of announcements.

2.3 Competitors' Data and Descriptive Statistics

The primary database employed in the study is Amadeus/Fame. It is generated and maintained by Bureau Van Dijk and it is the best selling company database for the UK. This database provides financial information for both public and private firms in the UK. Thus, 97% of firms in my sample are privately-owned firms versus 3% which are public, adding another interesting feature to the analysis since behavior of private firms is less often studied in the literature due to mainly the limited data on private firms in the US.

This database allows me to draw data on the competitors of the industrial sites which announce restructuring actions. Specifically, I use unconsolidated financial data of manufacturing firms at the subsidiary level. These provide more refined information compared to the consolidated balance sheets, which are aggregated financial data of all industrial activities and all units of a firm. The use of unconsolidated data is more appropriate in this case since I can determine which industry segment(s) of a multi-segment firm is restructured and which industrial sites of a firm are affected from the announcements. The 3-digit SIC codes and the location of the subsidiaries are available, which allows me to match them to an industry-region pair.[13] Hence, I can identify the competitor firms affected by the restructuring announcements in the industry-regions where the announcements take place. I drop the restructuring firms themselves as well as all firms in the same business group with the restructuring units irrespective of their industry or location. The 3-digit SIC industries in the sample are dispersed across the 12 regions in the UK: around 90% of the industries (3-digit SIC) operate in 8 (out of the 12) regions. The sample spans 2002 to 2009.

The sample used in the main analysis of the chapter covers over 17,000 firm-years although sample size may vary due to missing information for some of the variables used in the analysis. This sample includes competitor firms in industry-regions with announcements as well as firms in industry-regions with no announcements (i.e., firms in the same industry but in a different region or in the same region but in a different industry).[14] Table 2.3 displays summary statistics for key financial variables of the firms used in the analysis and presents evidence that the firms in industry-regions with announcements are very similar to those matched to a different industry-region pair in the year before the announcement. First, Column 1 reports means and standard deviations of the variables indicating that there is substantial variation in all the important variables. Subsidiaries in the sample are quite small, having an average of £25.3 millions in assets. They have a Return on

[13]The location refers to the headquarters of the subsidiaries.

[14]This sample does not include industry-regions with announcements which were classified to be revealing bad news.

Assets of 6.7% and they are on average 26 years old. Columns 2, 3 and 5 in Table 2.3 present the ex-ante characteristics of firms one year before the announcements: Column 2 refers to firms in industry-regions with announcements, Column 3 includes firms in the same industry but in different regions and Columns 5 includes firms in the same region but in different industries. As shown by the p-values in Columns 4 and 6 respectively, firms of Column 2 are similar in terms of their financial characteristics one year before the announcement with those of Column 3 as well as with those of Column 5.

In addition, I use information on macroeconomic variables such as regional unemployment rates provided by Eurostat and a regional measure of economic growth based on the measures of economic activity at the regional level published by the Office for National Statistics in the UK (ONS) (workplace-based GVA growth rates). I also use an in-sample measure for the number of firms (in logs) operating in each industry-region to control for the supply of the different manufacturing activities in each region.

2.4 Methodology

Any attempt to investigate the effect of actions taken by competitors on firms' real activities is particularly challenging since it requires a setting that allows to disentangle firms' responses to actions taken by competitor firms from responses to "other factors", both observable and unobservable, such as changes in investment opportunities, broad industry changes or changes in the macroeconomic environment. This chapter relies on announcements of actions to be taken by firms' competitors as an ideal laboratory for such an analysis. First, the analysis is restricted to one country, the UK, avoiding the problems of cross-country studies (Rodrik (2005)). Second, these announcements allow me to identify the effects "locally" since they provide information on the industry and exact locations affected by the restructurings in the UK. This "local" feature of my setting is the

key for the identification since it allows to isolate reactions of the competitors, i.e., of firms in the same industry and region, to the actions announced from reactions to other changes in their environment.

I examine the effect of the news on competitors' real activities by employing a difference-in-differences (DID) methodology. My identification strategy exploits two sources of variation: cross-sectional variation since the announcement-events affect firms in specific industries and regions, and time-series variation since the announcements are made at different points in time. The DID methodology is ideally suited to establish causal claims in my setting, where I compare the effect of the events-announcements on groups that are affected by them (treated) with those that are not affected (control). The control group includes otherwise similar firms which belong to the same industry but are located in different regions from the treated firms, as well as firms which are located in the same region but operate in different industries. The existence of the control group is necessary to make sure that we difference out any changes of the dependent variable (e.g., firms' investment) due to changes in the industry or the macroeconomic environment, which will be common to firms in both the treated and the control group. Consider for example, a common shock which hit one particular industry in the UK. The identification strategy makes sure that this shock is differenced out since it should affect both firms in the treatment and control groups.

A similar empirical methodology has been used in several studies (see for instance Card and Krueger (1994)). The multiple pre-announcement and post-announcement time periods address concerns regarding validity. To illustrate how the empirical design works we can think of the following example. Let $t = 0$ to be the initial period in the sample. Consider industry i operating in two regions, A and B in the UK. Suppose an announcement is made at time $t = 1$ in that industry in region A and at time $t = 2$ in the same industry in region B. From $t = 1$ to $t = 2$, industry i in region B belongs to the control group and after that it

belongs to the treated group for subsequent years.[15] Thus, it is possible that firms in an industry and region serve as both treated and control groups at different points in time. This specification is also robust to some groups not being treated at all, or to other groups being treated since the start date of the sample.

To evaluate the effect of the announcements on the competitor firms, I estimate the following specification using firm-level data:

$$y_{it} = \lambda_i + \gamma_t + \delta \cdot Announcement_{jk,t-1} + \beta \cdot X_{it} + \epsilon_{it} \tag{2.1}$$

where i denotes a firm, t denotes a year, j is an industry, and k is a region in the UK. y_{it} is the dependent variable of interest (log(1+capex) etc.), λ_i and γ_t are firm and year fixed effects respectively. $Announcement_{jk,t-1}$ is a measure which indicates whether a firm announces to take an action in a particular industry and region and is 0 otherwise. I use three variations of this measure in my regression specifications: first, the main definition I use in the analysis is the logarithm of the cumulative number of people announced to be laid off in a specific industry and region, second I use the ratio of the cumulative number of announced layoffs in an industry-region scaled by the number of employees in that industry-region (computed in-sample) and finally, I use an indicator variable which takes the value 1 after an announcement in a specific industry and region to test the robustness of my results. The advantage of the first definition is that it proxies also for the magnitude of the event, since it incorporates information about the number of people announced to be laid off as a consequence of the actions the firms announce to take as explained in Section 2.2. The second definition has the added benefit that takes also into account the size of the market where the announcement takes place. However, since the denominator in this measure is computed in-sample and it is therefore an imperfect measure, it could also lead to potential biases of my results. The DID estimator coefficient is δ and it measures the average within-firm changes in the dependent variable following an announcement, controlling for changes in

[15] The same intuition generalizes when we consider multiple industries and regions.

firms not affected by the announcements. X_{it} is a vector of control variables and ϵ_{it} is the error term. Year fixed effects control for aggregate fluctuations and firm fixed effects control for time invariant, firm-level differences between the treated and the control group. I cluster standard errors at the two-digit industry level.[16]

To further address endogeneity concerns, I am able to control in my specifications for time-varying industry-specific shocks by including the interaction $(\alpha_j * \gamma_t)$, where α_j is a two-digit industry fixed effect. As a result, I compare firms affected by an announcement with those not affected within the same two-digit industry.[17] Also, I control for regional specific shocks $(\alpha_k * \gamma_t)$ to address concerns that there might be changes at the local level, such as changes in investment opportunities in the region, which can affect firms' investment decisions. Therefore, I compare firms in the treated group with those in the control group within the same region.

The DID design that I employ differences out economic conditions and industry specific conditions which are common to both the treated and control groups. Moreover, the different combinations of fixed effects I include in my analysis further alleviate endogeneity concerns controlling, for example, for concomitant systematic changes in investment of firms operating in the same industry or located in the same region. However, it might be the case that there are some systematic changes affecting the treated firms which coincide with the timing of the announcements. It could be possible, for example, that there are changes in investment opportunities which affect industries in specific regions and that these coincide with the announcements in my sample. To the extent that all the announcement-events coincide with unobserved changes at the industry-local level, this is a concern for my identification. I overcome these concerns in two ways. First, in a difference-in-difference-in-differences (DDD) analysis, I exploit cross-sectional heterogeneity between firms and this is helpful as long as these potential industry-local shocks

[16]The results are robust when I cluster standard errors at the region level as well as at the industry/region level.

[17]I have also estimated my main results using three-digit industry fixed effects and the estimated coefficients were very similar, both in terms of magnitudes and in terms significance. For computational reasons, I proceed in my analysis using 2-digit industry fixed effects.

do not affect the two groups of firms in same way as the announcement-events in the sample. Most importantly, in this analysis I control for time-varying industry-region specific shocks by including the interaction $(\alpha_j * \alpha_k * \gamma_t)$. Second, I explore the dynamic effects of the announcements to rule out the possibility that that they were trends in my sample prior to the announcement dates.

My DDD analysis follows from the fact that not all firms will be able to react strategically, even though they would like to do so. In line with existing theories as well as related empirical evidence, it is natural to expect that firms' financial constraints will play a decisive role into whether firms will react strategically or not. I expect therefore to find that the strategic effects are mainly identified from the financially unconstrained group. To test this, I divide firms, in both treatment and control groups, according to their pre-treatment level of financial constraints and I estimate a DDD specification in which I compare the effect of the announcements between these two different groups of competitor firms. Thus, I estimate the following specification:

$$y_{it} = \lambda_i + \gamma_t + \delta_1 \cdot Announcement_{jk,t-1} + \delta_2 \cdot (Announcement_{jk,t-1} \times FC_i) + \beta \cdot X_{it} + \epsilon_{it} \tag{2.2}$$

FC is a dummy which indicates whether a firm is financially constrained or not. I sort firms in financially constrained and unconstrained using their pre-treatment ratio of total debt net of cash over the book value of assets as it compares to their industry median. The main financial constraints effect is absorbed by the firm fixed effects. All the other variables and subscripts are defined as in the previous specification. In this framework δ_1 and δ_2 are the difference-in-difference-in-differences estimators. δ_1 measures the average within-firm changes in the dependent variable following announcements for the financially unconstrained competitors and $\delta_1 + \delta_2$ measures the same effect for the financially constrained ones.

2.5 Results

2.5.1 Competitors' Strategic Investments

Focusing on announcements which indicate an improvement on firms' operations yields results that confirm that strategic incentives from competition between firms have a substantial impact on determining firms' investments, measured as either logarithm of one plus capital expenditures or as capital expenditures over assets. Figure 2.2 provides a snapshot of the results. I plot the average demeaned investment (measured as logarithm of one plus capital expenditures) one year before and one year after the dates of the announcements.[18] The graph compares the treated group of firms with two different groups of control firms. It compares firms matched to the industry-regions of the announcements with firms matched to the same industry but a different region and with firms matched to the same region but a different industry. The graph shows that competitor firms in the same industry and region as the one who makes the announcement, sharply increase their investment following the announcements. This increase is also statistically significant. To provide a counter-example, the graph does not show similar sharp increases in investment of firms operating in the same industry but located in different regions or located in the same region but operating in a different industry (statistically insignificant). For a formal identification of my effects, however, I turn to a multivariate regression analysis.

Table 2.4 presents DID estimates of the impact of the announcements on the investment of competitor firms operating in the same industry and region. The findings suggest that local competitors, other firms which operate in the same industry and region, respond to announcements indicating an improvement of the announcing firms by increasing their capital expenditures. The DID coefficient is statistically significant and fairly stable across specifications. The result is robust to changes in empirical specifications, including different definitions of the depen-

[18]The demeaning is done relative to each 3-digit SIC industry.

dent variable, different definitions of the announcement indicator and different combinations of controls. Thus, Panel A presents the effect of the announcements using as the main definition of my events, the logarithm of the cumulative number of workers announced to be laid off in a specific industry and region ($Announcement_{Def1}$). This definition also proxies for the magnitude of the event, since it incorporates information about the number of workers announced to be laid off. Panels B and C present the results using two alternative definitions of my events for robustness: $Announcement_{Def2}$ is the ratio of the cumulative number of workers announced to be laid off in an industry and region divided by the total number of workers in that industry-region. This measure proxies for the magnitude of the event but it also takes into account the size of the local market by scaling the announced layoffs with the number of workers in the industry-region. I therefore expect to find that for a given magnitude of the restructuring announced, the news will have a bigger effect the smaller the size of the market. $Announcement_{Def3}$ is an indicator variable which takes the value 1 after an announcement in a specific industry and region. I also measure firms' investments in two different ways (in all Panels): in Columns 1-4, I use the logarithm of one plus capital expenditures as my dependent variable, whereas in Columns 5-8, I use the ratio of capital expenditures divided by assets. In addition, this result is robust to different specifications, controlling for different combinations of fixed effects in all Panels. Columns 1 and 5 include firm fixed effects, as a way to control for time-invariant, firm-specific characteristics and year fixed effects to control for aggregate fluctuations. Columns 2 and 6 add also other controls (firms' age, the number of firms operating in the area and region) and measures of local macroeconomic conditions (regional unemployment and regional GVA growth rates). In Columns 3 and 7 I also include interacted industry and year fixed effects to take into account industry specific shocks, while in Columns 4 and 8 I add interacted region and year fixed effects to control for regional specific shocks in addition to industry specific shocks.

These estimates are also economically meaningful. In Panel A, announcements which involve 200 layoffs of workers result, on average, in an approximately 12%

increase in capital expenditures of local competitors (Columns 1-4) or a 9% increase in their ratio of capital expenditures over assets (Columns 5-8). In Panel B, 30% of workers laid off in an industry and region lead to a 9% increase in capital expenditures of local competitors (Columns 1-4) or to a 12% increase in capital expenditures to assets relative to the mean (Columns 5-8). In Panel C, Columns 1-4 indicate that the competitors increase on average their capital expenditures by 27% following an announcement and Columns 5-8 indicate that they increase the ratio of capital expenditure to assets by 20% relative to the mean.

These results provide empirical evidence in favor of a large theoretical literature in industrial organization, which predicts that firms undertake investments as a reaction to competitive threats presented. The feature of these investments is that they are not chosen considering for instance a new investment opportunity, but strategically to alter firms' future competitive positions. An important paper in this stream of literature by Fudenberg and Tirole (1983) also argues that the right variable to look at when it comes to strategic considerations is capital: unlike prices or quantities, which firms cannot credibly commit to keep at the same level, capital entails commitment value.[19]

The Importance of Financial Constraints

It is not obvious that all competitors will be willing or able to actually invest strategically. Caves and Porter (1977) note that strategic investment can be risky and can dampen short-run profits. The same view is shared by Gilbert and Lieberman (1987) and Porter and Spence (1982), who also claim that firm characteristics such as financial constraints can lead to asymmetric responses by firms. There-

[19]On the other hand, my findings are not consistent with a different set of theoretical models, which would predict a reduction in firms' investment. Firms' underinvestment is studied by Schmalensee (1982), Bulow, Geanakoplos, and Klemperer(1985), and Fudenberg and Tirole (1984) among others. However, in these models firms compete in prices, and not quantities. Fudenberg and Tirole (1984) for example find that firms will underinvest in advertisement or R&D in cases of entry or expansion of rivals. In these models pre and post entry investments are not perfect substitutes. However, the authors emphasize that this would not be realistic if investment is in capital and capital costs are linear and constant over time, in which case underinvestment would be ineffective.

fore, a natural test I consider is to examine competitors' responses based on how financially constrained they are. I proxy competitors' financial constraints by examining how the ratio of their debt net of cash over assets compares to their industry median ratio. Since the majority of the firms in my sample are private firms, leverage is the most common source of external financing, and therefore the use of leverage to capture firms' constraints is a reasonable choice in this case.

Figure 2.3 provides a graphical snapshot of the results. It plots the Epanechnikov kernel densities for the logarithm of one plus capital expenditures before and after the announcement dates. Both Panels in Figure 2.3 focus on local competitors of the firms who make the announcement, but Panel A shows investments of firms which are financially unconstrained relative to their industry median, whereas Panel B shows those of the financially constrained ones. These plots suggest that there is a rightward shift in the kernel density after the announcement dates for the unconstrained competitors in the same industry and region as the announcing firms (Panel A), but this is not the case for the constrained ones (Panel B). The observed shift in the density of the unconstrained competitors is statistically significant since the Kolmogorov-Smirnov test of the equality of distributions functions is rejected at the 1% level. On the contrary, the Kolmogorov-Smirnov test cannot reject the equality of distributions for the constrained competitors in Panel B (p-value: 0.72). To provide a counter-example, each Panel in Figure 2.4 presents the same graph as Figure 2.3, Panel A, for a different sample of firms. Thus, Panel A plots the kernel densities for financially unconstrained firms operating in the same industries with the announcing firms but located in different regions. Panel B does the same for financially unconstrained firms in the same regions with the announcing firms but classified in different industries. Both graphs show that the distributions do not appear to be different before and after the announcements. The Kolmogorov-Smirnov test cannot reject the equality of distributions in both Panels (p-value: 0.60 in Panel A and p-value: 0.30 in Panel B).

The identification strategy which is a DDD analysis is best captured by Table

2.5. The DDD coefficient of interest is the coefficient of the interaction between the event indicator and a firm-level dummy, which sorts firms in two groups depending on their degree of financial constraints. The coefficient is negative and statistically significant, suggesting that firms which are less levered relative to their industry, and therefore, less financially constrained, react by investing more following the announcements. The result is robust to different definitions of the dependent variable and different interactions of fixed effects.[20] It should be emphasized here that the results remain robust in a very stringent specification where I control for a triple interaction of fixed effects ($\alpha_j * \alpha_k * \gamma_t$), addressing concerns that firms may be subject to industry-local shocks.

Another way to see this is to estimate two separate regressions for the financially unconstrained and the financially constrained competitors. Thus, Panel A in Table 2.6 shows that competitors which are less financially constrained relatively to their industry, increase their investments following the announcements. On the contrary, the announcements do not seem to have a significant effect on the financially constrained competitors: the coefficient of the announcement indicator is insignificant in Panel B of Table 2.6. The advantage of this analysis is that it puts an emphasis on the fact that the financially unconstrained competitors are those who invest strategically. In fact, the magnitudes of the DID coefficient almost double when we focus on the financially unconstrained competitors compared to the ones reported in Table 2.4: hence, in Columns 1-4, Panel A, investment increases by approximately 24% for 200 people announced to be laid off and in Columns 5-8, the corresponding increase in capital expenditures over assets is approximately 16%. On the contrary, the coefficients in the sample of the constrained firms are both statistically and economically insignificant.

This result that financial constraints play a primary role for competitors' strategic investments is consistent with the the notion that firms may chose to be seem-

[20]For the remainder of the study, I report the results using only the first definition for the events, which incorporates information on the number of workers announced to be laid off. The results are robust to the use of the alternative definitions presented above and they are available upon request.

ingly underlevered in anticipation of future financing needs to respond to unexpected events (Hennessy and Whited (2005)). Moreover, it is also consistent with a fairly large literature which establishes that high leverage softens competition (Fudenberg and Tirole (1986); Bolton and Scharfstein (1990) on the theoretical side, Phillips (1995); Chevalier (1995); Chevalier and Scharfstein (1996); Kovenock and Phillips (1997); Zingales (1998) on the empirical side). Finally, it is in line with a vast literature on financing constraints and investment, pioneered by the seminal paper by Fazzari, Hubbard, and Petersen (1988).

Alternative Definitions of Financial Constraints

Although using firms' leverage to proxy for financial constraints is common in the literature, I also use firm age as an alternative proxy for firms' financial constraints to check the robustness of my results. Firm age can capture something about stability of cashflows and it may proxy for firms' financial constraints, like for example in Cabral and Mata (2003) and Hadlock and Pierce (2011). It can thus be assumed that financial constraints are more relevant for younger firms.

Columns 1 through 5 of Table 2.7 present cross-sectional heterogeneity results interacting the Announcement indicator with a dummy, constant for every firm, which takes the value of 1 if a firm's age is higher than the industry median and 0 otherwise. I find consistent results with the previous analysis: the interaction coefficient is positive, which indicates that younger, more constrained firms, invest less. The results are statistically significant in all Columns of Table 2.7 at 1% and 5% level of significance. Columns 1 and 2 control for firm and year fixed effects. Column 3 adds interacted year and industry fixed effects to control for industry-level dynamics, Column 4 adds interacted region and year fixed effects to control for regional specific shocks, while Column 5 is the strongest specification taking into account industry-region specific shocks in addition to the firm fixed effects.

Columns 6 through 10 of Table 2.7 run a horserace including the interactions of the Announcement indicator with both measures of financial constraints to address the concern that firms that are constrained according to the leverage proxy

could actually be the younger ones in the sample. Both interaction coefficients are statistically significant at the 5% level across all specifications. Therefore, the results are consistent with the previous findings.

Finally, the results are robust to an alternative measure likely to be correlated with financial constraints. This measure uses firms' cashflows to proxy for firms' financial vulnerability. Using the pre-treatment median ratio of firms' cashflow to assets, I classify firms into two groups as compared to their industry. Hence, I create a dummy, constant for every firm, which takes the value of 0 if the median ratio of cashflow over assets is lower than the industry median (pre-treatment) and it is 1 otherwise. The intuition is that firms with low cash flows should have lower access to external financing due to the lower amount of capital they can pledge to outside investors. Therefore, these firms should face higher financial constraints. In unreported regression specifications, similar to those presented in Table 2.7, I find that firms with low cashflows to assets relative to their industry invest less; therefore, I find that the interaction coefficient between the Announcement indicator and this alternative measure of financial constraints is positive and statistically significant.

Why Local?

In my analysis, I document the results at the industry-region level and not at the industry level. Indeed, Figures 2.2 and 2.4 show no obvious increase in investments of more distant competitors which operate in the same industry but are not located in the same region as the firms who make the announcements. Interestingly, this is also indicative of the fact that the results are not driven by aggregate industry changes. These findings rely thus on the assumption that product markets are somewhat segmented and that firms compete locally.

This assumption is plausible if we think that firms at the same industry and region are more likely to share the same customer and supplier base. To evaluate the relevance of this assumption in my sample, I conduct further empirical analysis.

If it is indeed the case that firms compete locally, I should observe that firms which are more "local" than others invest more. To test this, I use information on the pre-treatment percentage of sales that firms export as a proxy of how "local" these firms are. Thus, I construct a dummy that takes the value of 1 if this ratio is higher compared to the median value of the firm's industry and 0 otherwise.[21] According to my hypothesis, I expect to find that firms which are more "local", and therefore are the ones mostly affected by the news, respond by investing more. Indeed, this can be seen in Columns 1-3 in Table 2.8. Looking within treated and control groups of the financially unconstrained competitors, which are the ones shown to respond aggressively in Tables 2.5 and 2.6, I find that investment increases more for those that export less compared to their industry. Thus, the interaction coefficient between the Announcement Indicator and the Export Dummy is negative and statistically significant at 5% level.

Consistent with the assumption that firms compete locally are also the findings shown in Columns 4-9 of Table 2.8. Looking again within treated and control groups of the financially unconstrained competitors, in Columns 4-6, I interact the Announcement indicator with a measure which captures how concentrated are the industries at the regional level (Local-Industry HHI). This measure is basically a Herfindahl Index, constructed in-sample using information on the pre-treatment firms' sales. It is constructed at the industry-region level and it takes lower values the higher the degree of competition in the industry in a particular region. I find that the effect on strategic investments is more pronounced the lower the competition in an industry and region. This finding is consistent with the intuition that "local" competitors will reap more benefits from deterring expansion of other firms if the industry is more concentrated locally since they are more likely to be able to recover some of the short-run costs of strategic investments in the long-run.[22] I then repeat the same analysis defining the Herfindahl Index

[21]Ideally, I would like to have information on firms' sales within and outside the regions they are located in the UK. However, this information is not available.

[22]This is in line with findings by Kovenock and Phillips (1997), Zingales(1998), MacKay and Phillips(2005) among others.

at the industry level. Thus, the index varies now for every industry and not for every industry-region. The results are reported in Columns 7-9: the interaction coefficient is insignificant, indicating that competition at the industry level has no differential effect on firms' investment. Thus, these results support the claim that firms compete locally.[23]

Below, I refer to some anecdotal and survey evidence which also point towards this direction. According to a 2007 report published by the Business in the Community Organization in the UK: *"In the UK the driver for big businesses is via the Corporate Responsibility agenda and the desire of firms to invest in local economies, support neighborhood regeneration and ensure their supplier and customer profiles reflect those of the local community, all of which bring business benefits."*[24] Firms' local orientation should be even more noticeable for the small, mostly private companies in my sample.

An interesting example which features the importance of local markets comes from the food production industry. According to a survey by IGD for 2010, the size for locally sourced food products in the UK is very large (£3.75 billions in 2005 and £4.30 billions in 2007).[25] According to the same survey, Tesco, one of the three-largest retailers in the world, works with 3,000 local lines in the UK and co-operates with 480 local suppliers. Also, the survey records that the preference for locally produced food naturally goes down to the final consumers. What is interesting, though, is that consumers pointed out economic factors as a key reason why they prefer locally produced food: 54% of the surveyed consumers said they want to support the local producers, around 30% said that they prefer the local products since keeping jobs in the area is important, while a significant majority mentioned that local products are "cheaper than alternatives" or "a better value for money". The food industry is a particular industry where we might expect consumption of

[23]The results for all tests in Table 2.8 also hold when I consider the full sample and are available upon request. However, the estimates are stronger when I restrict the sample in the financially unconstrained competitors which is in line with the previous findings.

[24]Business Action on Supplier Diversity, Business in the Community, 2007 Report.

[25]IGD is a non-profit charitable organization, which operates as a think-tank specializing in the food sector.

local products to be prevalent, compared to other industries. However, one can argue that the message that the survey conveys, that the costumers-consumers consciously prefer local products in order to support the local economy, can be generalized to a broader range of industries.

Industry Local Shocks

An important possibility that remains to consider is that industry shocks at the local level could lead to both the competitors' announcements and to firms increasing their investment. This would be a problem for my identification since I would incorrectly attribute an endogenous relation to a causal response of firms to actions taken by their competitors. My empirical specifications presented above already tackle some of these concerns. First, my coefficients estimations remain fairly stable after controlling for regional macro variables (regional measures of economic activity and unemployment). Second, I include different interactions of fixed effects in my specifications which control for regional specific and industry specific trends. Third, the cross-sectional heterogeneity tests presented above help address these concerns as long as the potential industry-local shocks do not have the same effects on the two groups of firms as the announcements. Most importantly, in the cross-sectional heterogeneity results, I actually control, to some extent, for industry-regional specific shocks by including interacted two-digit SIC industry times region times year fixed effects. Interestingly, including the triple interaction of fixed effects does not attenuate my estimates which reinforces the argument that industry local shocks is not a concern here.

To further alleviate concerns that industry shocks at the local level might be driving the results, I perform a dynamic analysis to examine whether there are pre-treatment trends in the data. Table 2.9 examines the dynamics of asset sales (Columns 1-3) asset growth (Columns 4-6), return on assets (Columns 7-9) and cash flow to sales (Columns 10-12) since all these variables should be variables sensitive to an industry-local shock. Hence, $Announc_{(t+1)}$ is the 1-year-forward

value of the events' indicator, $Announc_{(t)}$ is the contemporaneous value of the indicator, $Announc_{(t-1)}$ is the 1-year-lagged value and $Announc_{(t-2)}$ is the 2-year lagged value of the indicator. Although, consistent with the previous analysis documenting strategic responses, I find that there is an increase in asset sales and asset growth 2 years after the announcements, there is no evidence of pre-treatment trends in the data. Moreover, when I examine the dynamics of profitability and of firms' cashflow to sales around the announcements I find that all coefficients are insignificant. This also suggests that the results are not driven by industry local shocks since such shocks would most likely show up in these measures.

Internal Capital Markets

The analysis so far has focused on firms' external financing to identify firms able to make strategic investments, treating firms as stand-alone operations. I showed that financially unconstrained firms in industry-regions with announcements respond by investing more following the announcements, compared to unconstrained firms in different industry-region pairs (Panel A, Table 2.6). Another group of firms which are also likely to be able to invest strategically are those which are part of an industrially diversified group. According to a large literature, (see for example Lamont (1997); Shin and Stulz (1998); Campello (2002); Fee, Hadlock, and Pierce (2009)), firms which are part of an industrially diversified group have better-functioning internal capital markets. Therefore, in this section, I consider the presence of internal capital markets and the possibility of cross-subsidization between firms.

To do this, I collect data on firms' direct and ultimate ownership from Amadeus database. Using this information, I identify firms in industry-region groups with announcements (treated firms) which share common ownership with other firms in different industry-region pairs (control firms). I can identify a very small subset of firms in my sample satisfying these criteria, nevertheless I redo the analysis using the small subset. This analysis has the important benefit that the treated

and control groups are consisted of somewhat more identical firms, namely firms with common ownership. Therefore, this test is a further robustness check that my results hold.

Figure 2.5 presents the Epanechnikov kernel densities for the logarithm of one plus capital expenditures before and after the announcement dates. Panel A in Figure 2.5 focuses on local competitors of the firms who make the announcement (treated group), and Panel B shows investments of firms not competing locally with the announcing firms (control group). The firms included in these plots are the ones for which I was able to identify common ownership using the ownership data by Amadeus. As can be seen, there is a rightward shift in the kernel density following the announcements for firms in Panel A, but this is not the case for firms in the control group presented in Panel B. Therefore, among firms which have been identified to have common ownership, I find an effect only on firms in the same industry-regions as the announcing firms.

The same conclusion can be reached by looking at Table 2.10. This table presents the analysis restricting the sample to the small subset of firms defined above. The analysis in Table 2.10 is somewhat similar to the analysis in Panel A of Table 2.6 since it refers to a subset of firms which seems to be characterized by greater financial flexibility. While the focus in Panel A, Table 2.6 was on firms' financial constraints linked to external capital markets, the analysis in Table 2.10 focuses on firms with greater financial flexibility provided via internal capital markets. I find suggestive evidence that local competitors invest strategically following the announcements compared to firms which have access to common sources of internal financing but belong in different industry-region pairs. The estimated coefficients are all positive, consistent with the previous findings. The statistical significance becomes weaker in these estimations, which could be justified by the fact that these specifications lose power due to the significantly smaller sample size. Moreover, the results might suffer from the fact that credit-constraints at the group level could have a confounding effect on groups' ability to allocate resources

across different firms. However, the results remain highly economically significant with the magnitudes of the estimated coefficients being similar to those reported in Panel A, Table 2.6.

A Falsification Test

Apart from the set of announcements used in the analysis described above which suggest that the announcing firm is taking an action to improve its operations, there are also announcements of firms which involve layoffs because the firm is doing badly.

This different set of events allows me to create a falsification test for the prediction that competitors invest strategically as a response to actions that will make the announcing firms "stronger". The differentiating point between the announcements included in my previous analysis and this set of "negative" announcements is their implications on the product markets. Competitors face a competitive threat following the first set of announcements, which is though not the case here.

One specific alternate story that this test helps me to address is a complementarity story: as mentioned earlier, the common characteristic of the announcements of firms restructuring their operations in my dataset is that they involve layoffs of workers. These layoffs affect the local labor markets, resulting in cheaper labor being now available to the firms, as I show in Section 2.5.2. To the extent that labor and capital are complements, we could attribute the increase in investment that I documented earlier, to the complementarity in the inputs of production since firms could hire workers increasing also their use of capital.

To rule out this hypothesis, I exploit the following asymmetry in my dataset: the two sets of announcements have the same effect on input markets, but they do not have the same effect on local competitors' product markets. I redo my analysis, using this set of "negative" announcements and I report the results in Table 2.11.[26]

[26]Earlier I documented the importance of financial constraints, since they determine the ability of competitors to do strategic investments; therefore Table 2.11 is the equivalent of Table 2.5 in

The estimations do not show the same pattern as in the previous analysis, even though we have the same effect on the labor market. Throughout all specifications of Table 2.11, the coefficients are insignificant. The same holds when I use firms' age as the proxy for firms' financial constraints (unreported estimates). I conclude that the relation between competitors' investments and the announcements is not explained by a complementarity story between the inputs of production.

2.5.2 Other Results: Wages and Hiring

My setting gives me the opportunity to explore further responses by competitors following the announcements. As explained earlier, the announcements in the dataset refer to restructuring actions of firms which involve layoffs of workers. Obviously, these announcements have a direct effect on firms' input markets in these industries and regions. It is therefore natural to explore whether competitors will change their worker related corporate policies in response to the news.

Using all announcements, I test the effect of the news on wages per employee in competitor firms. Panel A, Table 2.12 reports the results. The dependent variable is the logarithm of wages scaled by the number of employees and the event indicator is defined as above.[27] Since it is a well-established fact that labor variables are sticky, I report the results using both the one-year lagged value (Columns 1-3, Panel A) and the 2-year lagged value (Columns 4-6, Panel A) of the Announcement Indicator. I find that there is a reduction in the average wage per employee in competitor firms following the announcements. The result is statistically significant across specifications at the 5% level and it is robust to different combinations of fixed effects. Hence, Columns 1 and 4 include firm fixed effects to control for firm time-invariant characteristics and year fixed effects to control for aggregate fluctuations; Columns 2 and 5 add interacted industry and

this new setting.

[27]Wages here are nominal but the results are similar when I consider real wages instead. The results are also robust to the alternative definitions of the indicator used in the previous analysis and they are available upon request from the author.

year fixed effects to take into account industry specific shocks and Columns 3 and 6 add also interacted region and year fixed effects to control for regional specific shocks. However, the magnitudes estimated are relatively small: for 200 workers announced to be laid off, the coefficients estimates suggest that the £29,061 average wage per worker will be reduced by £145.[28]

These results demonstrate labor immobility as an important friction that determines personnel related policies of firms. Indeed, we need labor markets to be segmented so that the results go through. This assumption is plausible if we consider that it is relatively costly for workers to move and therefore they are relatively immobile. However, I perform further empirical analysis and I find supportive evidence that labor markets are segmented in my sample. I use data on workers' commutes provided by the Annual Population Survey (APS, 2008) for the UK. The APS provides information on commuting flows between different districts and counties in the UK. Thus, I collect information on where workers live and I aggregate it at the 12 region level of my sample. I find that the percent of local jobs taken by local residents is very high - on average higher than 90% in my sample.[29]

Hiring and Financial Constraints

However, do all competitors respond in a similar manner? There is a fairly recent literature in finance which argues that financial constraints interact with firms'

[28]I repeat this analysis isolating announcement-events in my dataset which are related to accidents (eg. fires, fuel leaks). A relevant example of this type of announcements is the following: *"Fast-food restaurant suppliers EBG Bakeries has announced it is to close its Hemel Hempstead plant with the loss of 100 jobs. The decision follows the bakery being severely damaged in a blast at the Buncefield oil depot last December... A spokesman for the workforce said many staff are unhappy about the level of redundancy payments being offered and the lack of support with finding new jobs..."* This test helps addressing concerns that local shocks at the industry level could lead to the observed reduction in labor costs; one can argue that these events-accidents are not related to industry-local conditions due to their idiosyncratic nature. In unreported regressions (available upon request), I redo the analysis and I find that the results remain.

[29]I also looked at a predecessor survey of the APS, the Local Labour Force Survey, 2001, and I found similar results.

wage setting and employment policies. Benmenlech, Bergman, and Seru (2011), in a recent study, show that financial constraints matter for firms' employment decisions like they matter for firms' investment decisions. The authors provide several theoretical explanations why this should be the case. First, they argue that to the extent that firms are financing labor throughout the production process, potential difficulties in financing working capital should also impact the financing of labor. Second, they argue that capital markets' imperfections will matter for labor since labor is not a variable factor of production but incorporates fixed costs, such as investments in the hiring or training of workers, which require financing (Oi (1962)). Third, they discuss the possibility that complementarities in the production function between labor and capital explain the results, but they rule out the possibility that this is what is driving their findings in their empirical analysis.[30]

In Panels B and C of Table 2.12, I separate the sample in financially constrained and unconstrained firms and estimate the impact of the announcements on wages, scaled by the number of employees, and on firm-level employment (logarithm of number of employees).[31] Columns 1-3 of both Panels look at firms with low financial constraints. I find that the reduction in the average wage per employee is associated with an increase in employment for this group of firms. On the other hand, Columns 4-6 of both Panels look at firms with high financial constraints and show that there is a strongly significant reduction in the average wage per employee which is though not driven by an increase in employment. Columns 4-6 report estimates using the 2-year lagged value of the indicator. The results are the same when I use the 1-year lagged value, instead, but they are statistically weaker and are not reported to save space. The fact that the results get stronger for the

[30] In addition, survey evidence by Campello, Graham, and Harvey (2010) show that financially constrained firms planned to cut employment more not only during the recent financial crisis but even in the pre-crisis period. On a similar note, Campello, Giambona, Graham, and Harvey (2010) provide survey evidence that credit lines attenuated the effects of the 2008-09 financial crisis on a number of corporate policies, including employment.

[31] As in the previous analysis, I sort firms in financially constrained and unconstrained using their pre-treatment ratio of total debt net of cash over the book value of assets as it compares to their industry median.

constrained firms when I examine the effect 2 years after the announcements is consistent with the notion in the labor literature that wages are sticky.

Overall, I interpret the findings in Table 2.12 to suggest that competitors, in the same industry and region, take advantage of workers' lower outside option following the announcements when bargaining with them on wages. Statements such as *"the decision would devastate the community, it is a significant blow to the area, work closely to mitigate the impact on the local community"* coming often along with the news are consistent with this interpretation. The news of layoffs thus have an impact on the reservation utilities of the workers employed in competitor firms and this can worsen their bargaining position and ability to extract a higher surplus. However, the results in Panel C of Table 2.12 indicate that the channel that leads to the reduction in wages per employee differs between firms depending on how constrained they are: it seems that the financially unconstrained firms hire workers following the news, negotiating down entry wages. On the other hand, the constrained ones do not increase employment but renegotiate down current wages.[32,33]

Competitors take advantage of workers' lower outside option

To assess the interpretation that competitors take advantage of workers' lower outside option following the announcements, negotiating down workers' entry (unconstrained competitors) or current (constrained competitors) wages, I conduct additional tests that exploit cross-sectional heterogeneity between firms.

First, I use information on unionization of industries. Such data are not available for the UK at the industry level and therefore I use unionization rates for

[32]I cannot rule out however, the possibility that financially unconstrained firms also renegotiate down wages of their current employees.

[33]The finding that wages are renegotiated down is also a somewhat surprising result since according to a large labor literature, wages are difficult to be negotiated down even when times are bad (Akerlof, Dickens, and Perry (1996) and Altonji and Devereux (1999) among others). However, this is not an unambiguous result since there is also some evidence in the literature that wage cuts are actually not rare. See for example McLaughlin (1994) for a relevant discussion.

the US, available at the 3-digit SIC level for 2002 by the Barry T. Hirsch and David A. Macpherson (2003) database. The use of US data to measure industries' dependence on a particular characteristic (on unions in this case) in other countries was first introduced by Rajan and Zingales (1998). It relies on the assumption that some industries are more unionized than others due to structural (e.g., technological) reasons which are similar across countries.[34] Consistent with the above intuition, Columns 1-3 in Panel A of Table 2.13 show that the reduction in the average wage per employee is less the more unionized is the industry. The coefficient of the interaction of the Announcement indicator and the proxy for industries' degree of unionization is positive and statistically significant. I then look only at the financially constrained competitors, since these are the ones who are clearly shown to bargain with the current workers, and I check what is the effect of the interaction between the Announcement indicator and the union variable on the logarithm of total wages. The results are reported in Columns 1-3, Panel B of Table 2.13 and they show that in higher unionized industries competitor firms find it harder to achieve wage reductions from their employees.

Columns 4-6 in Panel A of Table 2.13 make a similar point by testing if the layoff news have any differential effect on wages depending on workers' skills. A variable proxying for workers' skills may be viewed as a proxy for their bargaining position with the firm. I use information provided by EUROSTAT on whether industries in the UK are high or low technology industries and similarly, on whether regions in the UK are characterized by high concentration of high or low technology industries. I then create a dummy which takes the value 1 if a firm belongs to a high technology industry and is located in a high technology region and the value 0 if it belongs to a low technology industry and is located to a low technology region

[34]I believe that this is not an extreme assumption in my case since UK industries are likely to share common characteristics with their US counterparts, while the institutional environment governing industrial relations and the organization of labor bargaining are similar in the two countries. Consistent with this claim are the findings of several papers in the labor literature which look at the determinants of union membership (Blanchflower (2006)) or the effect of unions on wages and wage structure (Blanchflower and Bryson (2003), Card, Lemieux, and Riddell (2003)) uncovering similar patterns in the UK and the US.

in the UK. I observe that the interaction between the Announcement indicator and the proxy for workers' skills is positive and statistically significant: the more skilled the workers are, the less is the negative impact on wages. In Columns 4-6, Panel B of the Table, I redo the analysis of Columns 1-3 of Panel B using the proxy for workers' skills: the interaction coefficient is positive, in line with the intuition explained above. However, it is not significant which might be attributed to the fact that these proxies are imperfect measures and therefore, overall, these results should be interpreted with some caution.

Labor Markets Interact with Product Markets

In the previous analysis, I have documented that in cases where the announcements can be interpreted as a competitive threat, competitors of the announcing firms, and especially those which are not financially constrained, respond by increasing their capital expenditures. I also documented that the layoffs announced due to the restructuring actions of the firms lead to changes in wage and hiring policies of competitor firms in the affected industry-regions. In particular, I showed that the competitors with low financial constraints take advantage of the layoffs hiring more people and reducing the average wage they pay per employee. In this section, I link the two effects and I provide suggestive evidence that in my setting labor markets interact with product markets.

Focusing only on announcements which indicate that competition intensifies and on financially unconstrained competitors, Table 2.14, provides evidence consistent with this hypothesis. Columns 1-3 interact the Announcement Indicator with the level of wages per employee, while Columns 4-6 interact the Announcement Indicator with the growth rate of firms' wages per employee. Columns 1 and 4 include firm fixed effects to control for firm time-invariant characteristics and interacted industry and year fixed effects to control for industry specific shocks. Columns 2 and 5 add interacted region and year fixed effects to take into account regional specific shocks, while Columns 3 and 6 include firm and industry times

region times year fixed effects as a way to control for local industry specific shocks. The interaction coefficient is negative and significant across the different specifications. This result suggests that, to the extent that investments are lumpy, the availability of cheaper labor due to the layoffs increases the net present value of projects and therefore increases the likelihood that the unconstrained competitors will undertake them and will invest strategically. [35]

2.5.3 Further Robustness Tests

In this section, I discuss further checks to ensure that my estimations are robust to additional potential concerns.

One concern would be that the data for the competitor firms, which are data at the subsidiary level, include multiple plants with some plants located in different regions from the region of the subsidiaries' headquarters. These plants would not be affected by the news in the same way or they would even be subject to a different set of announcements in their industry and region. This mismeasurement could lead to less precise estimations but it is not obvious why it would bias the results. However, I address this concern in two ways.

To begin with, I collect information on the number of registered firms from the Inter-Departmental Business Register in the UK.[36] According to this data, 96% of the firms in the UK are private and 4% are public firms. Within the private firms, for which the relevant information is available, 80% are single unit firms. As mentioned earlier, 97% of firms in my sample are private firms, reflecting the balance in the economy. According to these statistics, it seems reasonable to assume that the majority of firms in my sample are single unit firms.

[35]The lumpiness of investments has been well documented in the literature. See Doms and Dunne (1997) and Caballero and Engel (1999) for a relevant discussion.

[36]The Inter-Departmental Business Register (IDBR) is a list of UK businesses maintained by the Office for National Statistics (ONS) and it provides a common framework for business registers for statistical purposes. It is a comprehensive list of businesses, missing some very small businesses (self employed and those with low turnover and without employees) and some non-profit organizations. Statistics on this data are protected by legislation and therefore only aggregate measures are available.

Second, I repeat my estimations for a subsample, including only private firms and only firms with less than 100 employees.[37] In this subsample, the average employment is approximately 50 employees. In Table 2.15, I present some specifications which are indicative of the main results presented above. Columns 1-3 correspond to Columns 3-5 of Table 2.5 and Columns 4-5 correspond to Columns 3-4, Panel A of Table 2.6. Although, the sample size is reduced, decreasing power, the results remain statistically significant. What is most remarkable though is that the magnitudes of the Announcement indicator coefficient increase substantially. If there is any bias at all, then this is against finding anything, and therefore I conclude that this is not a concern for my analysis. In the same Table, I also report some of the specifications of the last results on wages. Hence, Columns 6-7 of Table 2.15 repeat the analysis of Columns 2-3, Panel A of Table 2.12 for this subsample of the data. Although the results here are statistically weaker, the magnitudes somewhat increase, despite the fact that we lose power in these regressions, suggesting that there is no bias in favor of my estimates.

Another concern could be that there is an attrition issue in the sample. It could be the case, for example, that when competition intensifies more firms are exiting the sample because they cannot compete and therefore they exit the market. If this were the case, then the increase in investments could be due to weaker firms exiting the sample. However, this does not seem to be a concern here. First, including firm fixed effect across all my specifications ensures that the effects are estimated from consistent samples of firms. Second, I repeat my analysis including in the regressions only firms which I can observe both before and after the announcement dates. My results remain and therefore my estimations are robust to sample selection or attrition issues.

[37] I collected information from ONS on the count of manufacturing units in the economy per employment band size. I then compare this with the corresponding count of firms in my sample per employment band size. I make sure that the second is a much smaller subset of the first and I choose the cutoff of 100 employees. Thus, these firms are even more likely to be single unit firms.

2.6 Conclusion

This chapter provides empirical evidence that strategic considerations affect firms' real activities. The theme of firms taking strategic actions as a response to competitors' actions has long been in the epicenter of fundamental theoretical research in industrial organization and corporate finance. It is also naturally conceived as an important concern in business practice, with many consulting firms dedicating a significant amount of their activities on providing advisory services on that front, but also as a parameter of paramount importance that policy makers should take into account when designing and implementing competition policies. Therefore, examining these strategic effects and identifying how they affect corporate policies is an important empirical question.

To study this, I construct a unique dataset of announcements of restructuring activities of firms. I employ a DID analysis and I examine how the announcements affect other, competitor firms, which operate in the same industry and are located in the same region as the announcing firm. The underlying assumption of my identification is that firms compete locally, the validity of which I confirm empirically in the data. The focus on firms' local competitors allows me to disentangle firms' strategic reactions from reactions to aggregate changes, since the latter would equally affect all firms irrespective of their location or industry.

The main contribution of this chapter is to show that strategic incentives created by actions taken by firms have a notably robust and large impact on their competitors' investment decisions. The announcements in my dataset have different implications on firms' product markets. Focusing on announcements which describe an action intended to improve the competitive position of the announcing firm, I find that competitor firms use capital strategically to alter their future competitive position. This result is consistent with models which show that firms use their investment policies as a reaction to competitive threats, as in the paper by Fudenberg and Tirole (1983). Furthermore, an important implication of the study, which is in line with a broad literature in finance, is that the presence of

financial constraints significantly dampens firms' ability to react strategically. Interestingly, my laboratory allows me to check the robustness of my results creating falsification tests for the prediction that firms make strategic investments.

While this chapter makes an empirical contribution on our understanding of how firms' strategic responses to their rivals can determine firms' real activities, the implications on efficiency and on the optimality of these behaviors in a value enhancing sense still remains an open question to be examined.

Finally, these findings can also provide interesting insights to the policymakers as well as the local governments since the specific laboratory used in the analysis allows to draw some conclusions with respect to the consequences of firms' restructuring their operations on the local markets. This study makes an empirical case that firms' restructuring decisions, which intrinsically involve layoffs, affect not only the local labor markets but also firms' product markets, and it gives specific directions of these implications. Any intervention from the governments or local authorities will naturally impact these outcomes and thus has to be properly evaluated.

Table 2.1: Distribution of Announcements by Industry

This table lists the 3-digit SIC industries with restructuring announcements in my sample. Column 1 reports the description of the industry and Column 2 reports the 3-digit SIC code. Column 3 reports the distribution of announcements by industry.

Industry	SIC Code	Distribution of Announcements
Food and Kindred Products		
Meat Products	201	2.75%
Dairy Products	202	3.58%
Canned, Frozen, and Preserved Fruits, Vegetables, and Food Specialties	203	0.83%
Bakery Products	205	3.03%
Sugar and Confectionery Products	206	2.75%
Beverages	208	1.10%
Miscellaneous Food Preparations and Kindred	209	5.23%
Tobacco Products		
Cigarettes	211	0.83%
Cigars	212	0.55%
Textile Mill Products		
Broadwoven Fabric Mills, Cotton	221	0.55%
Knitting Mills	225	0.50%
Carpets and Rugs	227	0.28%
Miscellaneous Textile Goods	229	0.55%
Apparel and Other Finished Products		
Men's and Boys' Furnishings, Work Clothing, and Allied Garments	232	0.55%
Women's, Misses', and Juniors' Outerwear	233	0.28%
Miscellaneous Apparel and Accessories	238	0.55%
Lumber and Wood Products, Except Furniture		
Miscellaneous Wood Products	249	0.28%
Furniture and Fixtures		
Household Furniture	251	0.83%
Paper and Allied Products		
Paper Mills	262	1.65%
Paperboard Containers and Boxes	265	0.83%
Converted Paper and Paperboard Products, Except	267	0.55%
Printing, Publishing, and Allied Industries		
Newspapers: Publishing, or Publishing and Printing	271	2.20%
Periodicals: Publishing, or Publishing and Printing	272	0.55%
Books	273	0.55%
Commercial Printing	275	2.75%
Chemicals and Allied Products		
Industrial Inorganic Chemicals	281	2.75%
Drugs	283	2.20%
Soap, Detergents, Cleaning Preparations; Perfumes, Cosmetics, and Others	284	1.10%
Agricultural Chemicals	287	0.55%
Miscellaneous Chemical Products	289	0.83%
Rubber and Miscellaneous Plastics Products		
Tires and Inner Tubes	301	0.83%
Miscellaneous Plastics Products	308	1.93%
Leather and Leather Products		
Footwear, Except Rubber	314	0.55%
Stone, Clay, Glass, and Concrete Products		
Glass Products, Made of Purchased Glass	323	0.28%
Structural Clay Products	325	0.28%
Pottery and Related Products	326	1.10%

Table 2.1-*Continued*

Industry	SIC Code	Distribution of Announcements
Primary Metal Industries		
Steel Works, Blast Furnaces, and Rolling and Finishing Mills	331	3.58%
Iron and Steel Foundries	332	0.55%
Primary Smelting and Refining of Nonferrous	333	1.38%
Miscellaneous Primary Metal Products	339	0.55%
Fabricated Metal Products		
Cutlery, Handtools, and General Hardware	342	1.10%
Fabricated Structural Metal Products	344	0.55%
Metal Forgings and Stampings	346	0.28%
Miscellaneous Fabricated Metal Products	349	4.13%
Industrial and Commercial Machinery and Computer Equipment		
Engines and Turbines	351	1.65%
Construction, Mining, and Materials Handling	353	0.83%
Special Industry Machinery, Except Metalworking	355	0.83%
Computer and Office Equipment	357	3.86%
Electronic and Other Electrical Equipment, Exc. Computers		
Electric Transmission and Distribution Equipment	361	1.65%
Household Appliances	363	1.93%
Electric Lighting and Wiring Equipment	364	0.28%
Communications Equipment	366	3.58%
Electronic Components and Accessories	367	1.93%
Miscellaneous Electrical Machinery, Equipment, and Supplies	369	3.31%
Transportation Equipment		
Motor Vehicles and Motor Vehicle Equipment	371	11.27%
Aircraft and Parts	372	2.75%
Ship and Boat Building and Repairing	373	1.38%
Railroad Equipment	374	1.93%
Miscellaneous Transportation Equipment	379	0.28%
Measuring, Analyzing, and Controlling Instruments etc.		
Search, Detection, Navigation, Guidance, Aeronautical Systems etc.	381	0.28%
Surgical, Medical, and Dental Instruments and Supplies	384	0.83%
Miscellaneous Manufacturing Industries		
Miscellaneous Manufacturing Industries	399	2.20%
Total		**100%**

Table 2.2: Distribution of Announcements by Region

This table lists the 12 regions in the UK used in my sample and reports the distribution of announcements by region.

Region in the UK	Distribution of Announcements
East of England	6.89%
East Midlands	8.82%
Greater London	1.93%
Northern Ireland	5.23%
North East	5.51%
North West	10.47%
Scotland	9.09%
South East	4.68%
South West	9.92%
Wales	14.33%
West Midlands	14.60%
Yorkshire and the Humber	8.54%
Total	**100%**

Table 2.3: Descriptive Statistics: Main Variables

This table reports summary statistics for key financial variables of firms used in the main analysis of the chapter. The main analysis covers over 17,000 observations, although sample size may vary due to missing information for some variables in the analysis. Column 1 reports the mean and standard deviation (in parentheses) of the variables in the sample. Columns 2-6 report summary statistics for the firms one year before announcements were made. Column 2 refers to firms which belong to industry-regions where announcements are made. Column 3 refers to firms which belong in the same industries with the announcing firms but in different regions and Column 5 refers to firms which are located in the same regions with the announcing firms but operate in different industries. Means and standard deviations (in parentheses) are reported. Column 4 reports the p-value from a t-test for the difference between firms in Column 2 and 3, and Column 6 reports the p-values from a t-test for the difference between firms in Columns 2 and 5. P-values have been adjusted to take into account the lack of independence of the observations. Age is defined as the difference between the year and the year of establishment. I match firms into industries following the 3-digit SIC system of classification. The regions refer to 12 regions in the UK. The sample covers years 2002-2009.

	Mean	Same Industry-Region	Same industry	p-value of difference (2-3)	Same Region	p-value of difference (2-5)
	(1)	(2)	(3)	(4)	(5)	(6)
Ln(1+Capex)	11.704	11.755	11.571	0.37	11.634	0.53
	(1.938)	(1.992)	(1.988)		(1.935)	
Capex/Assets	0.054	0.046	0.051	0.39	0.054	0.13
	(0.071)	(0.060)	(0.070)		(0.069)	
Debt minus Cash/Assets	0.135	0.118	0.138	0.14	0.125	0.67
	(0.280)	(0.285)	(0.300)		(0.297)	
ROA	0.067	0.046	0.038	0.43	0.046	0.99
	(0.138)	(0.162)	(0.159)		(0.154)	
Ln(Assets)	15.33	15.59	15.41	0.23	15.26	0.01
	(1.31)	(1.37)	(1.30)		(1.28)	
Asset Growth	0.101	0.102	0.089	0.44	0.094	0.37
	(0.290)	(0.330)	(0.277)		(0.278)	
Sales Growth	0.071	0.077	0.072	0.77	0.070	0.70
	(0.236)	(0.269)	(0.236)		(0.227)	
Cashflows/Sales	0.059	0.063	0.057	0.34	0.059	0.52
	(0.099)	(0.010)	(0.099)		(0.095)	
Ln(Age)	3.018	2.954	2.937	0.75	2.886	0.27
	(0.831)	(0.100)	(0.953)		(0.941)	

Table 2.4: Competitors' Strategic Investments

This table summarizes the results of regressions of firms' investments on the Announcement Indicator variable, and a set of controls. The Announcement Indicator refers to firms announcing restructuring actions which improve their competitive position. These announcements are matched to a 3-digit SIC industry and to one region (out of 12) in the UK. Panels A, B and C use different definitions for the Announcement Indicator variable. $Announc._{Def1}$ in Panel A is defined as the logarithm of the cumulative number of workers announced to be laid off in a specific industry and region and is 0 in industry-regions with no announcements. $Announc._{Def2}$ in Panel B is defined as the ratio of the cumulative number of workers announced to be laid off in a specific industry and region scaled by the total number of workers in the industry-region and is 0 in industry-regions with no announcements. The total number of workers in the industry-region is computed in-sample. $Announc._{Def3}$ in Panel C is a dummy variable which takes the value of 1 after an announcement is made in a specific industry and region and is 0 otherwise. The Announcement Indicator is lagged by one year. Investment of Competitor firms is defined as ln(1+Capex) in Columns 1-4 and as Capex/Assets in Columns 5-8 in both Panels. All Columns include firm and year fixed effects. Columns 3 and 7 also include interacted 2-digit SIC industry and year fixed effects and Columns 4 and 8 add interacted region and year fixed effects. Controls, where indicated, include firms' age, log(number of firms in an industry-region), regional unemployment rate and a measure of economic activity at the regional level. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% level respectively. Standard errors are clustered at the 2-digit SIC industry level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in the UK and covers years 2002-2009.

	Ln(1+Capex)				Capex/Assets			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PANEL A								
$Announc._{Def1}$	0.0480	0.0503	0.0564	0.0623	0.0022	0.0023	0.0026	0.0024
	(0.0090)***	(0.0091)***	(0.0084)***	(0.0161)***	(0.0010)**	(0.0010)***	(0.0009)***	(0.0012)**
Adj. R^2	0.46	0.46	0.46	0.47	0.18	0.19	0.19	0.19
PANEL B								
$Announc._{Def2}$	0.288	0.272	0.281	0.287	0.019	0.019	0.019	0.020
	(0.040)***	(0.040)***	(0.037)***	(0.054)***	(0.005)***	(0.005)***	(0.005)***	(0.007)***
Adj. R^2	0.46	0.46	0.46	0.47	0.18	0.19	0.19	0.19
PANEL C								
$Announc._{Def3}$	0.192	0.205	0.232	0.266	0.010	0.010	0.012	0.011
	(0.062)***	(0.062)***	(0.059)***	(0.087)***	(0.004)**	(0.005)**	(0.004)***	(0.006)*
Adj. R^2	0.46	0.46	0.46	0.47	0.18	0.19	0.19	0.19
Obs.	17,364	17,364	17,364	17,364	17,364	17,364	17,364	17,364
Controls		X	X	X		X	X	X
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes			Yes	Yes		
Ind.*Year FE			Yes	Yes			Yes	Yes
Region*Year FE				Yes				Yes

Table 2.5: Competitors' Strategic Investments and Financial Constraints (I)

This table summarizes the results of regressions of firms' investments on the Announcement Indicator variable, the interaction of that indicator with a measure of firms' financial constraints, and a set of controls. The Announcement Indicator refers to firms announcing restructuring actions which improve their competitive position. These announcements are matched to a 3-digit SIC industry and to one region (out of 12) in the UK. $Announc._{Def1}$ corresponds to the first definition presented in Table 2.4 and is lagged by one year. Investment of Competitor firms is defined as ln(1+Capex) in Columns 1-5 and as Capex/Assets in Columns 6-10. FC is a dummy which takes the value of 1 if a firm is financially constrained and the value of 0 if a firm is classified as unconstrained. Firms are sorted in financially constrained and unconstrained based on their pre-treatment ratio of total debt net of cash over the book value of assets as it compares to their industry median. A financial constraints main effect is not reported since it is absorbed by the firm fixed effects. All Columns include firm and year fixed effects. Columns 3 and 8 also include interacted 2-digit SIC industry and year fixed effects. Columns 4 and 9 add interacted region and year fixed effects. Columns 5 and 10 include region times 2-digit SIC industry times year fixed effects in addition to the firm fixed effects. Controls, where indicated, include firms' age, log(number of firms in an industry-region), regional unemployment rate and a measure of economic activity at the regional level. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% level respectively. Standard errors are clustered at the 2-digit SIC industry level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in the UK and covers years 2002-2009.

	Ln(1+Capex)					Capex/Assets				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$Announc._{Def1}$	0.126	0.128	0.131	0.134	0.136	0.007	0.006	0.006	0.006	0.005
	(0.035)***	(0.034)***	(0.032)***	(0.035)***	(0.040)***	(0.002)***	(0.002)***	(0.002)***	(0.002)***	(0.003)*
$Announc._{Def1} * FC$	-0.141	-0.140	-0.134	-0.131	-0.133	-0.006	-0.006	-0.006	-0.006	-0.006
	(0.063)**	(0.064)**	(0.064)**	(0.064)**	(0.067)**	(0.003)**	(0.003)**	(0.003)**	(0.003)**	(0.003)**
Adj. R^2	0.46	0.46	0.46	0.47	0.47	0.19	0.19	0.19	0.19	0.19
Obs.	17,364	17,364	17,364	17,364	17,364	17,364	17,364	17,364	17,364	17,364
Controls		X	X	X	X		X	X	X	X
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes				Yes	Yes			
Ind.*Year FE			Yes	Yes				Yes	Yes	
Region*Year FE				Yes					Yes	
Ind.*Reg.*Year FE					Yes					Yes

Table 2.6: Competitors' Strategic Investments and Financial Constraints (II)

This table summarizes the results of regressions of firms' investments on the Announcement Indicator variable, and a set of controls. The Announcement Indicator refers to firms announcing restructuring actions which improve their competitive position. These announcements are matched to a 3-digit SIC industry and to one region (out of 12) in the UK. Panel A looks at firms with low financial constraints or unconstrained firms and Panel B repeats the estimations for firms with high financial constraints or constrained firms. Firms are sorted in financially constrained and unconstrained based on their pre-treatment ratio of total debt net of cash over the book value of assets as it compares to their industry median. $Announc._{Def1}$ corresponds to the first definition presented in Table 2.4 and is lagged by one year. Investment of Competitor firms is defined as ln(1+Capex) in Columns 1-4 and as Capex/Assets in Columns 5-8 in both Panels. All Columns include firm and year fixed effects. Columns 3 and 7 also include interacted 2-digit SIC industry and year fixed effects and Columns 4 and 8 also include interacted region and year fixed effects. Controls, where indicated, include firms' age, log(number of firms in an industry-region), regional unemployment rate and a measure of economic activity at the regional level. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% level respectively. Standard errors are clustered at the 2-digit SIC industry level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in the UK and covers years 2002-2009.

	Ln(1+Capex)				Capex/Assets			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PANEL A: Low Financial Constraints								
$Announc._{Def1}$	0.117	0.119	0.127	0.121	0.0050	0.0051	0.0048	0.0044
	(0.033)***	(0.032)***	(0.033)***	(0.035)***	(0.0018)***	(0.0018)***	(0.0021)**	(0.0024)*
Adj. R^2	0.44	0.44	0.44	0.44	0.21	0.21	0.21	0.21
Obs.	8,205	8,205	8,205	8,205	8,205	8,205	8,205	8,205
PANEL B: High Financial Constraints								
$Announc._{Def1}$	-0.0090	-0.0059	0.0009	0.0091	-0.0001	-0.0001	0.0008	0.0007
	(0.0312)	(0.0318)	(0.0296)	(0.0352)	(0.0015)	(0.0015)	(0.0015)	(0.0016)
Adj. R^2	0.47	0.47	0.47	0.47	0.16	0.16	0.17	0.17
Obs.	9,159	9,159	9,159	9,159	9,159	9,159	9,159	9,159
Controls		X	X	X		X	X	X
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes			Yes	Yes		
Ind.*Year FE			Yes	Yes			Yes	Yes
Region*Year FE				Yes				Yes

Table 2.7: Competitors' Strategic Investments: An Alternative Measure of Financial Constraints

This table summarizes the results of regressions of firms' investments on the Announcement Indicator variable, the interaction of that indicator with a proxy of firms' financial constraints, and a set of controls. The Announcement Indicator refers to firms announcing restructuring actions which improve their competitive position. These announcements are matched to a 3-digit SIC industry and to one region (out of 12) in the UK. $Announc._{Def1}$ corresponds to the first definition presented in Table 2.4 and is lagged by one year. Firm Age Dummy is used as an alternative proxy for firms' financial constraints. It is a dummy which takes the value of 1 if a firm's median age is higher than the industry median and 0 otherwise. FC is a dummy defined as in Table 2.5. A financial constraints main effect is not reported (for both measures used) since it is absorbed by the firm fixed effects. All Columns include firm and year fixed effects. Columns 3 and 8 also include interacted 2-digit SIC industry and year fixed effects. Columns 4 and 9 add interacted region and year fixed effects. Columns 5 and 10 include region times 2-digit SIC industry times year fixed effects in addition to firm fixed effects. Controls, where indicated, include firms' age, log(number of firms in an industry-region), regional unemployment rate and a measure of economic activity at the regional level. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% level respectively. Standard errors are clustered at the 2-digit SIC industry level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in the UK and covers years 2002-2009.

	Ln(1+Capex)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$Announc._{Def1}$	0.0245	0.0189	0.0257	0.0324	0.0359	0.0988	0.0935	0.0970	0.1010	0.1025
	(0.0148)*	(0.0185)	(0.0135)*	(0.0250)	(0.0283)	(0.0396)**	(0.0421)**	(0.0391)**	(0.0464)**	(0.0487)***
$Announc._{Def1}$ *Firm Age Dummy	0.0407	0.0545	0.0532	0.0514	0.0500	0.0499	0.0638	0.0623	0.0606	0.0596
	(0.0162)**	(0.0217)**	(0.0190)***	(0.0222)**	(0.0223)**	(0.0255)**	(0.0312)**	(0.0279)**	(0.0284)**	(0.0248)**
$Announc._{Def1}$ *FC						-0.1437	-0.1444	-0.138	-0.135	-0.137
						(0.0614)**	(0.06127)**	(0.0615)**	(0.0604)**	(0.0632)**
Adj. R^2	0.46	0.46	0.46	0.47	0.47	0.46	0.46	0.46	0.47	0.47
Obs.	17,364	17,363	17,364	17,364	17,364	17,364	17,364	17,364	17,364	17,364
Controls		X	X	X	X		X	X	X	X
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes				Yes	Yes			
Ind.*Year FE			Yes	Yes				Yes	Yes	
Region*Year FE				Yes					Yes	
Ind.*Reg.*Year FE					Yes					Yes

Table 2.8: Why Local? Evidence that Firms Compete Locally

This table summarizes the results from regressions of firms' investments on the Announcement Indicator, the interaction of that indicator with a proxy of firms' exports, a proxy for competition at the industry-region level and for competition at the industry level and a set of controls. The regressions are similar to those reported in Table 2.5, but the sample includes only observations for firms that have low financial constraints. Firms are sorted in financially constrained and unconstrained based on their pre-treatment ratio of total debt net of cash over the book value of assets as it compares to their industry median. Export Dummy, in Columns 1-3, is a dummy which takes the value of 1 if the pre-treatment percentage of sales that firms export is higher compared to the industry median and 0 otherwise. Local Industry HHI in Columns 4-6 is a measure of firms' competition at the industry-region level, which takes lower values the higher the degree of competition in an industry and region. It is a Herfindahl Index, constructed in-sample using information on the pre-treatment firms' sales. Industry HHI in Columns 7-9 is the same measure with the one of Columns 4-6, but it is measured at the industry level instead of the industry-region level. The main effects of the variables interacted with the Announcement Indicator are not reported since they are absorbed by the firm fixed effects. All Columns include firm fixed effects. Columns 1, 4, and 7 add interacted 2-digit SIC industry and year fixed effects and Columns 2, 5 and 8 add interacted region and year fixed effects. Columns 3, 6 and 9 include region times 2-digit SIC industry times year fixed effects in addition to the firm fixed effects. *, **, ***, indicates significance at the 10%, 5% and 1% level respectively. Standard errors are clustered at the 2-digit SIC industry level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in the UK and covers years 2002-2009.

	Ln(1+Capex)								
	Low Financial Constraints								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Announc._{Def1}$	0.210	0.240	0.222	0.030	0.049	-0.003	0.130	0.166	0.121
	(0.110)*	(0.093)**	(0.187)	(0.082)	(0.095)	(0.132)	(0.069)*	(0.067)**	(0.068)*
$Announc._{Def1}$ *Export Dummy	-0.265	-0.334	-0.427						
	(0.129)**	(0.161)**	(0.167)**						
$Announc._{Def1}$ *Local Industry HHI				0.389	0.340	0.622			
				(0.174)**	(0.232)	(0.339)*			
$Announc._{Def1}$ *Industry HHI							-0.168	-0.576	0.474
							(0.890)	(0.874)	(1.035)
Adj. R^2	0.47	0.47	0.48	0.47	0.47	0.47	0.47	0.47	0.47
Obs.	2,936	2,936	2,936	6,334	6,334	6,334	6,334	6,334	6,334
Controls	X	X	X	X	X	X	X	X	X
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind.*Year FE	Yes	Yes		Yes	Yes		Yes	Yes	
Region*Year FE		Yes			Yes			Yes	
Ind.*Reg.*Year FE			Yes			Yes			Yes

Table 2.9: Dynamic Analysis

This table summarizes the results of regressions of sales growth (Columns 1-3), asset growth (Columns 4-6), Return on Assets (Columns 7-9) and Cashflows to Sales (Columns 10-12) on the two-year lagged ($Announc._{Def1,(t-2)}$) and one-year lagged ($Announc._{Def1,(t-1)}$), the contemporaneous ($Announc._{Def1,(t)}$) and the one-year forward ($Announc._{Def1,(t+1)}$) values of the Announcement Indicator and a set of controls. The Announcement Indicator refers to firms announcing restructuring actions which improve their competitive position. These announcements are matched to a 3-digit SIC industry and to one region (out of 12) in the UK. $Announc._{Def1}$ corresponds to the first definition presented in Table 2.4 and is lagged by one year. Columns 1, 4, 7 and 10 include firm and year fixed effects. Columns 2, 5, 8 and 11 add interacted 2-digit SIC industry and year fixed effects. Columns 3, 6, 9 and 12 include also interacted region and year fixed effects. Controls, where indicated, include firms' age, log(number of firms in an industry-region), regional unemployment rate and a measure of economic activity at the regional level. Robust standard errors are reported in parentheses. Standard errors are clustered at the 2-digit SIC industry level. *, **, ***, indicates significance at the 10%, 5% and 1% level respectively. Standard errors are clustered at the 2-digit SIC industry level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in the UK and covers years 2002-2009.

	Sales Growth			Asset Growth			ROA			Cash Flows/Sales		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$Announc._{Def1,(t-2)}$	0.0141	0.0145	0.0144	0.0171	0.0163	0.0182	0.0032	0.0032	0.0042	0.117	0.088	0.163
	(0.0089)	(0.0079)*	(0.0065)**	(0.0070)**	(0.0063)**	(0.0072)**	(0.0028)	(0.0028)	(0.0030)	(0.224)	(0.188)	(0.249)
$Announc._{Def1,(t-1)}$	-0.0020	-0.0002	0.0019	0.0014	0.0004	0.0002	-0.0010	-0.0016	-0.0013	-0.090	-0.123	-0.108
	(0.0058)	(0.0062)	(0.0059)	(0.0031)	(0.0029)	(0.0035)	(0.0015)	(0.0017)	(0.0016)	(0.211)	(0.200)	(0.202)
$Announc._{Def1,(t)}$	-0.0019	-0.0040	-0.0047	-0.0040	-0.0036	-0.0027	0.0003	-0.0003	-0.0004	0.165	0.114	0.146
	(0.0045)	(0.0040)	(0.0035)	(0.0056)	(0.0055)	(0.0054)	(0.0010)	(0.0004)	(0.0004)	(0.153)	(0.158)	(0.118)
$Announc._{Def1,(t+1)}$	0.0048	0.0037	0.0036	0.0068	0.0055	0.0067	0.0005	0.0008	0.0012	0.073	0.093	0.067
	(0.0035)	(0.0039)	(0.0038)	(0.0045)	(0.0037)	(0.0047)	(0.0008)	(0.0010)	(0.0011)	(0.089)	(0.104)	(0.121)
Adj. R^2	0.18	0.18	0.18	0.13	0.13	0.13	0.55	0.55	0.55	0.49	0.49	0.49
Obs.	15,737	15,737	15,737	25,032	25,032	25,032	25,766	25,766	25,766	19,111	19,111	19,111
Controls	X	X	X	X	X	X	X	X	X	X	X	X
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes			Yes			Yes			Yes		
Ind.*Year FE		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes
Region*Year FE			Yes			Yes			Yes			Yes

Table 2.10: Competitors' Strategic Investments: Internal Capital Markets

This table summarizes the results of regressions of firms' investments on the Announcement Indicator variable, and a set of controls. The Announcement Indicator refers to firms announcing restructuring actions which improve their competitive position. These announcements are matched to a 3-digit SIC industry and to one region (out of 12) in the UK. The sample includes only firms in industry-region groups with announcements (treated firms) which share common ownership with other firms in different industry-region groups (control firms). Firms are included in this analysis only if they share common ownership. $Announc._{Def1}$ corresponds to the first definition presented in Table 2.4 and is lagged by one year. Investment of Competitor firms is defined as ln(1+Capex) in Columns 1-4 and as Capex/Assets in Columns 5-8. All Columns include firm and year fixed effects. Columns 3 and 7 also include interacted 2-digit SIC industry and year fixed effects and Columns 4 and 8 also include interacted region and year fixed effects. Controls, where indicated, include firms' age, log(number of firms in an industry-region), regional unemployment rate and a measure of economic activity at the regional level. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% level respectively. Standard errors are clustered at the 2-digit SIC industry level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in the UK and covers years 2002-2009.

	Ln(1+Capex)				Capex/Assets			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Announc._{Def1}$	0.086	0.094	0.119	0.128	0.0036	0.0037	0.0048	0.0028
	(0.059)	(0.064)	(0.100)	(0.120)	(0.0015)**	(0.0017)**	(0.0018)***	(0.0030)
Controls		X	X	X		X	X	X
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes			Yes	Yes		
Ind.*Year FE			Yes	Yes			Yes	Yes
Region*Year FE				Yes				Yes
Adj. R^2	0.53	0.53	0.52	0.50	0.22	0.22	0.22	0.25
Obs.	1,089	1,089	1,089	1,089	1,089	1,089	1,089	1,089

Table 2.11: A Falsification Test: Estimates from Announcements that Reveal Bad News

The estimations in this table present a falsification test. The Announcement Indicator refers here to a different set of restructuring actions which reveal bad news for the announcing firms. As in the previous analysis, these announcements are matched to a 3-digit SIC industry and to one region (out of 12) in the UK. The regressions study the reaction of competitor firms, i.e., of firms matched to the same industry-region pair as the announcing firms, to these announcements in terms of their investment activity. The regression specifications are the same as the ones reported in Table 2.5 but the Announcement Indicator in this Table includes this different set of announcements. *, **, ***, indicates significance at the 10%, 5% and 1% level respectively. Standard errors are clustered at the 2-digit SIC industry level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in the UK and covers years 2002-2009.

	Ln(1+Capex)					Capex/Assets				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$Announc._{Def1}$	-0.0102	-0.0113	-0.0209	-0.0172	-0.0095	-0.0001	-0.0002	-0.0006	-0.0004	-0.0004
	(0.0211)	(0.0212)	(0.0183)	(0.0208)	(0.0275)	(0.0018)	(0.0017)	(0.0017)	(0.0017)	(0.0026)
$Announc._{Def1}$*FC	-0.0194	-0.0224	-0.0152	-0.0100	-0.0143	-0.0003	-0.0004	-0.0002	0.0001	0.0001
	(0.0360)	(0.0350)	(0.0360)	(0.0364)	(0.0408)	(0.0027)	(0.0027)	(0.0027)	(0.0027)	(0.0032)
Adj. R^2	0.47	0.47	0.47	0.47	0.47	0.19	0.19	0.19	0.19	0.19
Obs.	18,947	18,947	18,947	18,947	18,947	18,947	18,947	18,947	18,947	18,947
Controls		X	X	X	X		X	X	X	X
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes				Yes	Yes			
Ind.*Year FE			Yes	Yes				Yes	Yes	
Region*Year FE				Yes					Yes	
Ind.*Reg.*Year FE					Yes					Yes

Table 2.12: Wages and Hiring

This table summarizes the results of regressions of wages per employee (Panels A and B) and of number of employees (Panel C) on the Announcement Indicator variable and a set of controls. The Announcement Indicator refers to firms announcing restructuring actions and it concerns all announcements included in Tables 2.4 and 2.11, since all these announcements involve layoffs of workers and therefore should impact the input markets of competitor firms. These announcements are matched to a 3-digit SIC industry and to one region (out of 12) in the UK. $Announc._{Def1}$ corresponds to the first definition presented in Table 2.4 and is lagged by one year in Columns 1 to 3 and by 2 years in Columns 4 to 6 in all Panels. In Panels A and B, the dependent variable is the logarithm of wages divided by the number of employees and in Panel C, the dependent variable is the logarithm of the number of employees. Columns 1 and 4 include firm and year fixed effects. Columns 2 and 5 also include interacted 2-digit SIC industry and year fixed effects, while Columns 3 and 6 add interacted region and year fixed effects. Controls include firms' tangibility, return on assets, logarithmic value of assets (apart from Panel C), age, log(number of firms in an industry-region), regional unemployment rate and a measure of economic activity at the regional level. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% level respectively. Standard errors are clustered at the 2-digit SIC industry level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in the UK and covers years 2002-2009.

	Ln(Wages/Employees)					
	PANEL A					
	(1)	(2)	(3)	(4)	(5)	(6)
$Announc._{Def1,(t-1)}$	-0.0019	-0.0024	-0.0023			
	(0.0011)*	(0.0009)**	(0.0009)**			
$Announc._{Def1,(t-2)}$				-0.0017	-0.0021	-0.0022
				(0.0010)*	(0.0008)**	(0.0008)**
Adj. R^2	0.87	0.87	0.87	0.88	0.88	0.88
Obs.	38,682	38,682	38,682	31,858	31,858	31,858
	Ln(Wages/Employees)					
	PANEL B					
	(1)	(2)	(3)	(4)	(5)	(6)
	Low Financial Constraints			High Financial Constraints		
$Announc._{Def1,(t-1)}$	-0.0028	-0.0028	-0.0029			
	(0.0012)**	(0.0013)**	(0.0017)*			
$Announc._{Def1,(t-2)}$				-0.0017	-0.0025	-0.0028
				(0.0011)	(0.0008)***	(0.0008)***
Adj. R^2	0.86	0.86	0.86	0.89	0.89	0.89
	Ln(Employees)					
	PANEL C					
	(1)	(2)	(3)	(4)	(5)	(6)
	Low Financial Constraints			High Financial Constraints		
$Announc._{Def1,(t-1)}$	0.0057	0.0036	0.0039			
	(0.0021)**	(0.0021)*	(0.0022)*			
$Announc._{Def1,(t-2)}$				-0.0020	-0.0011	-0.0016
				(0.0047)	(0.0030)	(0.0032)
Adj. R^2	0.96	0.96	0.96	0.95	0.95	0.95
Controls	X	X	X	X	X	X
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes			Yes		
Ind.*Year FE		Yes	Yes		Yes	Yes
Region*Year FE			Yes			Yes

Table 2.13: Wages and Workers' Outside Option

This table summarizes the results of regressions of wages per employee (Panel A) and of total wages (Panel B) on the Announcement Indicator variable, the interaction of that indicator with a proxy for unions and for workers' skills and a set of controls. The Announcement Indicator refers to firms announcing restructuring actions and it concerns all announcements included in Tables 2.4 and 2.11, since all these announcements involve layoffs of workers and therefore should impact the input markets of competitor firms. These announcements are matched to a 3-digit SIC industry and to one region (out of 12) in the UK. $Announc._{Def1}$ corresponds to the first definition presented in Table 2.4 and is lagged by one year. In Panel A, the dependent variable is the logarithm of wages divided by the number of employees and in Panel B, the dependent variable is the logarithm of wages. The sample in Panel A includes all firms, while in Panel B it includes only those with high financial constraints (as defined in Table 2.5). Union indicates unionization rates of 3-digit SIC industries in the US for 2002. The source of this variable is the Barry T. Hirsch and David A. Macpherson database (2003). Skills is a proxy for workers' skills. It is a dummy which takes the value of 1 if a firm belongs to a high technology industry and is located in a high technology region and the value of 0 if it belongs to a low technology industry and is located in a low technology region in the UK. All other combinations (i.e., firms in high technology industries but low technology regions and vice-versa) are dropped from the sample in Columns 4-6 in both Panels. Union and Skill main effects are not reported since they are absorbed by the firm fixed effects. All Columns include firm fixed effects. Columns 1 and 4 also include interacted 2-digit SIC industry and year fixed effects. Columns 2 and 5 add interacted region and year fixed effects. Columns 3 and 6 add region times 2-digit SIC industry times year fixed effects to the firm fixed effects. Controls include firms' tangibility, return on assets, logarithmic value of assets (apart from Panel B), age, log(number of firms in an industry-region), regional unemployment rate and a measure of economic activity at the regional level. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% level respectively. Standard errors are clustered at the 2-digit SIC industry level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in the UK and covers years 2002-2009.

	Ln(Wages/Employees)					
	PANEL A					
	(1)	(2)	(3)	(4)	(5)	(6)
$Announc._{Def1}$	-0.0040	-0.0041	-0.0054	-0.0057	-0.0053	-0.0058
	(0.0013)***	(0.0014)***	(0.0024)**	(0.0017)***	(0.0020)***	(0.0025)**
$Announc._{Def1}$*Union	0.0165	0.0180	0.0250			
	(0.0060)***	(0.0063)***	(0.0113)**			
$Announc._{Def1}$*Skills				0.0051	0.0048	0.0047
				(0.0025)**	(0.0028)*	(0.0041)
Adj. R^2	0.88	0.88	0.88	0.88	0.88	0.88
Obs.	33,738	33,738	33,738	21,455	21,455	21,455

Table 2.13-*Continued*

	Ln(Wages)					
	PANEL B: High Financial Constraints					
	(1)	(2)	(3)	(4)	(5)	(6)
$Announc._{Def1}$	-0.0147	-0.0167	-0.0154	-0.0103	-0.0010	-0.0096
	(0.0052)***	(0.0052)***	(0.0060)**	(0.0022)***	(0.0031)***	(0.0026)***
$Announc._{Def1}$*Union	0.0815	0.0863	0.0838			
	(0.0311)**	(0.0248)***	(0.0395)**			
$Announc._{Def1}$*Skills				0.0085	0.0079	0.0070
				(0.0079)	(0.0086)	(0.0136)
Adj. R^2	0.94	0.94	0.94	0.94	0.94	0.94
Obs.	20,321	20,321	20,321	12,869	12,869	12,869
Controls	X	X	X	X	X	X
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind.*Year FE	Yes	Yes		Yes	Yes	
Region*Year FE		Yes			Yes	
Ind.*Reg.*Year FE			Yes			Yes

Table 2.14: Labor Markets Interact with Product Markets

This table summarizes the results from regressions of firms' investments on the Announcement Indicator, the interaction of that indicator with two measures of workers' wages and a set of controls. The regressions are similar to those reported in Table 2.5, but the sample includes only observations for firms that have low financial constraints. Firms are sorted in financially constrained and unconstrained based on their pre-treatment ratio of total debt net of cash over the book value of assets as it compares to their industry median. All Columns include firm fixed effects. Columns 1 and 4 include interacted 2-digit SIC industry and year fixed effects and Columns 2 and 5 add interacted region and year fixed effects. Columns 3 and 6 include region times 2-digit SIC industry times year fixed effects in addition to firm fixed effects. *, **, ***, indicates significance at the 10%, 5% and 1% level respectively. Standard errors are clustered at the 2-digit SIC industry level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in the UK and covers years 2002-2009.

	Ln(1+Capex)					
	Firms with Low Financial Constraints					
	(1)	(2)	(3)	(4)	(5)	(6)
$Announc._{Def1}$	2.491	2.492	3.232	0.226	0.243	0.238
	(0.638)***	(0.567)***	(1.347)**	(0.036)***	(0.033)***	(0.061)***
$Announc._{Def1}$*ln(Wages/Employee)	-0.229	-0.228	-0.297			
	(0.063)***	(0.056)***	(0.131)**			
$Announc._{Def1}$*%change (Wages/Employee)				-0.012	-0.011	-0.009
				(0.005)**	(0.005)**	(0.001)
ln(Wages/Employee)	0.275	0.292	0.244			
	(0.246)	(0.269)	(0.489)			
%change (Wages/Employee)				0.025	0.018	0.018
				(0.012)**	(0.010)*	(0.014)
Adj. R^2	0.43	0.44	0.44	0.43	0.44	0.44
Obs.	5,428	5,428	5,428	5,306	5,306	5,306
Controls	X	X	X	X	X	X
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind.*Year FE	Yes	Yes		Yes	Yes	
Region*Year FE		Yes			Yes	
Ind.*Reg.*Year FE			Yes			Yes

Table 2.15: Further Robustness Tests

This table summarizes the results of regressions of firms' investments (Columns 1-5) and of wages per employee (Columns 6-7) on the Announcement Indicator variable and a set of controls. The regression specifications in Columns 1-3 are the same as the ones reported in Columns 3-5 of Table 2.5. The regression specifications in Columns 4-5 are the same as the ones reported in Columns 3-4 of Panel A, Table 2.6 , while those in Columns 6-7 are the same as the ones reported in Columns 2-3 of Panel A, Table 2.12. The difference in this table is that the coefficients are estimated in a subsample which includes only private firms and only firms with less than 100 employees. **, **, ***, indicates significance at the 10%, 5% and 1% level respectively. Standard errors are clustered at the 2-digit SIC industry level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in the UK and covers years 2002-2009.

	Ln(1+Capex)			Ln(1+Capex)		Ln(Wages/Employees)	
				Low Financial Constraints			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$Announc._{Def1}$	0.174	0.176	0.218	0.176	0.165	-0.0025	-0.0024
	(0.040)***	(0.042)***	(0.090)**	(0.046)***	(0.043)***	(0.0015)*	(0.0017)
$Announc._{Def1}$*FC	-0.199	-0.197	-0.230				
	(0.091)**	(0.090)**	(0.120)**				
Adj. R^2	0.37	0.37	0.37	0.64	0.65	0.89	0.89
Obs.	9,417	9,417	9,417	4,509	4,509	22,879	22,879
Controls	X	X	X	X	X	X	X
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind.*Year FE	Yes	Yes		Yes	Yes	Yes	Yes
Region*Year FE		Yes			Yes		Yes
Ind.*Reg.*Year FE			Yes				

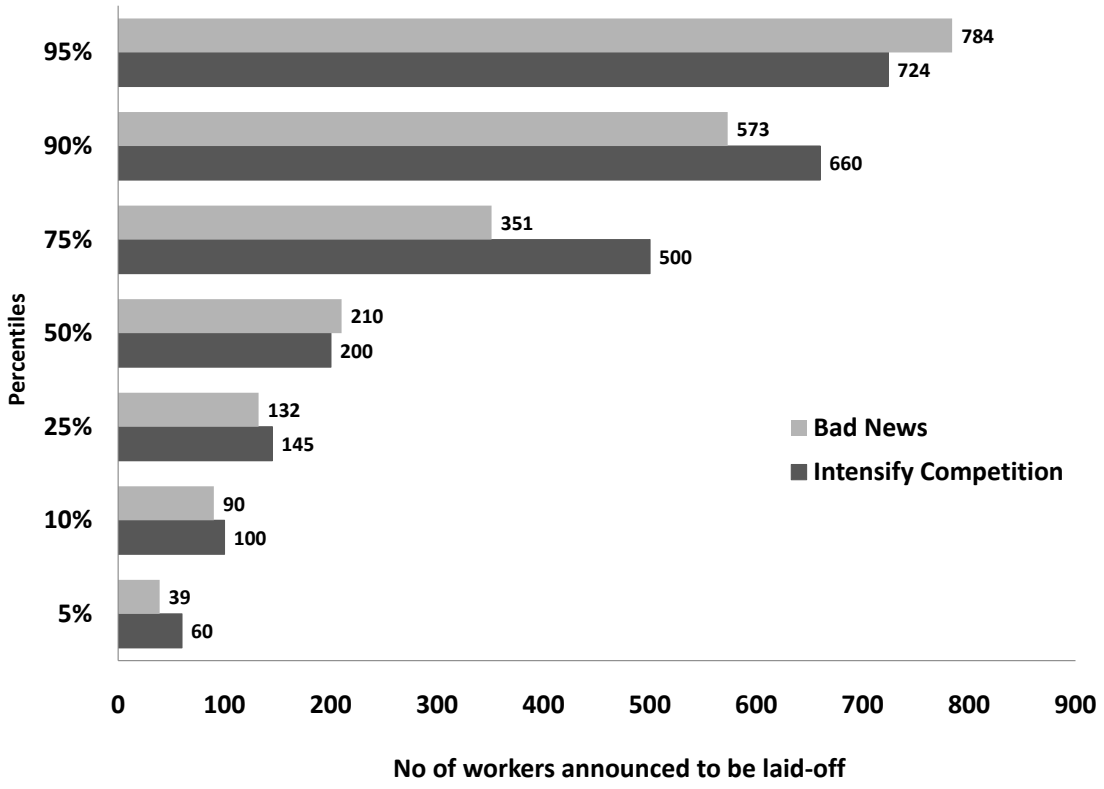

Figure 2.1: Distribution of the number of workers announced to be laid-off.

The Figure plots the distribution of the total number of layoffs announced in the industry-region pairs with announcements. This information is presented for two types of announcements: for restructuring announcements which indicate that competition intensifies and for restructuring announcements which reveal bad news.

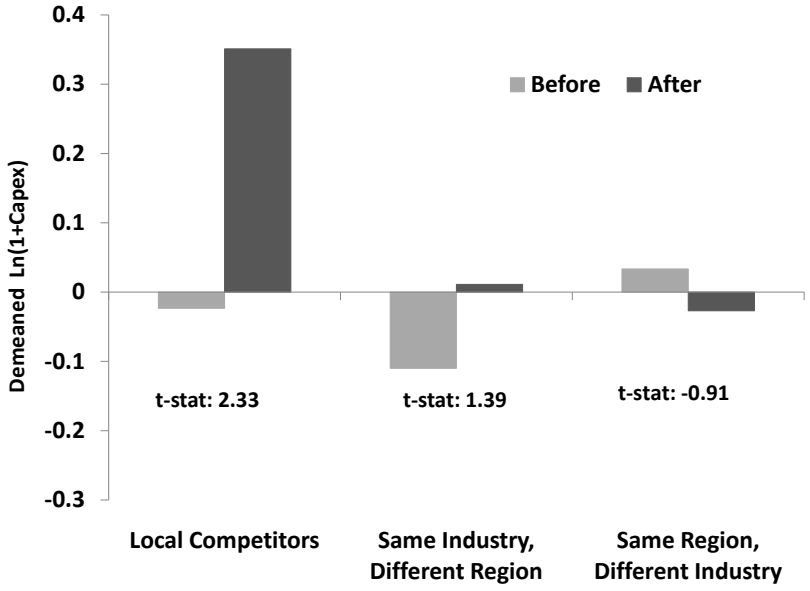

Figure 2.2: Investments of other firms one year before and one year after the announcement dates.

The Figure plots de-meaned average values of ln(1+Capex) in the year before and the year after the announcements of restructuring actions which improve the competitive position of the announcing firm. The graph includes three different sets of firms: (i) firms' local competitors, i.e., firms in the same (3-digit SIC) industry and in the same region as the announcing firms, (ii) firms in the same (3-digit SIC) industry but located in different regions from the announcing firms, and (iii) firms in the same region but operating in different (3-digit SIC) industries from the announcing firms. The demeaning is done relative to each 3-digit SIC industry. The graph reports the t-statistics for the difference between firms' investment before and after the announcements. Standard errors are corrected to take into account the lack of independence of observations.

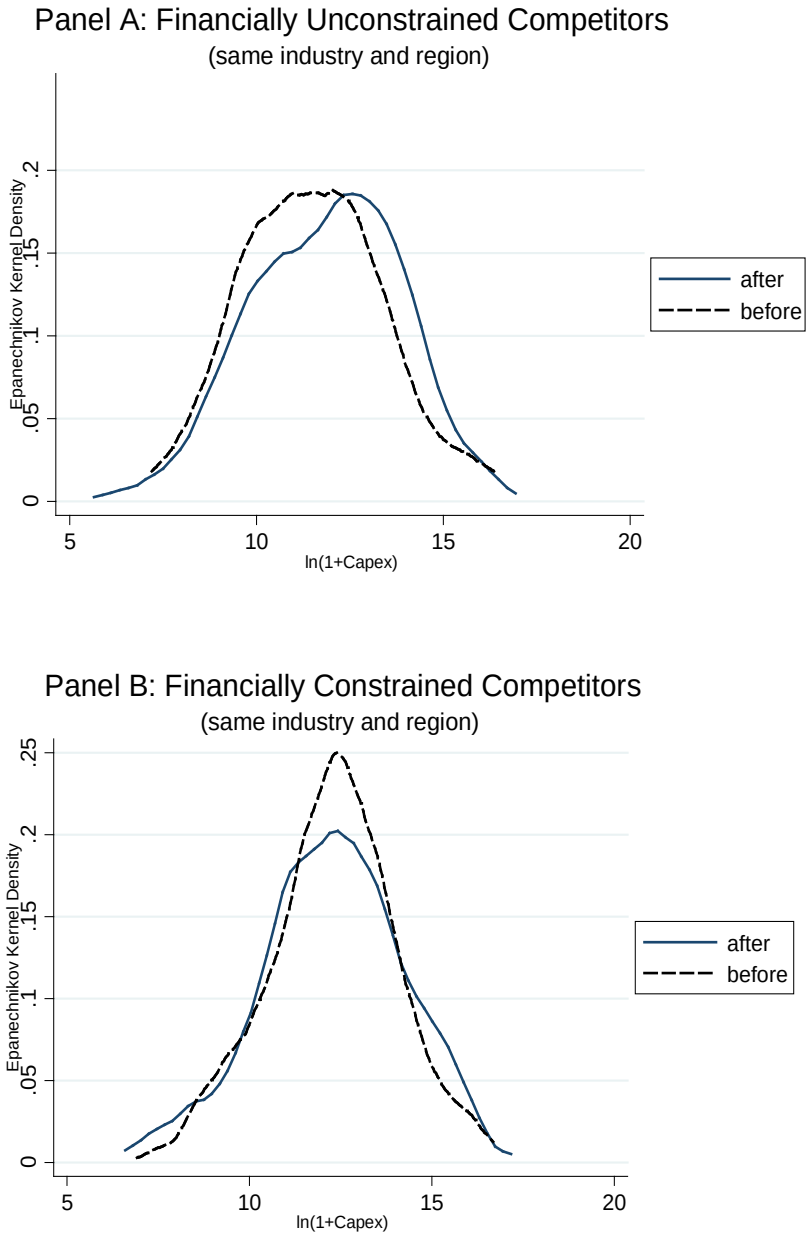

Figure 2.3: Distributions of Investments of Local Competitors.
The Figure plots the distribution functions of ln(1+Capex) of firms in the same industries and regions as the announcing firms before and after the announcements. Panel A includes the financially unconstrained local competitors and Panel B includes the financially constrained ones. Firms are sorted in financially constrained and unconstrained based on their pre-treatment ratio of total debt net of cash over the book value of assets as it compares to their industry median. The Kolmogorov-Smirnov test of equality of distributions functions is rejected at the 1% level in Panel A, but cannot be rejected for the constrained competitors in Panel B (p-value: 0.72). Sample covers years 2002-2009.

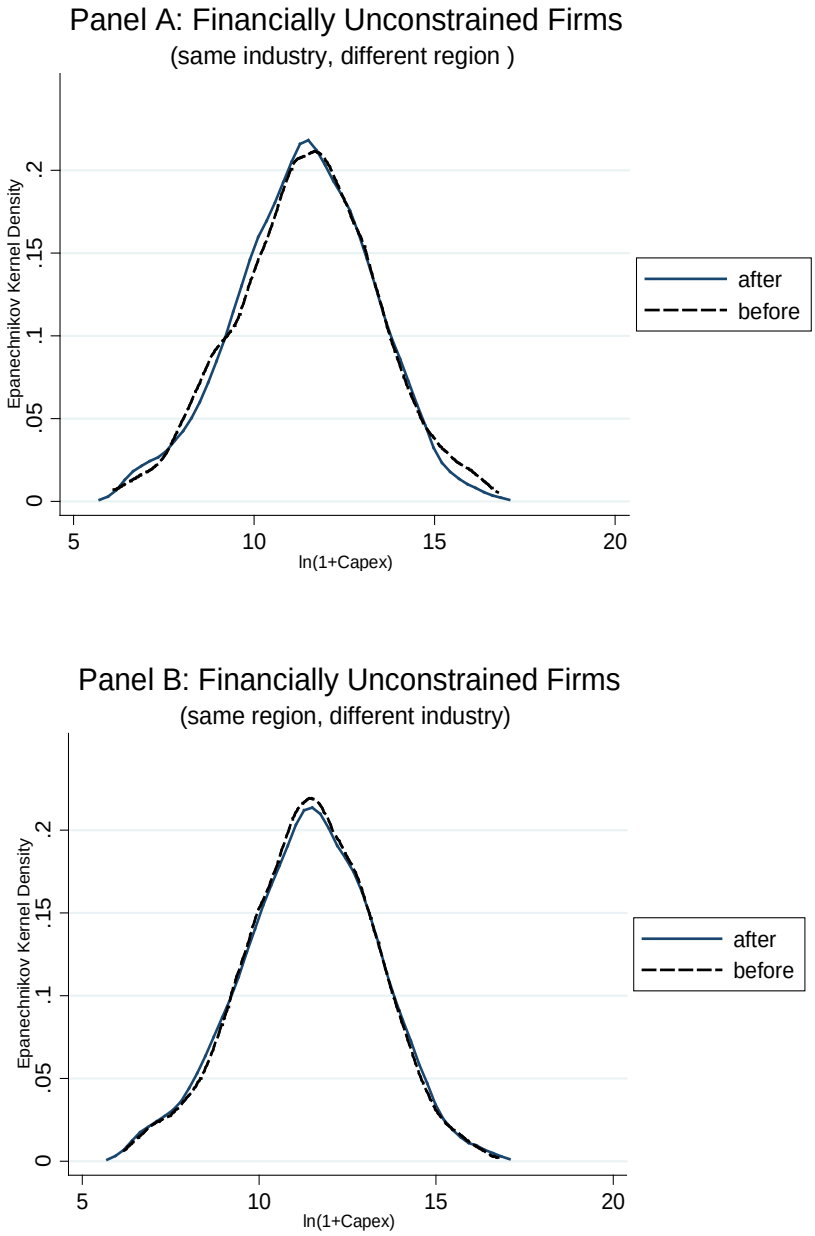

Figure 2.4: Distributions of Investments of Financially Unconstrained Firms in Different Industries or Regions.

The Figure plots the distribution functions of ln(1+Capex) of financially unconstrained firms before and after the announcement. Panel C includes firms in the same industries with the announcing firms but located in different regions. Panel B includes firms located in the same regions with the announcing firms but operating in different industries. Firms are characterized as financially unconstrained based on their pre-treatment ratio of total debt net of cash over the book value of assets as it compares to their industry median. The Kolmogorov-Smirnov test of equality of distributions functions cannot be rejected in both Panels (p-value: 0.60, Panel A and p-value:0.30, Panel B). Sample covers years 2002-2009.

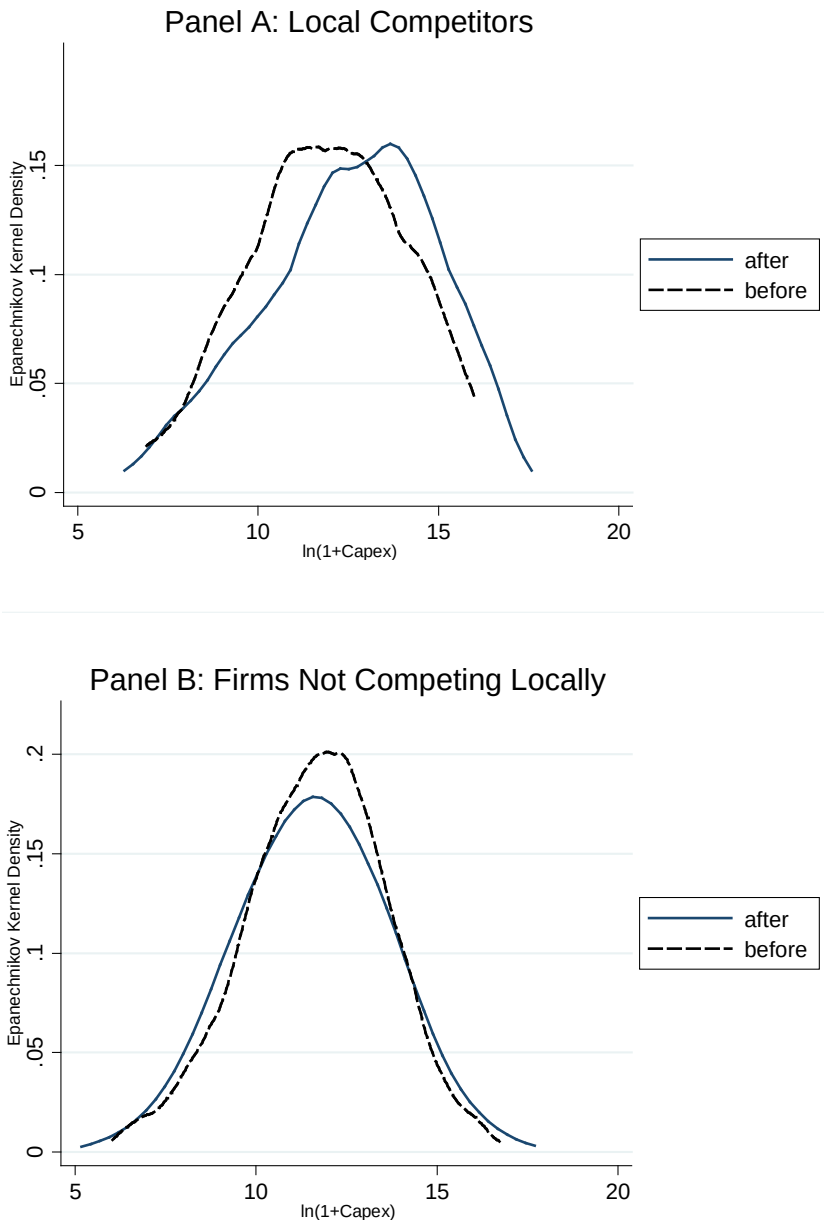

Figure 2.5: Distributions of Investments of Firms with Common Ownership.

The Figure plots the distribution functions of ln(1+Capex) of firms before and after the announcement. This analysis includes only firms in industry-region groups with announcements (treated firms) which share common ownership with other firms in different industry-region groups (control firms). Panel A includes firms in the same industry-regions with the announcing firms, while Panel B includes firms in different industries or regions from the announcing firms. The Kolmogorov-Smirnov test of equality of distributions functions is rejected at the 10% level in Panel A, but cannot be rejected for firms in Panel B (p-value: 0.24). Sample covers years 2002-2009.

Chapter 3

Labor and Finance: Part I

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3.1 Introduction

The recent financial crisis and the subsequent global recession have once again brought the contentious topic of employment protection at the forefront of the policy debate. Policymakers around the world are contemplating how to reform the rules that govern the relationship between labor and capital. While some countries, such as the US and the UK, are moving towards more labor protection, Continental European countries are discussing how to amend their current labor laws in order to reduce labor market rigidity.[2]

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[2] As a response to the threat associated with private equity, in 2007 the U.K. government proposed a bill to introduce greater employment protection for employees who work in businesses that are changing ownership by share transfer. Similarly, in the US the recent crisis has led to renewed demand for employment protection. The concern among some commentators and policymakers is that the flexible labor laws in the U.S. may have exacerbated the crisis, as the U.S. may have become a dumping ground for multinational firms unemployment.

Whether the benefits of employment protection outweigh its costs is unclear. On the one hand, the critics of labor-friendly legislation argue that legal restrictions on labor contracts impair the efficiency of labor markets and have a debilitating effect on job creation and employment. This provides a rationale for reducing employment protection. On the other hand, the proponents of labor protection claim that lay-offs generate significant negative externalities that firms fail to internalize. Consequently, labor laws provide a way of ensuring that firms internalize these externalities and avoid negative spillover effects in times of crises. This chapter provides evidence in support for the critical view and shows that stronger labor protection restricts firms' access to external capital and growth.

Our theoretical argument builds on the idea that pro-labor regulation implicitly makes labor claims rigid and difficult to restructure. The greater rigidity of labor costs brought about by labor friendly laws affects firms' ability to access external finance and generates a crowding out effect: stronger labor protection causes labor to crowd out finance and investment. We develop a simple and tractable model to capture this idea and motivate our empirical analysis. The main building block of the model is that employment protection reduces firms' ability to restructure their labor force when faced with a technology shock that makes the skill set of existing workers obsolete and thus requires firms to replace existing workers with new ones. In the presence of such a "creative destruction" shock, rigidity in employment contracts reduces firms' ability to adapt to the changing economic environment. This, in turn, leads to the inefficient liquidation of assets (when the labor force cannot be replaced), which reduces firms' cash flows and firms' borrowing capacity.

We test the model's implications using firm-level data from 21 countries over the 1985-2004 period. Specifically, we exploit inter-temporal variations in employment protection laws across countries and adopt a difference-in-differences (DID) research design to investigate the impact of labor reforms on firms' external financing.[3] We find that a one-unit increase in labor protection, as proxied by

[3]These changes in regulation represent a near-ideal setting since they are exogenous to the

Employment Protection Legislation, is associated with a reduction of debt by 4% (in absolute terms) or of 14% (relative to the mean). Another way of interpreting this finding is that going from a country like Canada to a country like Italy (with an increase in EPL of 2) leverage should decrease by 8% (in absolute terms) or 29% (in relative terms). These results are robust across a variety of empirical specifications and indicate that labor protection increases the cost of debt financing and crowds out external finance.

Consistent with our proposed explanation, we find that the negative relation between employment protection and leverage is more pronounced in labor-intensive industries. It is also more pronounced where "creative destruction" is more common - that is, in sectors that engage more frequently in hiring and firing.

Furthermore, we examine the differential effect of labor protection on leverage depending on the liquidation value of firms' assets. It is natural to expect (and is also consistent with our theoretical model) that rigidity of labor claims is associated with lower efficiency losses in firms with higher liquidation values and thus lower recovery losses. Consistent with this prediction, we find that labor-friendly laws reduce leverage more in industries with less tangible assets and in countries with weaker creditor protection, which we use as proxies for low liquidation value of the assets.

These cross-sectional heterogeneity results have also the benefit that they mitigate concerns about omitted variables. While our identification strategy (DID) alleviates some of the concerns, it is possible that our results may be due to other contemporaneous reforms (such as changes in taxation or corporate governance reforms). If this were the case, we would incorrectly attribute the changes in leverage to changes in labor laws. Exploiting cross-sectional heterogeneity is useful since such effects would be differenced out in our specifications. Also, in such a setup we can control for interacted year and country fixed effects, therefore controlling for any differences in the regulatory environment over time and across countries.

individual firm.

One further concern could be that our findings are due to some pre-treatment trends or business cycle effects, or even to the endogeneity of labor laws themselves (political economy of these reforms), and not due to changes in labor protection. For this purpose, we examine the dynamics of leverage around the passage of these laws. We find no statistically significant change in leverage prior to the passage of these laws but we find a change in leverage one and two years after the passage of the laws. This finding alleviates the concerns of reverse causality and/or pre-treatment trends that may confound the analysis.

So far, we have emphasized the supply channel through which employment legislation affects firms' access to external finance. Alternatively, it is possible that a demand channel generates similar results. For example, consistent with the argument in Besley and Burgess (2004), employment protection may reduce the demand for finance by decreasing entrepreneurs' incentives to invest. To rule out this explanation, we study the effect of changes in EPL on growth of sales and capital expenditure across firms that differ in their dependence on external finance. A direct implication of our supply-side story is that firms which rely more on external financing should witness a bigger drop in growth and investment when EPL increases. Consistent with this explanation but not with the demand channel, we find that the reduction in sales' growth and capital expenditure associated with an increase in EPL is more pronounced in firms that are more dependent on external capital.

If labor regulations impose an extra cost on firms, it is likely that firms may respond in a Coasian manner to undo some of these effects. A plausible way to achieve this would be by relying more on short-term debt and trade credit. These are by nature more short term, and therefore, they are less likely to be affected by the losses associated with rigid labor contracts. Indeed, we find evidence of an increase in trade credit and short-term debt following an increase in EPL, although the effect on short-term debt is not statistically significant.

This chapter connects several strands of literature, starting with the recent lit-

erature on labor regulations and economic growth. Using industry level data from India, Besley and Burgess (2004) find that more pro-worker regulation is associated with lower investment and economic growth. Botero et al. (2004) show that more stringent labor regulation is associated with lower labor force participation and higher unemployment. Contrarian evidence is offered by Acharya, Baghai and Subramanian (2009), who find that pro-labor laws can have an ex-ante positive effect on firms' innovation. This chapter revisits the link between labor regulation and growth using micro-level evidence and identifies the mechanism through which labor stifles growth, namely labor crowds out external finance.

This chapter also builds on the literature on labor bargaining and firm financing and real activity. Ruback and Zimmerman (1984), Abowd (1989) and Hirsch (1991) document that labor union coverage has a negative association with US firms earnings' and market values. Lee and Mas (2009) study the impact of firm-level union elections on firm performance and find that union wins are associated with stock price losses, decreases in firm profitability and growth. Chen, Kacperczyk and Molina (2011) document that the cost of equity is higher in more unionized industries. Atanassov and Kim (2009) provide international evidence that strong unions play an important role in firms' financial and economic restructuring. Benmelech, Bergman and Enriquez (2009) show that companies in financial distress extract surplus from workers by achieving substantial wage concessions.

In addition, this chapter relates to the stream of the literature which studies the bargaining role of debt (Perotti and Spier (1993), Bronars and Deere (1991), Dasgupta and Sengupta (1993), Matsa (2010a)). This literature has argued that firms use debt to lower the surplus workers can extract when bargaining with unions. While this chapter does not directly look at unions per se, labor laws can affect the bargaining between firms and workers as it changes the outside option of the workers. Furthermore, unions may operate through a similar mechanism as EPL - they make labor contracts more rigid. To the extent that unions introduce the same rigidity, there may be a countervailing force on financial structure that

may come from the supply side as documented in this chapter. This countervailing force - namely, the fact that an increase in labor bargaining power may lead to a reduction in firms' debt capacity - could explain why the CFOs surveyed by Graham and Harvey (2001) do not believe that strategic arguments are an important determinant of capital structure.

Finally, this chapter contributes to a broader literature which argues that firms' input markets and product markets are important factors interacting with firms' capital structure decisions. Mackay and Phillips (2005) find that firms' position within their industries determine their financial structure. Leary and Roberts (2010) show that firms make decisions on their leverage responding to capital structure decisions by their peers. Kim (2011) shows that human capital specificity impacts negatively firms' debt. Agrawal and Matsa (2011) find that lower labor unemployment risk is associated with increases in firms' debt.

The remainder of the chapter is organized as follows. Section 3.2 presents the model. Section 3.3 describes the sample and the variables. In Section 3.4 and 3.5 we present the empirical methodology and the main results. Section 3.6 reports robustness checks, auxiliary tests and other results, while Section 3.7 concludes.

3.2 Model

We develop a simple, stylized model to structure our theoretical arguments and develop empirical predictions that are tested in the rest of the chapter. The model's key result is that an increase in labor market rigidity, brought about by an increase in EPL, crowds out financing and generates negative real effects.

3.2.1 Technology

Consider an economy inhabited by risk-neutral individuals, where the risk-free interest rate and the labor cost are normalized to 0.

At $t = 0$, an entrepreneur with wealth A raises capital K and hires labor W to invest in a Leontief production technology with constant returns to scale. If labor and capital are a good match (which happens with probability $1 - \phi$), the output produced at $t = 1$ and at $t = 2$ is $Y_1 = Y_2 = \eta \min\{K, W\}$, where $\eta > 0$. Without loss of generality, as in any Leontief production function, we restrict attention to points on the efficient production frontier where $W = K$ and thus $\min\{K, W\} = K$. If labor and capital are a bad match (which happens with probability ϕ), output is $Y_1 = Y_2 = 0$. The parameter ϕ captures creative destruction, that is, the need for flexibility in hiring and firing.

At $t = 1$, first period output is produced. In the good state of the world (that is, when labor and capital are a good match), the output is $Y_1 = \eta K$. In the bad state of the world (that is, when labor and capital are a bad match), the firm produces no output and will produce no output at $t = 2$ as well (if there is no restructuring). Restructuring involves liquidating a fraction $l \in [0, 1]$ of the capital for $\lambda > 0$ per unit of capital and replacing a fraction $f \in [0, 1 - \rho]$ of the current workforce with new employees. The parameter $\rho \in [0, 1]$ captures labor market rigidity: the higher the employment protection, the smaller the number of workers that can be replaced. The newly hired workers (who are fK), who are paid the competitive wage 0, produce output $Y_2 = \eta \min\{(1 - l)K, fK\}$ at $t = 2$. The parameter λ measures the liquidation value of the assets. We assume that $\eta > \lambda$ so that restructuring is more efficient than liquidating.

At $t = 2$, second period output is produced. If the firm is not restructured at $t = 1$, $Y_2 = Y_1$. If instead the firm is restructured at $t = 1$, then $Y_2 = \eta \min\{(1 - l)K, fK\}$. Capital has no liquidation value at this stage.

The timeline of the model is presented in Figure 3.1.

3.2.2 Financing

The capital invested at $t = 0$ can come from the entrepreneur's own wealth (inside equity) and/or external capital raised from competitive financial markets. Without loss of generality, we assume that the entrepreneur can try to raise debt D at a (gross) promised payment R due at $t = 1$ and/or to sell equity $(1-a)E$ to dispersed shareholders, where a is the stake retained by the entrepreneur and E is the market value of equity.[4]

We make four important assumptions:

Assumption 1: Output is not verifiable and there is a positive but negligible probability that output $Y_2 = 0$. Hence, the entrepreneur cannot write contracts contingent on output and can always claim that output is 0. This is a standard assumption in the incomplete contract literature (see Hart and Moore (1998)).

Assumption 2: $\eta < 1$, that is, the marginal return from investment that is pledgeable to investors is smaller than 1 (even in the case in which employment protection is $\rho = 0$). Otherwise, the firm would be able to borrow an infinite amount of capital.

Assumption 3: $3(1-\phi)\eta/2 + \phi\lambda \geq 1$, that is, the marginal return of investment from the view point of the entrepreneur (inclusive of the non-pledgeable component) is greater than 1 even with the greatest degree of employment protection ($\rho = 1$). This ensures that the entrepreneur's participation constraint is met. Otherwise, there would be no investment.

Assumption 4: Debt is a hard claim. If the promised payment RD is not made, creditors take over and can manage the firm. As shown in Bolton and Scharfstein (1996), this rules out strategic default. Outside equity instead is in the hands of atomistic shareholders and thus control is never transferred to outside shareholders. In other words, at $t = 0$ the firm cannot be sold to a different

[4]The combination of debt and equity spans any generic security with promised payments c_1 and c_2 paid at $t = 1$ and $t = 2$, respectively.

controlling shareholder than the entrepreneur herself.

3.2.3 Financing Capacity

In this section we will first show that, as in the incomplete contract literature, in our model the optimal financial contract is debt. Intuitively, because cash flows are not verifiable, the firm cannot raise outside equity. We will then show that the debt capacity is a decreasing function of employment protection ρ. In the next section, we solve for the optimal investment and leverage decision.

The entrepreneur cannot pledge the second period output Y_2 to outside financiers. The reason is that output is not verifiable. Hence, the party in control (the entrepreneur herself or any other manager) can claim that output is 0 and pay nothing to outside financiers.

Whether the first-period output Y_1 can be pledged to outside financiers depends on the type of financial contract. Being diffused, outside equity yields no threat of termination. In that case, the entrepreneur does not repay outside shareholders, and thus no outside equity can be raised: $a^* = 1$. Consider instead the case of debt. Because the threat of termination is credible, the entrepreneur repays creditors, provided that her incentive compatibility constraint is met.

To find the firm's debt capacity, we need to consider the value of the firm in the case of a poor match between labor and capital. At that stage, the party in control chooses $l \in [0, 1]$ and $f \in [0, 1 - \rho]$ to maximize her expected utility: she receives the entire Y_2 output, $\eta \min\{(1 - l)K, fW\}$ and the proceeds from any liquidation of capital done at $t = 1$, $l\lambda K$. Hence, she chooses

$$\max_{(f,l)\in[0,1-\rho]\times[0,1]} \eta \min\{(1 - l)K, fK\} + l\lambda K$$

The solution is $(f^*, l^*) = (1 - \rho, \rho)$. Thus, the continuation payoff in the bad state of the world is $[\lambda + (1 - \rho)(\eta - \lambda)]K$.

Consider next the incentive compatibility condition of the entrepreneur when $Y_1 = \eta K$. If the entrepreneur does not pay RD, creditors take over and receive $\lambda K + (1-\rho)(\eta - \lambda)K$, while the entrepreneur consumes $Y_1 = \eta K$. If the entrepreneur pays RD to creditors, she is left with $\eta K - RD$ in the first period and the entire ηK in the second period. Hence, the incentive compatibility constraint is $RD \leq \eta K$, which is also the solvency constraint.

Given that the riskless rate is 0 and creditors are competitive and risk-neutral, the cost of debt R must be such that

$$(1-\phi)RD + \phi[\lambda + (1-\rho)(\eta - \lambda)]K = D$$

Since the IC constraint must be satisfied, the entrepreneur can raise external finance D up to the debt capacity

$$\overline{D} \equiv (1-\phi)\eta K + \phi[\lambda + (1-\rho)(\eta - \lambda)]K$$

at a promised interest rate

$$R = \max\left\{\frac{D - \phi\lambda K - \phi(1-\rho)(\eta-\lambda)K}{(1-\phi)D}, 1\right\}$$

Intuitively, the debt capacity is decreasing in employment protection. This happens because employment protection restricts firm's ability to restructure labor claims.

3.2.4 Investment and leverage choice

At date 0, the entrepreneur chooses investment K and debt D to maximize the net present value from the investment:

$$U^* \equiv \max_{(D,K)} 2(1-\phi)\eta K + \phi[\lambda + (1-\rho)(\eta - \lambda)]K - K \tag{3.1}$$

subject to the budget constraint

$$K \geq A + D \tag{3.2}$$

and the debt capacity constraint

$$D \leq (1-\phi)\eta K + \phi[\lambda + (1-\rho)(\eta - \lambda)]K \tag{3.3}$$

Because of Assumption 3, the entrepreneur wants to maximize the size of the firm. This is done by maximizing D. Hence, $D^* = \overline{D}$ and combining equation (3.3) with the budget constraint (3.2), which will be met with equality, one obtains that:

Proposition. The optimal investment is

$$K^* = \frac{A}{1-(1-\phi)\eta - \phi[\rho\lambda + (1-\rho)\eta]}$$

and the optimal leverage is

$$\frac{D^*}{K^*} = (1-\phi)\eta + \phi[\rho\lambda + (1-\rho)\eta]$$

Notice also that the participation constraint of the entrepreneur is met, as $U^* \geq A$ whenever $3(1-\phi)\eta/2 + \phi[\rho\lambda + (1-\rho)\eta] \geq 1$, which is satisfied for all values of ρ because of Assumption 3.

3.2.5 Empirical Predictions

The model presented delivers several empirical predictions which are tested in this chapter.

First, an increase in labor protection ρ reduces leverage:

$$\frac{d\left(D^*/K^*\right)}{d\rho} = -\phi\left(\eta - \lambda\right) < 0. \tag{3.4}$$

Intuitively, stronger employment protection reduces firms' ability to restructure and thus leads to efficiency losses in case of a poor match. By affecting negatively firms' value in the bad state of the world, employment protection reduces debt capacity and thus firms' leverage. This is our first testable prediction:

Prediction 1: Leverage is strictly decreasing in labor protection ρ.

Second, the negative effect of an increase in labor protection is greater in firms that are more likely to need employment restructuring (that is, in firms with a greater probability of a negative shock ϕ):

$$\frac{d^2\left(D^*/K^*\right)}{d\rho d\phi} = -\left(\eta - \lambda\right) < 0. \tag{3.5}$$

Hence:

Prediction 2: The negative relation between leverage and labor protection should become greater in magnitude in firms that are more prone to "creative destruction".

Third, the negative effect of an increase in labor protection is smaller in firms with greater liquidation value λ

$$\frac{d^2\left(D^*/K^*\right)}{d\rho d\lambda} = \phi > 0. \tag{3.6}$$

This follows from the fact that firms with a greater liquidation value, on the margin, stand to gain less from restructuring because the option to liquidate is more valuable compared to restructuring. Thus:

Prediction 3: The negative relation between leverage and labor protection should become smaller in magnitude in firms that have a greater liquidation value.

Fourth, it is also interesting to notice that an increase in labor protection ρ reduces firm's size:

$$\frac{dK^*}{d\rho} = -\frac{\phi\left(\eta-\lambda\right)A}{\left[1-(1-\rho\phi)\eta-\phi\rho\lambda\right]^2} < 0 \tag{3.7}$$

Hence:

Prediction 4: Firm growth is strictly decreasing in labor protection ρ.

Fifth, one can compare firms with different degrees of dependence on external capital. The idea is to look at a country like the US where employment protection is low ($\rho = 0$) and compute the degree of dependence on external capital of different firms. If $\rho = 0$, dependence on external capital is given by:

$$\frac{K^* - A}{K^*} = \eta$$

Thus, the effect of employment protection on the sensitivity of firm growth with respect to dependence on external capital is:

$$\frac{d^2K^*}{d\rho d\eta} = -\frac{2(1-\rho\phi)\left(\eta-\lambda\right)+\left[1-(1-\rho\phi)\eta-\phi\rho\lambda\right]}{\left[1-(1-\rho\phi)\eta-\phi\rho\lambda\right]^3}\phi A < 0 \tag{3.8}$$

Hence:

Prediction 5: The negative relation between firm growth and labor protection is more pronounced in firms that are more dependent on external capital.

The model also has predictions for capital expenditures undertaken by the firm. In our simple framework, we have assumed labor and capital to be complements.[5] Given this, an increase in the cost of labor would result in lower capital expenditure. But labor and capital can be substitutes, in which case an increase in labor cost would increase capital expenditure. The effect on capital expenditure is thus ambiguous and depends on the degree of complementarity between labor

[5]It is important to note that Predictions 1 through 5 do not depend on the choice of production function. The Leontief function is simply chosen out of convenience.

and capital.

While the effect on capital expenditure is ambiguous, the cross-partial of capital expenditure with EPL and financial dependence is negative. To see this, consider the case in which labor and capital are complements. In this case, one would expect capital expenditure to go down more for firms that are more dependent on external finance due to the crowding out effect discussed above. On the other hand, if labor and capital were substitutes, one would expect capital expenditure to go up less for firms that are more dependent on external finance, again due to the same crowding out effect. This leads us to our sixth prediction.

Prediction 6: An increase in EPL should have a disproportionately negative effect on capital expenditures in firms that are more dependent on external financing.

To deliver these six predictions, we have used a simple theoretical model where the results were driven by a particular friction - labor claims introduce rigidity that leads to inefficient liquidation and lowers debt capacity. It is likely that some other frictions may generate a similar effect: for instance, labor protection may *de facto* increase the seniority of labor claims in bankruptcy. While some of our cross-sectional results (such as the prediction on labor hiring and firing) are specific to our model, others are also consistent with alternative interpretations. We would like to stress here that we are not wedded to a particular friction, but rather the objective is to identify a channel (the finance channel) through which labor stifles growth.

3.3 Data

We combine three sets of variables: (i) yearly, country-level data on labor regulation; (ii) yearly, firm-level financial data; and (iii) industry-level and country-level control variables. In Table 3.1, we present the definition, source, number of observations, mean, median and standard deviation of the main variables used in the analysis.

3.3.1 Labor Regulation Indicators

As our indicator of labor regulation, we use the Employment Protection Legislation (EPL) Indicator. EPL covers 21 aspects of employment protection legislation grouped into three broad categories: (1) laws protecting workers with regular contracts (Regular Contracts), (2) those affecting workers with fixed-term (temporary) contracts or contracts with temporary work agencies (Temporary Contracts), and (3) regulations applying to collective dismissals (Collective Dismissals). The Regular Contracts indicator focuses on the procedural requirements that need to be followed when firing an employee with a regular employment contract, the notice and severance pay requirements, and the prevailing standards of (and penalties for) "unfair" dismissals. The Temporary Contracts indicator evaluates the conditions under which these types of contracts can be offered, the maximum number of successive renewals and the maximum cumulated duration of the contract. The Collective Dismissals index specifies what is defined as collective dismissal, the notification requirements provided by law and the associated delays and costs for the employers.[6]

The most important feature of the EPL indicator for us is that it provides both cross-sectional and within country time-variation of labor laws. Therefore, it allows for time-series as well as cross-sectional comparisons across different countries. The indicator ranges from 0 to 6. A higher EPL score indicates larger firing costs for

[6]The original EPL indicator was constructed by OECD in 1985 as an equally weighted average of two sub-indicators, which take into account regulations on regular and temporary contracts respectively. Later on, the OECD redefined the indicator by adding also regulations on collective dismissals. This new version of EPL is available at an annual frequency since 1998 and it is constructed as a weighed sum of the three-sub-indicators. The weights for each of the sub-indicators are defined on the basis of the number of different items of employment protection grouped in each sub-indicator. There are 21 aspects related to employment protection covered in total. Allard (2005) reconstructed the OECD employment protection legislation providing a longer time-series of the three components included in the new OECD indicator. In our analysis we use this longer time series of the three individual EPL components provided by Allard (2005) and we construct the EPL index as an equally-weighted average of these three components. Attaching the same weights in the three components seems natural and it leads to giving a greater weight to the regulation of collective dismissals than in the OECD indicator. However, the results are robust to different weighting schemes as well as to the specific weights used by the OECD.

firms and therefore stronger job security for workers, and vice versa. As shown in Table 3.1, the average EPL score in our sample is about 2.3 and the standard deviation is quite large, at about 1. The summary statistics for the components of EPL show that there is large variation in all components. There is also a significant time-series variation in EPL. Figure 3.2 presents the plots of the EPL Indicator for each individual country. Our sample consists of 21 OECD countries for which the EPL indicator is available.[7]

3.3.2 Firm-Level Data

Our main data source is Worldscope. Our sample contains financial information on over 8,900 manufacturing companies in the 21 countries for which the EPL indicator is available. The sample spans the 1985-2004 period. Sample size varies over time because of missing information on some variables used in the analysis. We follow the 2-digit SIC classification to form our group of manufacturing companies. On average, the manufacturing sector comprises about 40% of total assets in the 21 countries.

Following the literature, our main proxy for leverage is market leverage, which is defined as the ratio of book value of debt over the market value of the firm (sum of book value of debt and market value of equity). Debt is the sum of long-term debt, short-term debt, and current portion of long-term debt. As a robustness check, we also consider alternative definitions of leverage: debt to total assets (also known as book leverage), where total assets refers to the book value of firms' assets; the ratio of net debt over market value of assets, where we subtract the cash and other marketable securities from total debt; and net debt over book value of assets. In our regression analysis, we include the standard, firm-level set of explanatory variables for leverage, as identified by Rajan and Zingales (1995) and many others: tangibility (which is defined as net property, plant and equipment

[7]They are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States.

over total assets) as a proxy for the amount of collateral that a firm can pledge; size (which is defined as the logarithm of firms' real assets) as a control for the degree of diversification and thus the risk of default; profitability (as measured by the Return on Assets, which is the ratio of EBIT over total assets) as a proxy for the availability of internal funds; and the market-to-book ratio, or Q (that is, the ratio of the market value of equity plus book value of debt over the book value of debt plus equity), as an indicator of growth opportunities.

We look at several other firm-level variables, which may be affected by changes in labor protection: trade credit is measured as the difference between the accounts payable minus the accounts receivable over total debt; short-term debt is measured as the portion of short-term debt over total debt; and labor costs are measured as the ratio of cost of staff over total assets. This variable is available however only for a sub-sample of firms. We also use the ratio of capital expenditures to assets to proxy for firms' investment and the growth rate of firms' sales to proxy for firm growth. To focus on access to finance as the channel through which labor regulation affects growth, we follow Rajan and Zingales (1998) and we measure the degree of firms' dependence on external sources of financing by using the ratio of firms' capital expenditures minus their cash flow from operations scaled by their capital expenditures.

As shown in Table 3.1, there is a good deal of variability in all the important variables. The average market leverage, for example, is 28% with a standard deviation of 22%. The total debt to assets of all firms is 25% with a standard deviation of 16%, while the average net debt to assets is 12% and the standard deviation is 23%. Firm size is on average 7.9 and Q is on average 1.2. On average, 30% of firms' assets are tangible assets. The average profitability, as measured by ROA, is around 6.3%.

3.3.3 Other Variables

To take advantage of cross-sectional heterogeneity, we produce several industry-level variables, where industries are defined at the 2-digit SIC codes. Labor intensity is defined as the median cost of staff normalized by sales at the 2-digit SIC industry level. Turnover is defined as the average job creation and destruction; it is measured at the 2-digit SIC industry level using data by Davis, Haltiwanger and Schuh (1996) for the US. Median Tangibility is the (2-digit SIC) industry median of tangibility, as defined above at the firm level.

To control for the differences in macroeconomic conditions and income across countries, we include in our set of control variables country-level GDP growth and GDP per capita. An important variable for our analysis is creditor protection, which is measured as the creditor rights indicator from Djankov, McLiesh and Shleifer (2007). The creditor rights index takes values from 0 to 4, with higher values indicating stronger creditor rights and it provides time variation in creditor protection. Another institutional factor we take into account is the countries' tax systems, using a variable defined as in Fan, Titman and Twite (2006) which describes how dividends and interest payments are taxed in each country. We also use indicators provided by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) to characterize the countries' legal origin, indicating whether a country's legal origin or commercial regulations follow French, German, Scandinavian or English law. Further, based on the Demirguc-Kunt and Levine (1999) classification, we identify which economies are bank-based and which are market-based.

3.4 Main Results

In this section we present the main results of the chapter. We start by investigating the relation between EPL and leverage in our data. By employing a difference- in-differences methodology that exploits the inter-temporal variations in employment laws across countries, we find that firms reduce their use of debt following legal

changes that increase employment protection. We then explore the cross-sectional heterogeneity in our sample and we find that the negative effect of labor protection on leverage is more pronounced for sectors that rely more on labor and that are subject to more frequent hiring and firing or more "creative destruction". We also find that the negative effect of labor protection on leverage is more pronounced for firms that have fewer tangible assets and in countries with weaker creditor rights.

3.4.1 Leverage and EPL

In this section we examine the effect of labor regulation on firms' capital structure. We thus exploit both time series and cross-sectional variation in the EPL index of employment protection and we employ a difference-in-differences research design to identify the causal impact of labor regulations on the capital structure of firms. Using firm level data, we analyze the following specification:

$$y_{it} = \gamma_t + \lambda_i + \delta \cdot EPL_{k,t-1} + \beta \cdot X_{it} + \epsilon_{it}, \tag{3.9}$$

where i denotes a firm, t denotes a year, j is an industry, and k is a country. The dependent variable y_{it} is debt to market value of assets; λ_i and γ_t are firm and year fixed effects respectively. X_{it} is the vector of control variables and ϵ_{it} is the error term. X_{it} includes the contemporaneous effect of profitability, investment opportunities, size and tangibility, which are important determinants of the costs of financial distress. The vector of controls also includes macroeconomic variables and in some specifications country-level controls, taking into account countries' different legal origins, tax systems and development of their financial markets (market based versus bank based economies). We cluster the standard errors at the country level, since the labor laws are changing at the country level. It is important to note that clustering at the country level generates the most conservative standard errors, that is, the standard errors become much smaller when we

cluster them at the firm or industry level.[8]

A similar research design has been used in several studies, particularly in labor economics. The multiple pre-intervention and post-intervention time periods take care of many threats concerning validity. This methodology is best illustrated by the following example.[9] Suppose there are two countries, A and B, undergoing legal changes at times $t = 1$ and $t = 2$, respectively. Consider $t = 0$ to be the starting period in our sample. From $t = 1$ to $t = 2$, country B initially serves as a control group for legal change; and after that it serves as a treated group for subsequent years. Therefore, most countries belong to both treated and control groups at different points in time. This specification is robust to the fact that some groups might not be treated at all, or that other groups were treated prior to 1985, which is our sample's beginning date.

The results are reported in Table 3.2. In column 1, besides controlling for all usual determinants of leverage, we have industry/year ($\alpha_j * \gamma_t$) fixed effects to control for industry-level dynamics. The coefficient of interest (δ in specification (1) above) is negative and statistically different from zero at the 1% level. In column 2, we add country fixed effects to the previous specification to control for country time-invariant characteristics. The results are unchanged: δ is negative and statistically different from zero at the 1% level. In columns 3 and 4 we add firm fixed effects, as a way to control for time-invariant, firm-specific characteristics. Column 3 adds the firm fixed effects to the specification estimated in column 1, which controls for industry/year fixed effects and other country-level variables. In column 4, we estimate the same specification as in column 3 with the addition of country/industry ($\alpha_k * \alpha_j$) fixed effects, which allow for differences across countries within the same industry.

Across all specifications reported in Table 3.2, the coefficient of the EPL in-

[8]The results can be obtained upon request.

[9]In this example, we assume, for simplicity, that the labor variable is a 0-1 binary variable to provide the basic intuition. The discussion generalizes when the labor variable (e.g. EPL) is an index, as is the case in this chapter. Essentially, the DID strategy identifies out of differences.

dicator is negative, always strongly statistically significant (at 5% level), and has a similar magnitude. Notice that the coefficients on Tangibility, Size, ROA and Q have the expected sign and are all strongly statistically significant. To gauge the economic significant of the findings, consider a two-unit increase in EPL: this change is associated with an approximately 8% reduction in market leverage or with a reduction by 29% relative to its mean.

The negative relation between leverage and our measure of employment protection is consistent with Prediction 1 of our model. An increase in employment protection is associated with a reduction in the firm's ability to replace the current labor force in case of a "creative destruction" shock and thus a reduction in the firm's debt capacity.

An alternative explanation for this result is that an increase in labor protection would lead to a reduction in the demand of debt. An immediate effect of an increase in labor protection is an increase in the rigidity of labor contracts. For instance, after an increase in labor protection, firms may face tighter restrictions on their ability to restructure their labor force than before. In the presence of uncertainty, an increase in contractual rigidity leads to an increase in the probability of financial distress. As a simple application of the trade-off theory of capital structure, to reduce the risk of financial distress following the increase in labor protection, firms will reduce their demand of debt.

Both these mechanisms, lead to the same conclusion: higher employment protection legislation increases the cost of debt for firms, leading to lower levels of leverage. And therefore, both channels imply that an increase in EPL causes operating leverage to crowd out financial leverage. We will address this alternative explanation later on.

3.4.2 Cross-Sectional Heterogeneity

The results so far suggest that labor laws have a causal impact on the financial structure of firms. Specifically, we document a negative relation between increases in labor protection and financial leverage. However, one concern with this causal interpretation is that EPL changes may be associated with other regulatory reforms, like changes in taxation or corporate governance, which may happen at the same time as changes in EPL. In such case, the worry is that the uncovered relation between employment protection and leverage may be spurious: in other words, we would incorrectly attribute the changes in leverage to changes in labor laws.

A second concern with respect to a causal interpretation of our findings is that changes in labor regulation may be endogenous to firms' financial decisions. This concern is likely to be less severe than in the case of changes in variables that are directly affected by the choice of an individual firm, like the unionization rate. This is because, changes in EPL reflect changes in laws and thus are not directly affected by the decisions of individual firms. However, there may still be some concerns about the political economy of changes in labor protection. After all, firms or unions may lobby politicians to change labor regulations when it is in their interest to do so.

The existing empirical studies on the political economy of labor regulation do not find much support for a lobbying explanation. Botero, et al.(2004) show that legal origin and economic development are the most important determinants of labor regulation, with ideology being irrelevant. Moreover, existing political economy models have highlighted several potential determinants of employment protection which are exogenous to firms' decisions: Saint-Paul (2002) indicates that greater employment protection is likely to emerge in countries with less competitive labor markets; Pagano and Volpin (2005) predict that lower employment protection is likely to emerge as a political outcome in countries with majoritarian (as compared to proportional) electoral rules; Perotti and Von Thadden (2006) argue that when

financial wealth is more concentrated, labor rents and labor protection are higher.

The specification in Table 3.2 (Column 1) already controls for legal origin, economic development and creditor rights, as suggested by Botero et al (2004). In unreported regressions, we also find that our basic results in Table 3.2 are unchanged when we control for a measure of the rigidity of the labor market (whether wage bargaining is centralized or decentralized) as suggested by Saint-Paul (2002), the degree of proportionality of the electoral system in a country, as suggested by Pagano and Volpin (2005), and income inequality as a proxy for wealth inequality, as suggested by Perotti and Von Thadden (2006). However, it is important to emphasize that controlling for country/year ($\alpha_k * \gamma_t$) fixed effects, as done in this section, addresses all these concerns.

Creative Destruction and Labor

It is intuitive that labor protection should affect leverage more in firms where labor is a more important production input. We thus expect to observe a greater negative correlation between EPL and leverage in sectors with greater labor costs. To test this prediction, we estimate the following regression specification:

$$y_{it} = \gamma_t + \lambda_i + \delta \cdot EPL_{k,t-1} + \zeta \cdot E_{it} + \theta \cdot (EPL_{k,t-1} \times E_{it}) + \beta \cdot X_{it} + \epsilon_{it} \quad (3.10)$$

Here E_{it} denotes the relative use of employment in the production function in a given firm and our variable of interest is θ. All the other variables and subscripts are defined as in the previous specification. The specification above essentially represents a difference-in-difference-in-differences analysis. This specification has the added benefit that it allows us to control for country specific shocks as it allows us to include a fixed effect of each country/year pair ($\alpha_k * \gamma_t$). This addresses concerns that there might be changes at the country level, such as changes in the tax rates for example, which can have an impact on firms' leverage and which coincide with the labor regulation changes.

In columns 1-4 of Table 3.3, we measure E_{it} as the median of the ratio of labor costs over sales for each 2-digit SIC industry in our sample. In column 1, besides the usual determinants of leverage, we control for firm fixed effects and industry/year fixed effects. In this specification we can see that EPL is negatively correlated with leverage only to the extent that firms operate in labor-intensive industries. In fact, the direct effect (coefficient δ in specification 2) is negative but statistically insignificant, while the coefficient on the interaction term between EPL and employment intensity E (coefficient θ in specification 2) is negative and statistically significant. In column 2, we estimate this specification by including firm fixed effects and country/ year fixed effects. The parameter of main interest is the coefficient θ on the interaction term of EPL and labor intensity E_{it}, which remains negative and is statistically different from zero at the 10% level. The estimate of θ is negative and statistically different from zero at the 1% level in column 3, where we estimate the same specification as in column 2 with the further addition of industry/year fixed effects to control for differences in industry dynamics. In column 4, we further saturate our specification by adding industry/country fixed effects to the specification estimated in column 3. The estimate of θ is negative and statistically different from zero at the 5% level.

If an increase in EPL makes labor contracts more rigid (for example it becomes more difficult for firms to fire workers or make use of flexible temporary contracts), we expect to observe a more negative impact on leverage in industries where labor flexibility is more important. This follows from Prediction 2 of our model. Using data on employment creation and destruction at the industry level, we construct a measure of labor turnover for industries.[10] Higher values of this variable mean that these industries require higher labor turnover for their operation and therefore, the introduction of labor rigidities would impact these industries more negatively.

Hence, in columns 5-8 of Table 3.3, we measure E_{it} as the labor turnover at

[10]This data is available for the US by Davis, Haltiwanger and Schuh (1996) and we use them, making the assumption that industries share common characteristics (eg. technological) across countries.

the 2-digit SIC industry level testing Prediction 2 of our model. As before, this analysis allows us to control for different combinations of fixed effects. In column 5, besides the usual determinants of leverage, we control for firm fixed effects and industry/ year fixed effects. In this specification we can see that EPL is negatively correlated with leverage only to the extent that firms operate in high labor-turnover industries. In fact, the direct effect is positive and statistically insignificant, while the coefficient on the interaction term between EPL and employment intensity E is negative and strongly statistically significant (at 1% level). In column 6, we control for firm fixed effects and country/year fixed effects. The parameter of main interest is the coefficient on the interaction term of EPL and labor turnover, which remains negative and statistically different from zero at the 1% level. The estimate of θ is negative and statistically different from zero at the 1% level in column 7, where we estimate the same specification as in column 2 with the further addition of industry/year fixed effects to control for differences in industry dynamics. In column 8, we once again saturate the specification by adding industry/country fixed effects to the specification estimated in column 7. The estimate of θ is negative and statistically different from zero at the 1% level. These results indicate that firms reduce debt more in sectors which are more likely to become effectively more constrained in their needs to restructure their labor force.

Liquidation Value

We expect that the reduction of debt following an increase in EPL should be larger in firms with lower liquidation value (see Prediction 3 of our model).

We investigate the differential impact of strengthening employment protection on capital structure of firms that differ in the liquidation value of their assets by estimating the following regression specification:

$$y_{it} = \gamma_t + \lambda_i + \delta \cdot EPL_{k,t-1} + \zeta \cdot L_{it} + \theta \cdot (EPL_{k,t-1} \times L_{it}) + \beta \cdot X_{it} + \epsilon_{it} \quad (3.11)$$

Here L_{it} denotes the liquidation value of the assets and our variable of interest is θ. All the other variables and subscripts are defined as in the previous specification. Specification (3.11) essentially represents a difference-in-difference-in-differences analysis. This specification has the added benefit that it allows us to control for country specific shocks as it allows us to include a fixed effect of each country/year pair ($\alpha_k * \gamma_t$). This addresses concerns that there might be changes at the country level, such as changes in the tax rates for example, which can have an impact on firms' leverage and which coincide with the labor regulation changes.

The results are reported in Table 3.4, where we consider three alternative proxies for the liquidation value of a firm. In columns 1-4, we use median asset tangibility, which is computed as the median 2-digit SIC industry ratio of net property, plant and equipment to total assets. In columns 5 and 6, we use the country-level indicator of creditor rights provided by Djankov et al (2007). In columns 7-10, we proxy liquidation value in an industry/country as the product of median assets tangibility in the industry and the creditor rights in the country. This latter measure may be the most accurate proxy of the three as the creditors' proceeds from liquidation are affected both by the tangibility of the assets and creditor rights in bankruptcy.

In column 1 we start from a basic specification in which we control for firm and industry/year fixed effects. It is worth mentioning that we cannot estimate a coefficient for our proxy for liquidation value (L1) because it is absorbed by the industry/year fixed effects, given that it does not vary within a given industry/year. We confirm that EPL is negatively correlated with leverage, while the coefficient θ on the interaction term of EPL and L1 is positive and statistically significant. In column 2, we exclude the industry/year fixed effects and add the country/year fixed effects. Thus, we can now estimate the effect of L1 on leverage but we can no longer estimate the direct effect of EPL on leverage. The coefficient θ is positive but not statistically significant, while L1 has a negative effect on leverage but is also not statistically significant. In column 3, we add the industry/year fixed

effects to the specification estimated in column 2: in this case we can only estimate θ and we find that it is positive and statistically significant at the 10% level. In column 4, we also add industry/country fixed effects: the estimate of θ is positive and statistically significant at the 5% level. Across all specifications, we find that an increase in EPL is associated with a smaller decrease in leverage in sectors that have more tangible assets. The effect of a one-standard deviation increase in tangibility on leverage is 1.6% higher in a country with EPL equal to 3 (like Italy) compared with a country with an EPL of 1 (like Canada).

In columns 5 and 6 we use a country-level proxy for the liquidation value, namely the indicator of creditor rights proposed by Djankov et al (2007), labeled L2 in the Table. The idea is that creditors can extract a higher value in case of liquidation in countries in which they have stronger rights in case of bankruptcy. We thus expect that the correlation between leverage and EPL should increase with the quality of creditor rights. We test this prediction adopting the same specification used before: in column 5, we include both EPL and the interaction term of EPL and creditor rights while controlling for firm and industry/year fixed effects, firm and country level variables. In column 6, we also include industry/country fixed effects.[11] As can be seen, the interaction coefficient is positive and statistically different from zero at the 1% level in both specifications. The coefficient on EPL is negative and statistically significant at the 1% level; while creditor rights (L2) have by themselves a negative effect on leverage.

These results are even stronger when we consider the third proxy for liquidation value, L3, which is the product of industry median tangibility and creditor rights. As we do in column 1 of Table 3.4, in column 7 we start from a basic specification in which we include firm and industry/year fixed effects. We confirm that EPL is negatively correlated with leverage, while the coefficient θ on the interaction term of EPL and L3 is positive and statistically significant at 1% level. In this case, we can also estimate the coefficient on L3 because the latter proxy of liquidation

[11] It is important to note that we cannot include country/year fixed effects in this specification because creditors rights do not vary across firms within the same country.

value varies across countries, year and industry. A positive (and highly statistically significant) θ is also found in column 8, where we control for firm and country/year fixed effects. A similar result is found in column 9, where we add industry/year fixed effects to the previous specification; and finally, in column 10, where we also control for industry/country fixed effects. Across all specifications, the estimate of θ is statistically different from zero at the 5% or 1% level. The effect of a one-standard deviation increase in tangibility and a one-standard deviation increase in creditor rights is 1.5% higher in a country with EPL equal to 3 (like Italy) compared with a country with an EPL of 1 (like Canada).

In summary, across all specifications, we find that an increase in EPL is associated with a greater decrease in leverage in sectors with less tangible assets and in countries with lower protection of creditor rights. In those sectors or countries, with lower liquidation values increases in employment protection legislations will have a greater negative effect on leverage.

3.5 Investment and Firm Growth

In this section, we examine the effect of stricter employment protection on firms' real activities. As derived in the model (Prediction 4), we expect employment friendly reforms to be associated with a reduction in overall firm growth since they restrict firms' ability to access external finance.[12] Our model also predicts that this effect is stronger for firms that are more dependent on external capital (Prediction 5).

Table 3.5 reports the results of a difference-in-differences analysis, which examines the effect of changes in employment protection legislations on firms' growth, measured as firms' sales growth (Columns 1-3). Column 1 includes country fixed effects to control for country time invariant characteristics and industry/year fixed

[12] A similar prediction could also follow, however, from a demand channel argument described by Besley and Burgess (2004): an increase in employment protection may reduce the incentive of an entrepreneur to invest.

effects to control for industry specific shocks. Column 2 includes firm fixed effects instead of the country fixed effects in column 1, to control for firm time-invariant characteristics, while column 3 adds country/industry fixed effects in addition to the controls in the previous specification. Consistent with Prediction 4 of the model, the estimated coefficients are negative throughout all specifications and statistically significant at 5% (Column 1) or 10% (Columns 2-3) levels of significance. These results are also economically significant. A two-unit increase in EPL is associated with a 7.8% reduction in firms' sales growth (Column 3).

In columns 4-7 of Table 3.5, we exploit cross-sectional heterogeneity in the firms taking into account firms' dependence on external capital. Thus, columns 4-7 present the results of a difference-in-difference-in-differences estimation, where we test whether more financially dependent firms on external capital grow less following EPL increases. We interact the EPL variable with a time-invariant measure of firms' financial dependence at the firm level. All columns include firm fixed effects. Column 4 also includes industry/year fixed effects, while column 5 includes country/year fixed effects to control for country specific shocks. Column 6 includes both industry/year and country/year fixed effects in addition to the firm fixed effects and Column 7 adds country/industry fixed effects to the previous specification which allow for differences across countries within the same industry. Consistent with Prediction 5 in our model, across all specifications, we find that the interaction coefficient is negative and statistically significant at the 1% level. The effect of a one-standard deviation increase in firms' dependence on external capital on sales growth is 2.8% higher in a country with EPL equal to 3 (like Italy) compared with a country with an EPL of 1 (like Canada).

We next examine the effect of EPL on capital expenditures undertaken by firms. According to our model, an increase in EPL would result in a reduction in capital expenditures. This comes from the fact that capital and labor in our simple set-up (Leontief production function) are perfect complements. In reality, however, labor and capital might be substitutes.[13] In such a scenario, we would expect

[13]It is important to note that predictions 1-5 in our chapter are not dependent on our choice of

firms to change their production technology away from the input that has become more expensive (labor) and towards the relatively cheaper one (capital). This substitution effect may lead to an increase in the capex/asset as EPL increases. Thus, the effect on capital expenditures is ambiguous and depends critically on the degree of complementarity between labor and capital.

However, there is a clear prediction for the cross-partial of capital expenditures with EPL and financial dependence on external capital (Prediction 6), which is independent of whether capital and labor are substitutes or complements: capital expenditures should decrease more for those firms that are more dependent on external capital.

We test these implications in Table 3.6 and we find results consistent with this view. Columns 1-3 show the effect of EPL on capital expenditures over assets. The results are not statistically significant, which can be rationalized on the basis of the argument explained above. Similarly to Table 3.6, in columns 4-7 we exploit cross-sectional heterogeneity in the firms taking into account firms' dependence on external capital. The interaction coefficients in columns 4-7 of Table 3.6 are negative and statistically significant at the 1% level throughout all specifications. It is also worth emphasizing here that the estimates are robust to the inclusion of industry/year fixed effects, which take care of any concerns relating to the fact that the degree of complementarity between labor and capital might be correlated with our measure of financial dependence.

These results support a supply channel explanation: the increase in employment protection restricts firms' access to capital, and thus reduces investment and growth relatively more in financially dependent firms. The demand channel instead would have no such prediction and therefore these results rule out demand side effects.

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the production function; one would get exactly the same predictions using a generic production function.

3.6 Other Results

In this section, we report additional tests to check the robustness of our findings, and we extend the analysis in several directions. First, we check the robustness of our results by considering alternative definitions of leverage, and by studying the lead and lag relation between changes in EPL and leverage. This is a way to check for the presence of trends in leverage and reverse causality. As already mentioned, all our results survive and become even more statistically significant if we cluster the standard errors at the industry or firm level, rather than at the country level. Moreover, we have checked that our results are not driven by any specific country: our results are unaffected by dropping any individual country.

Second, we consider whether firms react to the increase in operating leverage by shortening the debt maturity and relying more on trade credit. Finally, to shed more light on the economic mechanism (namely, the idea that operating leverage crowds out financial leverage), we study the relation between EPL and firms' profitability and labor costs.

3.6.1 Alternative Definitions of Leverage

In Table 3.7, we re-estimate our main Table 3.2 using different definitions of leverage to check the robustness of our results.

In columns 1-3, we use the book value of leverage as the dependent variable: book value of debt over the book value of assets. In column 1, besides controlling for all usual determinants of leverage, we have country and industry/year fixed effects. In column 2 we include firm fixed effects together with industry/year fixed effects, while in column 3, we estimate the same specification as in column 2 with the addition of country/industry fixed effects. The results are very similar to those in Table 3.2: throughout our specifications, increases in labor protection are associated with decreases in leverage. Using the results in column 3, the book leverage of a firm falls by approximately 5.4% as EPL increases by 2 units.

In columns 4-6, we test if our previous finding is robust when leverage is defined as net debt (which is defined as debt minus cash) over market value of assets. We find that the coefficient of the EPL Indicator is negative and statistically different from zero. The magnitude of the effect is also economically significant. Using the results in column 6, on average, net debt over assets fall by 5.8% as EPL increases by 2 units. In columns 7-9, we consider net debt over book value of assets and find that on average, net debt over assets falls by 9.6% as EPL increases by 2 units (Column 9). Hence, we can conclude that the negative relation between EPL and leverage is robust to different definitions of leverage.

3.6.2 Capital Structure Dynamics

As mentioned earlier, the cross-sectional heterogeneity tests presented in Section 3.4.2 partially address concerns of reverse causality and endogeneity, in support of our interpretation that there is a causal impact of EPL on leverage. To further address reverse causality, we examine the dynamic effects of EPL changes on firms' capital structure in greater detail. In Table 3.8, we replace the EPL indicator with four variables: EPL (+1) is the 1-year-forward value of EPL, EPL (0) is the contemporaneous value of EPL, EPL (-1) is the 1-year-lagged value of EPL and EPL (-2) is the 2-year-lagged value of EPL. We estimate similar specifications to those presented in Table 3.2: in column 1, besides controlling for all usual determinants of leverage, we have country fixed effects to control for country time-invariant characteristics and industry/year fixed effects to control for industry-level dynamics. In column 2 we control for firm fixed effects and for industry/year fixed effects and in column 3, we estimate the same specification as in column 2 with the addition of country/industry fixed effects, which allow for differences across countries within the same industry.

The coefficient on EPL (+1) allows us to assess whether any leverage effects can be found prior to the passage of labor laws (EPL). Finding such an effect of the legislation prior to its introduction could be symptomatic of some reverse

causation. Across all specifications, we find that the estimated coefficient on EPL (+1) is economically and statistically insignificant. This rejects any support for a reverse causality story. Moreover both EPL (-1) and EPL (-2) are statistically and economically significant in all specifications. This confirms that changes in EPL cause changes in firm leverage, supporting our causal interpretation of the results. It is worth mentioning here that these results suggest that it takes 2 years for the capital structure to adjust following the employment protection legislation changes and the effect remains thereafter.

3.6.3 Debt Maturity and Trade Credit

An immediate implication of our result is that, as a Coasian response after an increase in EPL, firms will try to rely more heavily on debt that is less likely to be crowded out by the increase in operating leverage. In this section, we discuss two ways in which this can be achieved.

First, firms may increase their use of trade credit. Trade credit is, by its very nature, short-term and relatively senior (see Petersen and Rajan, 1997). We would then expect firms to increase their use of trade credit to counteract the increase in employment protection. In columns 2 and 3 of Table 3.9, we find strong evidence that firms rely more on trade-credit following increases in EPL. In Table 3.9, column 1 includes country and industry/year fixed effects; column 2 includes firm and industry/year fixed effects; column 3 adds country/industry fixed effects, which allow for differences across countries within the same industry.

Second, firms may also use more short-term debt because it is more likely than long-term debt to mature before the firm is hit by a "creative destruction" shock. Hence, we would expect that short-term debt should increase relatively to long-term debt following an increase in EPL. In columns 4-6 of Table 3.7, firms increase their use of short-term debt (relative to total debt) when labor protection increases. However, the coefficients are not statistically different from zero. As before, column

4 includes country and industry/year fixed effects; column 5 includes firm and industry/year fixed effects; while column 6 adds country/industry fixed effects.

3.6.4 Profitability and Labor Costs

The economic mechanism behind our analysis is the idea that an increase in the rigidity of the labor market (as proxied by an increase in firing costs or more restrictions to firing employees) increases the operating leverage of the firm and thus crowds out financial leverage. According to this view, an increase in EPL should be associated with a decrease in firms' profitability and is also likely to be associated with an increase in their labor costs.

In Table 3.10, we show that indeed changes in EPL are associated with a decrease in firms' profitability and an increase in labor costs. We estimate a difference-in-differences specification similar to the one in Table 3.2, where the dependent variable is ROA in columns 1-3 and Cost of Staff scaled by Assets in columns 4-6. Columns 1 and 4 include country and industry/year fixed effects; columns 2 and 5 include firm and industry/year fixed effects; while columns 3 and 6 also include country/industry fixed effects.

Across specifications, we find that firms' profitability decreases as EPL increases. Using the specification reported in column 3, a two-unit increase in EPL is associated with a reduction by about 3% in ROA. These findings are consistent with the idea in our theoretical model that stricter employment protection limits firms' access to finance and this may result in firms being unable to take advantage of investment opportunities.

The results on profitability confirm also findings in a large literature in labor economics. Ruback and Zimmerman (1984), Abowd (1989) and Hirsch (1991) find that labor unionization has a negative effect on firms' earnings and market values; Lee and Mas (2009) show a negative effect of union elections on firm performance.

The results in columns 4-6 show instead that across all specifications labor

costs increase as EPL increases. Relying on the estimates in column 6, a two-unit increase in EPL is associated with an increase by approximately 5.6% in staff cost over assets.[14] These findings indicate that employment protection is costly for the firms.

3.7 Conclusion

In this chapter, using firm-level data from 21 OECD countries over the 1985-2004 period, we provide evidence that firm leverage decreases when employment protection increases. We also find that increases in employment protection have more negative effects on firms' leverage for firms where labor is a more important input of production, and where hiring and firing are more frequent. Further, the negative effect of labor-friendly legislation on firms' leverage is more pronounced when the liquidation value of firms' assets is lower. We also examine the effect of employment protection legislations on firms' investment and sales' growth. We find that increases in EPL dampen firms' growth and that the effect is more pronounced for firms which depend more on external capital. This chapter thus identifies a channel through which labor regulation hinders growth: labor crowds out external finance.

Notwithstanding the political importance of employment protection, the existing literature still has no definitive answers to several important questions: What are the costs and benefits of providing employment protection? How does it affect investment and growth? What is the transmission channel through which labor impacts growth? How does employment protection interact with other forms of regulation? Answers to these questions further our understanding of the effects of labor regulation on the economy and facilitate the design of effective regulatory policies.

[14]Because of the large drop in the number of observations, one needs to interpret the results on labor costs with some caution.

This chapter contributes to this debate and offers supporting evidence for the critics of employment protection laws by showing that labor friendly regulation has negative real effects by restricting access to external finance. This indicates that the transmission channel through which labor regulation impacts growth is through the supply of external capital. From a regulatory perspective, we also find that the negative effect of labor regulation on finance and growth is reduced in the presence of strong creditor rights. This indicates that a country may partially offset the negative effects of increases in employment protection by strengthening creditor rights.

Table 3.1: Main Variables: Descriptive Statistics

This table reports summary statistics for the main variables used in the analysis. The EPL Indicator is time-varying and its value range is 0-6. Its three components are Regular Contracts (which focuses on the laws protecting workers with regular contracts), Temporary Contracts (which focuses on laws affecting workers with fixed-term, temporary contracts) and Collective Dismissals (which focuses on regulations applying to collective dismissals). Total debt/Market Value is the ratio of total debt (which is the sum of long-term and short-term debt) and the market value of assets. Total debt/Assets is the ratio of total debt and the book value of assets. Net Debt/Market Value is the ratio of total debt net of cash and the market value of assets. Net Debt/Assets is the ratio of total debt net of cash and the book value of assets. Short-term Debt/Debt is the ratio of the short-term portion of debt over total debt. Net trade Credit/Total Debt is the difference of accounts payables minus accounts receivables over total debt. Tangibility is the ratio of net property, plant and equipment and total assets. Size is measured as the logarithm of firms' real assets. Q is the ratio of market value of assets over book value of assets. ROA is calculated as earnings before interest and taxes (EBIT) over total assets. Cost of staff/assets is the ratio of the total labor costs over total assets. Capex/Assets is the ratio of firms' capital expenditures over total assets. Sales' Growth is the growth rate of firms' sales. Financial Dependence is a constant variable at the firm level which captures the degree of firms' financial dependence on external capital. This is proxied by the average ratio of capital expenditures minus cash flow from operations over capital expenditures. Worldscope variables are winzorized at the 1% tails. Labor intensity is the median ratio for each 2-digit industry of the cost of staff normalized by firms' sales. Median Tangibility is the median tangibility ratio for each 2-digit level industry. Turnover is a variable defined at the 2-digit industry level using data from Davis, Haltiwanger and Schuh (1996). It is defined as the average of the employment creation and destruction variables provided by Davis, Haltiwanger and Schuh (1996) for the US industries. GDP per Capita is the logarithm of GDP per Capita expressed in current prices. Creditor Rights takes values from 0-4. The sample period is from 1985 to 2004.

	Source	Observations	Mean	Median	Std. Dev.
Labor Law Indicators					
EPL Indicator	Allard (2005)		2.336	2.393	0.918
Regular Contracts	Allard (2005)		2.213	2.250	1.097
Temporary Contracts	Allard (2005)		1.818	1.630	1.386
Collective Dismissals	Allard (2005)		2.976	3.130	1.203
Firm-level Variables					
Total Debt/Market Value	Worldscope	73,065	0.284	0.241	0.218
Total Debt/Assets	Worldscope	80,022	0.245	0.228	0.164
Net Debt/Market Value	Worldscope	77,476	0.120	0.111	0.317
Net Debt/Assets	Worldscope	79,299	0.121	0.132	0.227
Short-term Debt/Total Debt	Worldscope	69,355	0.431	0.409	0.278
Net Trade Credit/Total Debt	Worldscope	63,188	-1.576	-0.411	5.571
Tangibility	Worldscope	84,037	0.300	0.287	0.152
Size	Worldscope	82,222	7.853	7.757	1.757
Q	Worldscope	76,839	1.199	0.931	0.903
ROA	Worldscope	82,235	0.063	0.069	0.105
Cost of Staff/Assets	Worldscope	17,231	0.276	0.262	0.151
Capex/Assets	Worldscope	70,050	0.059	0.049	0.044
Sales' Growth	Worldscope	74,595	0.078	0.047	0.253
Financial Dependence Firm	Worldscope	83,755	-0.562	-0.635	3.200
Industry-level Variables					
Labor Intensity	Worldscope		0.278	0.291	0.061
Turnover	Worldscope		9.622	9.346	1.622
Median Tangibility	Worldscope		0.301	0.302	0.066
Country Factors					
GDP Growth (%)	IMF, WEO		2.466	2.673	1.762
log (GDP Per Capita)	IMF, WEO		10.126	10.150	0.317
Creditor Rights	Djankov et al (2007)		2.151	2.000	1.182

Table 3.2: DID Analysis: Employment Protection Legislation

This table reports the results of regressions of leverage on the EPL Indicator and a set of controls. Leverage is defined as total debt over market value of assets. EPL is lagged by one year. Columns 1 and 2 include interacted year times two-digit industry fixed effects; column 2 also includes country fixed effects; column 3 includes firm and year times two-digit industry fixed effects and column 4 adds country times two-digit industry fixed effects. Other Control variables refer to macro factors (GDP Growth, log (GDP per Capita), Creditor Rights). In Column 1, these also include indicators characterizing countries' legal origin, tax system (using an indicator used by Fan, Titman and Twite (2006)) and countries' financial development, namely whether a country is a bank-based or a market-based economy. In the rest of the specifications these country-level controls are absorbed by the fixed effects. All variables are defined in Table 4.5. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% respectively. Standard errors are clustered at the country level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in 21 countries. Coverage: 1985-2004.

	Total Debt/Market Value of Assets			
	(1)	(2)	(3)	(4)
EPL	-0.0325	-0.0456	-0.0409	-0.0409
	(0.0068)***	(0.0134)***	(0.0162)**	(0.0163)**
Tangibility	0.166	0.168	0.251	0.253
	(0.0585)**	(0.0604)**	(0.0436)***	(0.0437)***
Size	0.0110	0.0110	0.0608	0.0608
	(0.0019)***	(0.0019)***	(0.0080)***	(0.0080)***
ROA	-0.555	-0.554	-0.499	-0.497
	(0.097)***	(0.100)***	(0.047)***	(0.046)***
Q	-0.0941	-0.0935	-0.0650	-0.0647
	(0.0044)***	(0.0045)***	(0.0041)***	(0.0040)***
Other Control Var.	X	X	X	X
Country*Industry FE				Yes
Country FE		Yes		
Ind*Year FE	Yes	Yes	Yes	Yes
Firm FE			Yes	Yes
Observations	61,248	61,248	61,248	61,248
Adjusted R^2	0.34	0.34	0.78	0.75

Table 3.3: Cross-sectional Heterogeneity: Labor Intensity and Turnover

This table reports the results of regressions of cross-sectional heterogeneity. Total debt over market value of assets is regressed on the interaction of EPL with a proxy of Labor intensity at the industry level and a set of controls. Labor intensity is computed as the median cost of staf over sales for each industry defined at the 2-digit level. Turnover is a proxy for employment turnover calculated using data by Davis, Haltiwanger and Schuh (1996). EPL is lagged by one year. All columns include firm fixed effects. Columns 1 and 5 include firm and year times two-digit industry fixed effects; columns 2 and 6 include firm and country times year fixed effects; Columns 3 and 7 include firm, year times two-digit industry fixed effects and country times year fixed effects and Columns 4 and 8 add country times two-digit industry fixed effects to the previous specification. Other Control variables refer to macro factors (GDP Growth, log (GDP per Capita), Creditor Rights). All variables are defined in Table 4.5. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% respectively. Standard errors are clustered at the country level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in 21 countries. Coverage: 1985-2004.

Table 3.3 *Continued*

	Total Debt/Market Value of Assets							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
EPL	-0.0160				0.0029			
	(0.0240)				(0.0241)			
EPL*Labor Intensity	-0.0904	-0.0742	-0.0844	-0.0874				
	(0.0486)*	(0.0397)*	(0.0315)***	(0.0369)**				
Labor Intensity		0.0450						
		(0.048)						
EPL*Turnover					-0.0049	-0.0033	-0.0042	-0.0062
					(0.0015)***	(0.0006)***	(0.0009)***	(0.0014)***
Turnover						0.0101		
						(0.0031)***		
Tangibility	0.251	0.229	0.213	0.215	0.251	0.228	0.215	0.212
	(0.0435)***	(0.0438)***	(0.0412)***	(0.0419)***	(0.0436)***	(0.0438)***	(0.0412)***	(0.0419)***
Size	0.0608	0.0594	0.0628	0.0632	0.0607	0.0593	0.0632	0.0627
	(0.0080)***	(0.0081)***	(0.0081)***	(0.0082)***	(0.0081)***	(0.0082)***	(0.0082)***	(0.0082)***
ROA	-0.499	-0.518	-0.512	-0.510	-0.499	-0.518	-0.512	-0.510
	(0.0467)***	(0.0506)***	(0.0483)***	(0.0480)***	(0.0467)***	(0.0505)***	(0.0482)***	(0.0480)***
Q	-0.0649	-0.0567	-0.0554	-0.0552	-0.0650	-0.0567	-0.0555	-0.0553
	(0.0041)***	(0.0031)***	(0.0030)***	(0.0029)***	(0.0041)***	(0.0030)***	(0.0029)***	(0.0029)***
Other Control Var.	X				X			
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind*Year FE	Yes		Yes	Yes	Yes		Yes	Yes
Country*Year FE		Yes	Yes	Yes		Yes	Yes	Yes
Country*Industry FE				Yes				Yes
Observations	61,248	61,248	61,248	61,248	61,248	61,248	61,248	61,248
Adjusted R^2	0.78	0.79	0.76	0.77	0.78	0.79	0.76	0.77

Table 3.4: Cross-sectional Heterogeneity: Liquidation Values

This table reports the results of regressions of cross-sectional heterogeneity. Total debt over assets is regressed on the interaction of EPL with a proxy for the liquidation value of firms' assets (L) and a set of controls. EPL is lagged by one year. The first proxy L1, is the median tangibility in the industry, L2 is a measure of creditor rights and L3 is the product of the two measures (L1*L2). All columns include firm fixed effects. Columns 1, 5 and 7 include also year times two-digit industry fixed effects. Column 6 controls for year times two-digit industry and country times two-digit industry fixed effects in addition to firm fixed effects. Columns 2 and 8 add year times country fixed effects to the firm fixed effects, Columns 3 and 9 add country times year and year times two-digit industry fixed effects to the firm fixed effects and Columns 4 and 10 control for firm, year times two-digit industry, country times year and country times two-digit industry fixed effects. Other Control variables refer to macro factors (GDP Growth, log (GDP per Capita), Creditor Rights). All variables are defined in Table 4.5. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% respectively. Standard errors are clustered at the country level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in 21 countries. Coverage: 1985-2004.

Table 3.4 *Continued*

	Total Debt/Market Value of Assets									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
EPL	-0.093				-0.105	-0.104	-0.087			
	(0.0158)***				(0.0214)***	(0.0204)***	(0.0164)***			
EPL*L1	0.171	0.088	0.103	0.125						
	(0.0675)**	(0.0548)	(0.0588)*	(0.0541)**						
L1		-0.162								
		(0.102)								
EPL*L2					0.0426	0.0423				
					(0.0113)***	(0.0111)***				
L2					-0.0618	-0.0621				
					(0.0177)***	(0.0174)***				
EPL*L3							0.0980	0.0690	0.0841	0.1000
							(0.0259)***	(0.0337)**	(0.0252)***	(0.0252)***
L3							-0.116	-0.140	-0.078	-0.022
							(0.0397)***	(0.0659)**	(0.0809)	(0.0843)
Tangibility	0.251	0.229	0.213	0.215	0.247	0.249	0.249	0.229	0.213	0.215
	(0.0432)***	(0.0439)***	(0.0412)***	(0.0419)***	(0.0412)***	(0.0413)***	(0.0413)***	(0.0440)***	(0.0410)***	(0.0416)***
Size	0.0608	0.0593	0.0627	0.0632	0.0609	0.0609	0.0609	0.0593	0.0627	0.0633
	(0.0080)***	(0.0081)***	(0.0081)***	(0.0082)***	(0.0080)***	(0.0080)***	(0.0079)***	(0.0080)***	(0.0081)***	(0.0081)***
ROA	-0.499	-0.518	-0.512	-0.055	-0.498	-0.496	-0.499	-0.518	-0.512	-0.510
	(0.0468)***	(0.0505)***	(0.0482)***	(0.0479)***	(0.0465)***	(0.0462)***	(0.0469)***	(0.0505)***	(0.0484)***	(0.0480)***
Q	-0.0650	-0.0567	-0.0554	-0.0552	-0.0645	-0.0643	-0.0647	-0.0567	-0.0554	-0.0553
	(0.0041)***	(0.0031)***	(0.0030)***	(0.0029)***	(0.0038)***	(0.0037)***	(0.0039)***	(0.0031)***	(0.0030)***	(0.0030)***
Other Control Var.	X				X	X	X			
Ind.*Country FE				Yes		Yes				Yes
Country*Year FE		Yes	Yes	Yes				Yes	Yes	Yes
Ind.*Year FE	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	61,248	61,248	61,248	61,248	61,248	61,248	61,248	61,248	61,248	61,248
Adjusted R^2	0.78	0.79	0.76	0.77	0.79	0.76	0.79	0.79	0.76	0.77

Table 3.5: Growth and Financial Dependence

This table reports the results of regressions of firms' sales growth on the EPL indicator and a set of controls (Columns 1-3) and on the interaction of EPL with a proxy for firms' financial dependence on external capital (constant at the firm level) and a set of controls (Columns 4-7). EPL is lagged by one year. Column 1 includes country and interacted year and two-digit industry fixed effects; columns 2 and 4 include firm and interacted year and two-digit industry fixed effects; column 3 adds country times two-digit industry fixed effects. Column 5 controls for firm and country times year fixed effects. Column 6 adds industry times two-digit industry fixed effects to the previous specification and Column 7 adds also country times two-digit industry fixed effects to the specification in Column 6. Other Control variables refer to macro factors (GDP Growth, log (GDP per Capita), Creditor Rights). All variables are defined in Table 4.5. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% respectively. Standard errors are clustered at the country level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in 21 countries. Coverage: 1985-2004.

	Growth of Sales						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
EPL	-0.0037	-0.0388	-0.0386	-0.0429			
	(0.018)**	(0.023)*	(0.023)*	(0.0224)*			
EPL*Financial Dependence				-0.00575	-0.00399	-0.00495	-0.00442
				(0.00156)***	(0.00121)***	(0.0014)***	(0.0010)***
ROA	0.334	0.639	0.638	0.636	0.6545	0.6256	0.6253
	(0.048)***	(0.043)***	(0.044)***	(0.0452)***	(0.0369)***	(0.03797)***	(0.03807)***
Q	0.044	0.024	0.024	0.0251	0.0292	0.0287	0.0285
	(0.006)***	(0.007)***	(0.007)***	(0.00706)***	(0.0061)***	(0.0062)***	(0.0063)***
Other Control Var.	X	X	X	X			
Firm FE		Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes						
Ind*Year FE	Yes	Yes	Yes	Yes		Yes	Yes
Country*Year FE					Yes	Yes	Yes
Country*Industry FE			Yes				Yes
Observations	66,456	66,456	66,456	64,973	64,973	64,973	64,973
Adjusted R^2	0.14	0.34	0.25	0.34	0.27	0.28	0.28

Table 3.6: Capital Expenditure and Financial Dependence

This table reports the results of regressions of firms' investment measured as capital expenditures over assets on the EPL indicator and a set of controls (Columns 1-3) and on the interaction of EPL with a proxy for firms' financial dependence on external capital (constant at the firm level) and a set of controls (Columns 4-7). EPL is lagged by one year. Column 1 includes country and interacted year and two-digit industry fixed effects; columns 2 and 4 include firm and interacted year and two-digit industry fixed effects; column 3 adds country times two-digit industry fixed effects. Column 5 controls for firm and country times year fixed effects. Column 6 adds industry times two-digit industry fixed effects to the previous specification and Column 7 adds also country times two-digit industry fixed effects to the specification in Column 6. Other Control variables refer to macro factors (GDP Growth, log (GDP per Capita), Creditor Rights). All variables are defined in Table 4.5. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% respectively. Standard errors are clustered at the country level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in 21 countries. Coverage: 1985-2004.

	Capex/Assets						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
EPL	0.0002	-0.0009	-0.0008	-0.00183			
	(0.002)	(0.003)	(0.003)	(0.00310)			
EPL*Financial				-0.00115	-0.00105	-0.00115	-0.00116
Dependence				(0.0003)***	(0.00027)***	(0.00029)***	(0.00028)***
ROA	0.044	0.028	0.028	0.0279	0.0258	0.0243	0.0242
	(0.004)***	(0.004)***	(0.004)***	(0.0037)***	(0.0029)***	(0.0031)***	(0.0031)***
Q	0.004	0.003	0.004	0.00335	0.0043	0.0042	0.0042
	(0.001)***	(0.001)***	(0.001)***	(0.0006)***	(0.00047)***	(0.00049)***	(0.0005)***
Other Control Var.	X	X	X	X			
Firm FE		Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes						
Ind*Year FE	Yes	Yes	Yes	Yes		Yes	Yes
Country*Year FE					Yes	Yes	Yes
Country*Industry FE			Yes				Yes
Observations	56,723	56,723	56,723	56,641	56,641	56,641	56,641
Adjusted R^2	0.15	0.55	0.48	0.55	0.49	0.49	0.49

Table 3.7: Other Definitions of Leverage

This table reports the results of regressions of alternate definitions of leverage on the EPL Indicator and a set of controls. Leverage is defined as Total Debt over Book Value of assets in columns 1-3, as Net Debt (total debt minus cash) over market value of assets in columns 4-6, and as Net Debt over book value of Assets in columns 7-9. EPL is lagged by one year. Columns 1, 4 and 7 include country and interacted year and two-digit industry fixed effects. Columns 2, 5 and 8 include firm and interacted year and two-digit industry fixed effects and columns 3, 6 and 9 add interacted country and two-digit industry fixed effects. Other Control variables refer to macro factors (GDP Growth, log (GDP per Capita), Creditor Rights). All variables are defined in Table 4.5. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% respectively. Standard errors are clustered at the country level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in 21 countries. Coverage: 1985-2004.

	Total Debt/Assets			Net Debt/Market Value			Net Debt/Assets		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
EPL	-0.0273	-0.0261	-0.0265	-0.0493	-0.0478	-0.0285	-0.0281	-0.0283	-0.0481
	(0.0094)***	(0.0120)**	(0.0122)**	(0.0158)***	(0.0167)***	(0.0157)*	(0.0116)**	(0.0155)*	(0.0167)**
Tangibility	0.146	0.129	0.131	0.514	0.653	0.507	0.383	0.504	0.656
	(0.0492)***	(0.0240)***	(0.0242)***	(0.1060)***	(0.0697)***	(0.0269)***	(0.3830)***	(0.0283)***	(0.0693)***
Size	0.0120	0.0528	0.0531	0.0183	0.0775	0.0588	0.0124	0.0585	0.0776
	(0.0021)***	(0.0066)***	(0.0068)***	(0.0027)***	(0.0084)***	(0.0071)***	(0.0025)***	(0.0069)***	(0.0084)***
ROA	-0.374	-0.358	-0.356	-0.503	-0.499	-0.413	-0.387	-0.414	-0.497
	(0.0912)***	(0.0362)***	(0.0362)***	(0.1490)***	(0.0482)***	(0.0424)***	(0.1380)***	(0.0427)***	(0.0477)***
Q	-0.0098	0.0024	0.0025	-0.0398	0.0028	-0.0091	-0.0423	-0.0092	0.0031
	(0.0083)	(0.0047)	(0.0048)	(0.0127)***	(0.0112)	(0.0066)	(0.0113)***	(0.0065)	(0.0113)
Other Control Var.	X	X	X	X	X	X	X	X	X
Country*Industry FE			Yes			Yes			Yes
Country FE	Yes			Yes			Yes		
Ind*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE		Yes	Yes		Yes	Yes		Yes	Yes
Observations	61,512	61,512	61,512	64,050	64,050	64,050	61,188	61,188	61,188
Adjusted R^2	0.14	0.76	0.72	0.19	0.76	0.76	0.19	0.79	0.73

Table 3.8: Dynamics of Leverage

This table reports the results of regressions of leverage on the one-year lagged, two-year lagged, the contemporaneous and the one-year forward values of the EPL indicator and a set of controls. Leverage is defined as total debt over market value of assets. Column 1 includes interacted year times two-digit industry fixed effects and country fixed effects; column 2 includes firm and year times two-digit industry fixed effects and column 3 adds country times two-digit industry fixed effects. Other Control variables refer to macro factors (GDP Growth, log (GDP per Capita), Creditor Rights). All variables are defined in Table 4.5. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% respectively. Standard errors are clustered at the country level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in 21 countries. Coverage: 1985-2004.

	Total Debt/Market Value of Assets		
	(1)	(2)	(3)
EPL(+1)	0.0111	0.0037	0.0050
	(0.0106)	(0.0109)	(0.0110)
EPL(0)	-0.0061	-0.0037	-0.0042
	(0.0098)	(0.0105)	(0.0010)
EPL(-1)	-0.0203	-0.0148	-0.0139
	(0.0052)***	(0.0072)**	(0.0073)*
EPL(-2)	-0.0272	-0.0290	-0.0298
	(0.0068)***	(0.0086)***	(0.0084)***
Other Control Var.	X	X	X
Country*Industry FE			Yes
Country FE	Yes		
Ind*Year FE	Yes	Yes	Yes
Firm FE		Yes	Yes
Observations	49,171	49,171	49,171
Adjusted R^2	0.35	0.80	0.77

Table 3.9: Trade Credit and Short-Term Debt

This table reports the results of regressions of net trade credit over debt (columns 1-3) and short-term debt to debt (columns 4-6) on the EPL indicator and a set of controls. EPL is lagged by one year. Columns 1 and 4 include country and interacted year and two-digit industry fixed effects; columns 2 and 5 include firm and interacted year and two-digit industry fixed effects; columns 3 and 6 add country times two-digit industry fixed effects. Other Control variables refer to macro factors (GDP Growth, log (GDP per Capita), Creditor Rights). All variables are defined in Table 4.5. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% respectively. Standard errors are clustered at the country level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in 21 countries. Coverage: 1985-2004.

	Net Trade Credit/Debt			Short-term Debt/Debt		
	(1)	(2)	(3)	(4)	(5)	(6)
EPL	0.151	0.352	0.360	0.018	0.009	0.007
	(0.156)	(0.156)**	(0.161)**	(0.014)	(0.014)	(0.014)
Tangibility	3.973	4.664	4.724	-0.221	-0.090	-0.091
	(0.404)***	(0.779)***	(0.786)***	(0.022)***	(0.027)***	(0.029)***
Size	0.292	0.596	0.591	-0.020	-0.040	-0.039
	(0.067)***	(0.173)***	(0.175)***	(0.005)***	(0.009)***	(0.009)***
ROA	-5.654	-3.214	-3.135	-0.128	-0.128	0.128
	(0.759)***	(0.480)***	(0.508)***	(0.033)***	(0.025)***	(0.025)***
Q	-0.354	-0.151	-0.143	-0.005	-0.005	-0.005
	(0.069)***	(0.056)**	(0.054)***	(0.012)	(0.005)	(0.005)
Other Control Var.	X	X	X	X	X	X
Country*Industry FE			Yes			Yes
Country FE	Yes			Yes		
Ind*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE		Yes	Yes		Yes	Yes
Observations	51,738	51,738	51,738	54,964	54,964	54,964
Adjusted R^2	0.05	0.50	0.42	0.25	0.63	0.57

Table 3.10: Firms' Profitability and Cost of Labor

This table reports the results of regressions of net firms' profitability (columns 1-3) and labor costs (columns 4-6) on the EPL indicator and a set of controls. EPL is lagged by one year. Columns 1 and 4 include country and interacted year and two-digit industry fixed effects; columns 2 and 5 include firm and interacted year and two-digit industry fixed effects; columns 3 and 6 add country times two-digit industry fixed effects. Other Control variables refer to macro factors (GDP Growth, log (GDP per Capita), Creditor Rights). All variables are defined in Table 4.5. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% respectively. Standard errors are clustered at the country level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in 21 countries. Coverage: 1985-2004.

	ROA			Cost of Staff/Assets		
	(1)	(2)	(3)	(4)	(5)	(6)
EPL	-0.0091	-0.0140	-0.0147	0.0525	0.0281	0.0277
	(0.0060)	(0.0059)**	(0.0057)***	(0.0168)***	(0.0132)**	(0.0130)**
Tangibility	0.027	-0.099	-0.099	0.123	0.125	0.125
	(0.017)	(0.011)***	(0.011)***	(0.036)***	(0.033)***	(0.032)***
Size	0.0100	0.0156	0.0157	-0.0229	-0.0608	-0.0617
	(0.0021)***	(0.0037)	(0.0037)***	(0.0013)***	(0.0044)	(0.0044)***
ROA				0.0219	-0.1030	-0.1040
				(0.0209)	(0.0100)	(0.0102)***
Q	0.0262	0.0307	0.0305	-0.0164	-0.0034	-0.0036
	(0.0038)***	(0.0041)***	(0.0041)***	(0.0030)***	(0.0018)*	(0.0018)**
Other Control Var.	X	X	X	X	X	X
Country*Industry FE			Yes			Yes
Country FE	Yes			Yes		
Ind*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE		Yes	Yes		Yes	Yes
Observations	64,732	64,732	64,732	13,461	13,461	13,461
Adjusted R^2	0.16	0.61	0.55	0.38	0.90	0.88

Figure 3.1: Model Time-line

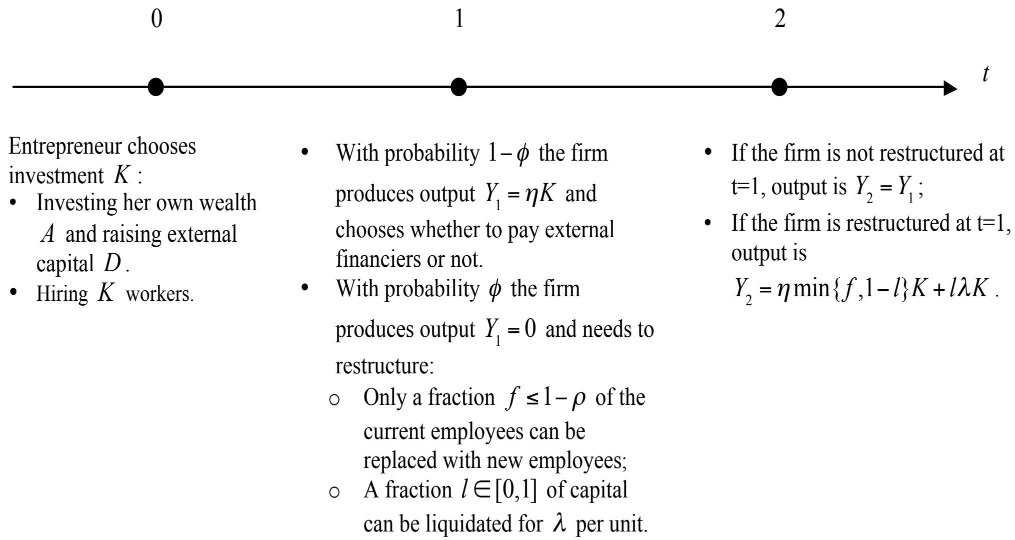
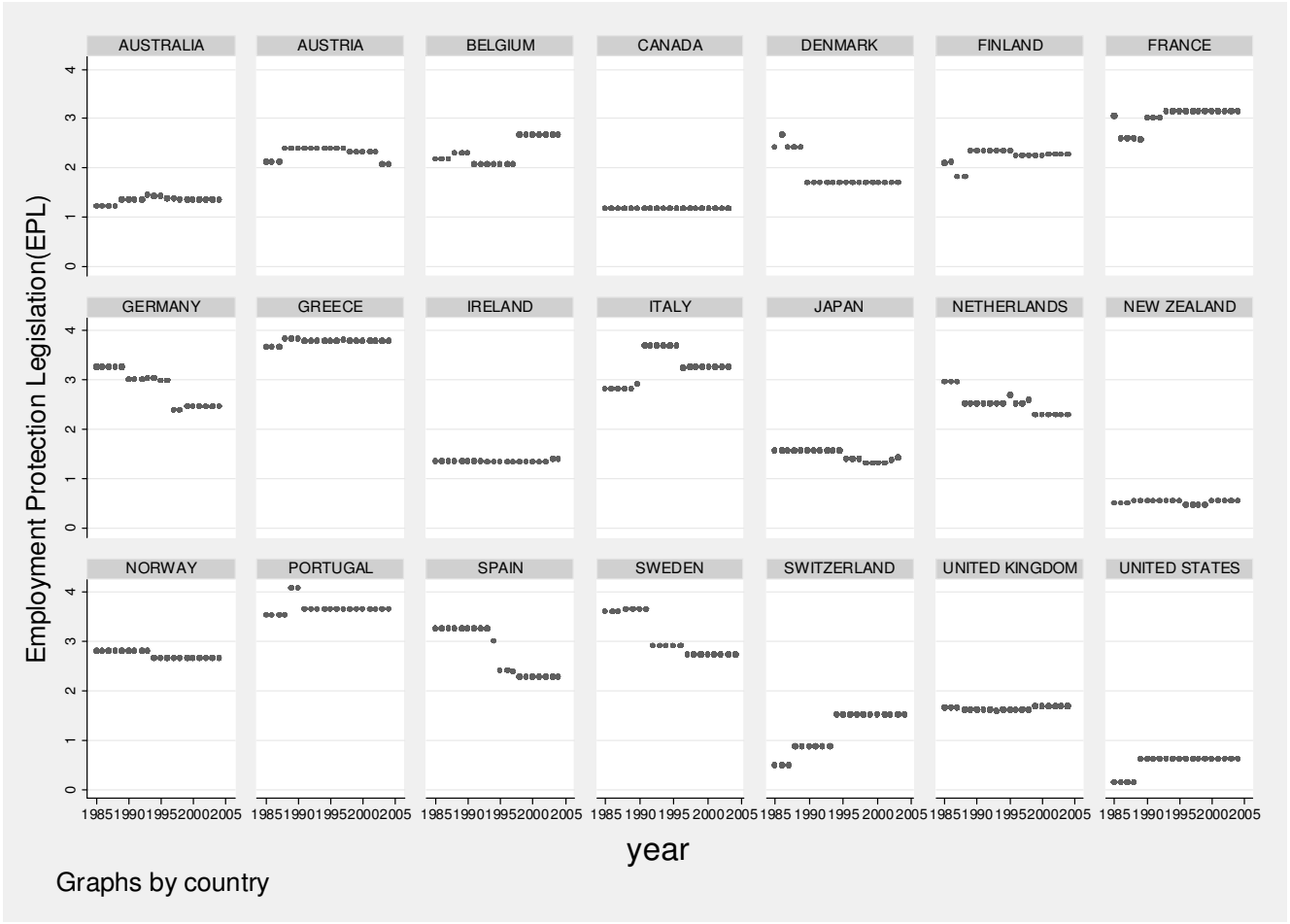


Figure 3.2: EPL



Chapter 4

Labor and Finance: Part II

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4.1 Introduction

There is a large theoretical literature that emphasizes the strategic role of debt. The existing dominant paradigm is that firms use debt to improve their bargaining position against labor and other suppliers of inputs. According to this view, debt allows firms to reduce the cost of these inputs and alleviates the underinvestment problem caused by supplier holdout power. This literature, thus, predicts a positive causal relationship between supplier bargaining power and the use of debt.

We can better illustrate this argument using a simple example. Consider a bargaining game between two parties, workers and managers, in which both parties have equal bargaining power. Assume that their joint effort generates some cash flows of one hundred dollars. Since the parties have equal bargaining power, the

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cash flows will be equally split with fifty dollars going to each party. Now suppose that the managers can issue claims (for example using a debt contract) for fifty dollars before going into the bargaining game. In that case, the managers are able to extract seventy five dollars (50 + 0.5*50). This is essentially the bargaining benefit of debt. The above argument has been made in various settings: employers negotiating wages with unions (Baldwin, 1983, Perotti and Spier 1993, Dasgupta and Sengupta, 1993); regulated firms bargaining with regulators (Spiegel and Spulber, 1994); customers negotiating input prices with suppliers (Hennessy and Livdan, 2009); raiders bidding for potential targets (Muller and Panunzi, 2004).

The existing empirical evidence also provides some support for this view. Bronars and Deere (1991) use industry-level data to document a positive correlation between leverage and the degree of unionization as a proxy for labor bargaining power. Matsa (2010a) uses changes in labor laws in the US (the adoption of the right-to-work laws and the repeal of the unemployment insurance work stoppage provisions) to identify the causal relation (if any) between labor bargaining power and leverage. Consistent with the strategic role of debt, he finds a positive relationship between increases in labor bargaining power and firm leverage. Along the same lines, Benmelech, Bergman and Enriquez (2009) show that companies in financial distress extract surplus from workers by achieving substantial wage concessions. Interestingly, however, the Graham and Harvey's (2001) survey of CFOs, indicates that managers *do not knowingly* use debt as a bargaining tool to extract wage concessions.[2]

The bargaining literature relies on three critical assumptions to generate the

[2]There is also a large literature, which studies the impact of labor regulation on other firms' financial and real decisions. Ruback and Zimmerman (1984), Abowd (1989) and Hirsch (1991) document that labor union coverage has a negative association with US firms' earnings and market values. Besley and Burgess (2004) find that a high degree of employment protection is associated with lower investment and economic growth. Chen, Kacperczyk and Ortiz-Molina (2008) show that US firms that belong to more unionized industries are characterized by higher cost of equity and that unionization is negatively associated with firms' operating flexibility. Atanassov and Kim (2009) provide international evidence that strong unions are effective in deterring layoffs in distressed firms. Acharya, Baghai and Subramanian (2009) find that stronger labor laws can have an ex ante positive effect on firms' innovation.

strategic role of debt. First, shareholders choose debt before they engage in bargaining with suppliers. In reality, both capital structure and bargaining decisions happen frequently and its difficult to argue that shareholders have a first mover advantage. Second, shareholders have full control over the proceeds of the debt issue and consume the proceeds before negotiating with the suppliers. Third, creditors are excluded from bargaining, that is, their claims cannot be renegotiated. In reality, debt claims are often renegotiated, particularly when the debt is in the form of bank loans. We show that relaxing these assumptions (in particular, allowing for debt renegotiation) reverses the relationship between leverage and bargaining power.

The basic theoretical argument of this chapter rests on the bargaining power of labor *vis-a-vis* capital providers. Using a simple theoretical framework that is adapted from Hart and Moore (1994), we demonstrate that when employees possess a critical input and can hold up the firm, for example by threatening to withdraw their essential labor input and going on strikes, the relation between labor bargaining power and leverage is theoretically ambiguous: as labor providers negotiate with financiers over the surplus that they generate, there can be a positive or negative relation depending on whether debt is renegotiable or not. The basic economic intuition for the negative relation between labor bargaining power and leverage comes from a crowding out effect: when debt is renegotiable an increase in labor bargaining power increases operating leverage and crowds out financial leverage.

We begin our empirical analysis by examining correlations between a union coverage indicator and capital structure choices of firms. The indicator captures the number of employees participating in unions in 21 OECD countries over the 1985-2004 period. Unions have been largely used in the literature as a proxy for workers' bargaining power; it is intuitive that in countries with greater union coverage, firm policies are more likely to be subject to bargaining with workers. We find that an increase of union coverage by 10 percentage points is associated

with a 2.5% decrease in firms' leverage (in absolute terms) or of 11% (relative to the mean).

A potential drawback of this analysis is, however, its inability to control for omitted variables. It is clear that countries that differ in their union coverage also differ along many other dimensions, both observable and unobservable. Thus, the comparison between countries with high and low union coverage may capture the effect of omitted variables or unobserved differences across countries. To address this concern, the main empirical strategy of this chapter exploits both time-series and cross-sectional variation in labor bargaining power which is associated with labor law changes. The advantage of looking at changes in regulation is that these are exogenous compared to the more endogenous union coverage variable. Specifically, we use what is commonly referred to as the difference-in-differences (DID) research design. The strategy exploits changes in labor laws across countries and across time.

The results with this approach are also consistent with our insight: an increase in labor's bargaining power, as measured by a ten-unit increase in the labor law indicator, is associated with a reduction in firms' leverage of 3% (in absolute terms) or of 13% (relative to the mean). On disaggregating the labor law indicator into its five sub-components, we find that laws governing collective relations and industrial action are the main drivers of our results. While we believe that all components capture aspects of labor bargaining power, the components describing laws governing employee representation and industrial actions capture more precisely the collective bargaining power that is believed to be the most relevant variable determining labor bargaining.

The remainder of the chapter is organized as follows. In Section 4.2, we present a simple theoretical framework which motivates our empirical analysis. In Section 4.3, we describe the sample and define the variables. In Section 4.4, we present the empirical methodology and the results. Section 4.5 concludes.

4.2 Wage Bargaining and Debt

Consider a firm, in which risk-neutral shareholders (or a manager representing their interests) bargain with a set of risk-neutral employees (providers of essential labor input). Wage bargaining is modeled as in Grout (1984) and Hart and Moore (1994): employees possess a critical input and can hold up the firm by threatening to withdraw their essential labor input. We embed wage bargaining into a simple trade-off model of capital structure to show that the relation between the bargaining power of employees and leverage is theoretically ambiguous and depends on whether debt is a hard claim or not.

4.2.1 Timeline

At $t = 0$, the shareholders of an all-equity firm with total assets F hire a set of workers and choose how much debt with face value $D \in \left[0, \overline{D}\right]$ to borrow from risk-neutral and competitive creditors (who demand a gross return R, which is normalized to 1). Workers are promised a wage W, which can be (re)negotiated at $t = 1$, while the proceeds from the debt issue are paid at $t = 0$ to shareholders via a debt-for-equity swap. The benefit of debt is the tax shield that it generates: $B(D) = \tau \min\{y, D\}$, where τ is the marginal corporate tax rate and y is the firm's output, which is produced at $t = 2$ and is uniformly distributed on the interval $\left[0, \overline{Y}\right]$. The cost of debt is the loss of value from liquidation when continuation would yield more: $C(D) = y - L$ for any $y \geq L$.

At $t = 1$, creditors, shareholders and workers learn a (perfectly) informative signal about the firm's output y, decide whether to liquidate the firm for L, and negotiate the labor compensation W. The sequence of actions is as follows. First, if $y \geq D$, labor negotiation takes place between employees and shareholders. The outcome of the negotiation is the cooperative Nash bargaining solution, in which employees receive a fraction $\alpha \in [0, 1]$ of the surplus $y - D$. The parameter α represents labor bargaining power; while shareholders receive the remaining $1 - \alpha$

portion of the surplus. Second, if $y < D$ or if labor negotiation with workers fails, creditors take over the firm and liquidate it for L.

At $t = 2$, output is produced and paid to the various claimants. If negotiation succeeds, the firm's output is y: creditors are paid D; shareholders and workers share the remaining $y - D$. If labor negotiation fails or if $y < D$, the firm is liquidated for L. In such case, workers receive 0 (their outside option from alternative employments); creditors are paid L (assuming that $D \geq L$, which holds in equilibrium) and shareholders are paid nothing.

4.2.2 Benchmark Case with No Bargaining

Because of the definition of $B(D)$ and $C(D)$, in the absence of bargaining ($W = W_0 = 0$ or $\alpha = 0$) the optimal choice of debt is the solution of the following problem:

$$\max_{D} \int_{0}^{D} \frac{L}{\overline{Y}} dy + \int_{D}^{\overline{Y}} \frac{[D + (y - D)(1 - \tau)]}{\overline{Y}} dy \tag{4.1}$$

The first term is the value of the firm in liquidation, which happens whenever $y < D$. The second term is the value of the firm if solvent, that is, when $y \geq D$. From the first-order conditions, the marginal benefit of debt is $\tau\left(\overline{Y} - D\right)$ while the marginal cost is cost of the inefficient liquidation $D - L$. The solution to the problem above is:

$$D_0^* = \frac{L + \tau\overline{Y}}{1 + \tau} > L \tag{4.2}$$

which is strictly increasing in the liquidation value L and firm's profitability $\overline{Y}$, and in the corporate tax rate τ.

4.2.3 Debt as a Bargaining Tool

The model is solved by backward induction starting with the payoffs at $t = 2$. If labor negotiations succeed and $y \geq D$, the firm pays debt in full; it pays wages W

and makes after-tax profits $(1-\tau)(y-D-W)$, which are distributed to shareholders as dividends. If labor negotiation fails and $y < D$, the firm is liquidated for L, which is paid to creditors (assuming that $D \geq L$, which holds in equilibrium); while both shareholders and workers receive 0.

We proceed backwards to the labor negotiation at $t = 1$. If $y \geq D$, workers bargain with shareholders. Given that both shareholders and workers are paid nothing if negotiations fail, they will reach an agreement and split the surplus $y - D \geq 0$. Following the asymmetric Nash bargaining solution, workers receive a fraction α of the surplus: $W = \alpha(y - D)$.

We then move backwards to the choice of debt at $t = 0$. Given that all proceeds from the debt issue are paid to shareholders in a debt-for-equity swap, shareholders choose debt to maximize the firm value:

$$\max_{D} \left(L + \int_{D}^{\overline{Y}} \frac{D-L}{\overline{Y}} dy \right) + (1-\tau) \int_{D}^{\overline{Y}} \frac{(1-\alpha)(y-D)}{\overline{Y}} dy \tag{4.3}$$

The first term (in parenthesis) is the market value of debt; the second term is the market value of equity. From the first order condition, the marginal benefit of debt is $[\tau + \alpha(1-\tau)]\left(\overline{Y} - D\right)$, which is strictly increasing in α. In fact, compared to the case with no bargaining, now debt has two benefits: it generates a tax shield and it can be used as an effective bargaining tool to reduce workers' wages. The marginal cost of debt is the loss from inefficient liquidation $(D - L)$, which is unaffected by α.

Hence, we can show that:

Result 1: *The optimal choice of debt D^*_α is strictly increasing in labor bargaining power α:* $D^*_\alpha = \frac{L+[\tau+\alpha(1-\tau)]\overline{Y}}{1+\tau+\alpha(1-\tau)}$.

The amount of debt raised at $t = 0$ is

$$V_D = L + \int_{D_\alpha^*}^{\overline{Y}} \frac{D_\alpha^* - L}{\overline{Y}} dy \tag{4.4}$$

which is strictly increasing in labor bargaining power α as

$$\frac{\partial V_D}{\partial \alpha} = \frac{L + \overline{Y} - 2D_\alpha^*}{\overline{Y}} \frac{\partial D_\alpha^*}{\partial \alpha} = \frac{(1-\alpha)(1-\tau)\left(\overline{Y} - L\right)}{\overline{Y}\left[1 + \tau + \alpha(1-\tau)\right]} \frac{\partial D_\alpha^*}{\partial \alpha} > 0 \tag{4.5}$$

because $\frac{\partial D^*}{\partial \alpha} > 0$. The optimal choice of debt is also increasing in the liquidation value L, the firm's profitability $\overline{Y}$ and the corporate tax rate τ. Given that the book value of the firm is F, the predictions above also apply to leverage $l^* = V_D/F$.

4.2.4 Discussion

The model that we just presented relies on four critical assumptions: (i) firms choose debt before they engage in wage negotiation; (ii) shareholders have full control over the proceeds of the debt issue; (iii) debt claims are senior to labor claims in case of default; and (iv) creditors do not renegotiate their claims.

The first assumption (debt choice comes before labor negotiation) is critical in all bargaining models. If labor negotiation were to precede the capital structure decision, one would obtain the opposite result that wages may act as a strategic device to reduce debt capacity. In reality both capital structure decisions and labor negotiations happen frequently and it is difficult to argue that one comes before the other.

The second assumption (shareholders control the proceeds of the debt issue) implies that shareholders are able to cash in from the debt-for-equity swap via equity repurchase or special dividends. If there are limits to their ability to do so, some of the proceeds from the debt issue will be obtained by workers. In this case, shareholders may not be able to reduce labor costs by raising debt.

The third assumption (debt seniority in case of default) is important because for debt to be a strategic device workers must suffer in case of default. This critically depends on what happens when the firm defaults: if employees retain some of the value of the firm, debt would not be an effective bargaining tool. In most countries debt claims are *de jure* senior to labor claims in case of default, they might in practice not be so. For example, if labor claims are paid before debt claims, their shorter maturity makes them *de facto* senior to debt (Diamond, 1993). Also judicial discretion and government intervention may increase the effective seniority of labor claims.[3]

The fourth assumption (the hardness of creditors' claims) critically depends on the nature of the debt contract and the rights that debtholders have in case of default. The assumption that debt cannot be renegotiated is unrealistic if most debt is in the form of bank loans or if creditors have weak rights in case of bankruptcy. In those cases, it is likely that debtholders will renegotiate their claims if it is ex-post efficient to do so. While bonds are difficult to renegotiate because of coordination problems, in bankruptcy they get renegotiated too.

The key assumptions discussed above are common in the existing literature which emphasizes the role of debt as a strategic tool when bargaining with labor and other input suppliers. Most contributions (Baldwin, 1983; Bronars and Deere, 1991; Dasgupta and Sengupta, 1993; Hennessy and Livdan, 2009; and Matsa, 2010a) make these assumptions explicitly or implicitly.

In the next section, as an example, we focus on the fourth assumption (i.e. the hardness of the debt claims) and show that one obtains very different empirical predictions if debt can be renegotiated.[4]

[3]As an example, consider the recent experiences of GM and Chrysler. In the case of Chrysler's bankruptcy, "secured creditors owed some $7 billion will recover 28 cents per dollar. Yet an employee health-care trust, operated at arm's length by the United Auto Workers union, which ranks lower down the capital structure, will receive 43 cents on its $11 billion-odd of claims, as well as a majority stake in the restructured firm." Moreover, in the GM case "unsecured creditors owed about $27 billion are being asked to accept a recovery rate of 5 cents, says Barclays Capital, whereas the health-care trust, which ranks equal to them, gets 50 cents as well as a big stake in the restructured firm" (Economist, May 7th 2009).

[4]Sarig (1998) makes a similar point: he argues that highly-levered firms may be weaker in

4.2.5 Renegotiable Debt

Consider now the case in which creditors cannot commit not to renegotiate their claims if it is ex-post in their interest to do so. In particular, if $y > L$, liquidation is inefficient. Hence, creditors are better off negotiating with workers to split the surplus $y - L$. In such a negotiation, we assume for simplicity that workers' bargaining power is α, as in the case in which they bargain with shareholders. So, if $y \in [L, D)$, workers receive $W = \alpha (y - L)$. This renegotiation is ex-post efficient as the firm is less likely to be liquidated and liquidation is inefficient if $y > L$.

However, because they can renegotiate with creditors whenever $y > L$, workers have a stronger bargaining position when they negotiate with shareholders: they can count on the payoff $\alpha (y - L)$ as their outside option. Hence, workers accept a deal with shareholders only if the surplus from renegotiation $(y - D)$ net of their outside option $\alpha (y - L)$ is greater than zero: in other words, for the negotiation with shareholders to succeed $S = [y - D - \alpha (y - L)] \geq 0$. Since the cutoff value of output $\widehat{y} \equiv \frac{D - \alpha L}{1 - \alpha}$ for which $S = 0$ is greater than D, the firms defaults (and does not pay the face value of debt D that it owes) even if $y \in [D, \widehat{y})$. Hence, workers receive a wage $W = \alpha (y - L)$ if $y \in [D, \widehat{y})$ and $W = \alpha (y - L) + \alpha S$ if $y \geq \widehat{y}$.

As before, at $t = 0$ shareholders choose debt to maximize the firm value:

$$\max_{D} \quad \left[L + (1 - \alpha) \int_{L}^{\widehat{y}} \frac{y - L}{\overline{Y}} dy + \int_{\widehat{y}}^{\overline{Y}} \frac{D - L}{\overline{Y}} dy \right] + (1 - \tau) \int_{\widehat{y}}^{\overline{Y}} \frac{(1 - \alpha) [y - D - \alpha (y - L)]}{\overline{Y}} dy \tag{4.6}$$

The first term (in the square brackets) is the market value of debt. Compared

their wage negotiation because they are more exposed to the risk of losing the specialized human capital of their employees and thus to defaulting. A related argument, which relies however on risk aversion, is offered by Berk, Stanton and Zechner (2010). They derive the optimal compensation contract for risk-averse workers in the presence of leverage, and show that wages must increase with leverage to compensate workers for the costs of financial distress that they suffer. Because of the greater labor costs, an increase in the human costs of financial distress is associated with a reduction of leverage.

with the case of not renegotiable debt in equation (4.3), the market value of debt increases from L to $L+(1-\alpha)(y-L)$ when $y \in [L, D)$. This happens because in those cases the firm avoids the inefficient liquidation. However, it decreases from D to $L+(1-\alpha)(y-L)$ when $y \in [D, \widehat{y})$. This happens because workers can extract some of the creditors' value by threatening to leave the firm. The second term in equation (4.6) is the market value of equity. This is strictly lower than in the case of not renegotiable debt, given in equation (4.3). Now, shareholders are paid nothing if $y \in [D, \widehat{y})$ and they are paid less than before if $y \geq \widehat{y}$: their payoff decreases by $(1-\tau)(1-\alpha)\alpha(y-L)$. Intuitively, workers extract more shareholder value because they have the outside option of bargaining with creditors.

From the first order conditions, we have:

Result 2: *If debt is renegotiable, the optimal choice of debt D^*_α is strictly decreasing in labor bargaining power α: $D^*_\alpha = \overline{Y}(1-\alpha) + \alpha L$.*

The amount of debt raised at $t = 0$ is

$$V_D = L + (1-\alpha)\int_L^{\overline{Y}} \frac{y-L}{\overline{Y}} dy = L + (1-\alpha)\frac{\left(\overline{Y}-L\right)^2}{2\overline{Y}} \tag{4.7}$$

which is decreasing in labor bargaining power α as

$$\partial V_D/\partial\alpha = -\left(\overline{Y}-L\right)^2/(2\overline{Y}) < 0 \tag{4.8}$$

The intuition for these results is as follows. Because debt is renegotiable, it is not inefficient any more. As debt still generates a tax shield, firms want to have as much debt as possible. The maximum amount of debt that can be raised is strictly decreasing in labor bargaining power α because as α increases workers extract a larger fraction of the pledgeable output. As before, given that the book value of assets is F, the predictions above also apply to leverage $l^* = V_D/F$.[5]

[5]Notice that we assume that the firm is already setup at $t = 0$ and is all-equity financed.

Summarizing, if debt is renegotiable, we obtain the opposite results from the case in which debt is a hard claim: leverage is decreasing in labor bargaining power. The discussion above indicates that the theory does not deliver univocal predictions on the relationship between leverage and labor bargaining power. Hence, we now turn to the empirical analysis.

4.3 Data

We combine three sets of variables: (i) cross-country data on union coverage and labor regulation; (ii) firm-level data from Worldscope; and (iii) control variables at the country level. In Tables 4.1 and 4.3, we present the definition, source, number of observations, mean, median and standard deviation of each of the variables that are used in the analysis.

4.3.1 Labor Indicators

To proxy for the bargaining power of labor, we first use data on union coverage of workers in 21 OECD countries, namely the percentage of workers that are members of unions in each country. This variable is available from the CEP-OECD Institutions data and is time-varying. Higher values of this variable indicate higher bargaining power of labor since it is intuitive that in countries with greater union coverage, firm policies are more likely to be subject to bargaining with workers. On average, 37% of workers are union members in the 21 OECD countries of our sample and this percentage varies significantly with a standard deviation of 21%.

In our main analysis, we proxy labor bargaining power using the labor regulation indicator constructed by Deakin, Lele and Siems (2007), henceforth DLS index. The advantage of DLS is that it provides both cross-sectional and within country time-variation of labor laws, which are exogenous compared to the union

However, if we were to consider the stage when the firm is set up, in our model, as in Hart and Moore (1994), debt would be the optimal security to use in order to raise external capital.

coverage indicator mentioned above. Therefore, it allows for time-series as well as cross-sectional comparisons across different countries. This indicator is constructed based on a "leximetric" analysis, which uses indices to depict the major differences among the legal systems between countries. The indicator consists therefore of 40 indices which are grouped in 5 broader categories: a) legislation of alternative employment contracts, which measure the cost of using alternative to the standard employment contracts, b) working time regulation, i.e. rules that govern working time, c) regulation of dismissal, namely laws governing dismissal procedures, d) employee representation, which refers to legislation related to unions and collective agreements and e) legislation of industrial action, which measures the strength of protection of industrial action (e.g. right to strike). As it is apparent, the DLS indicator characterizes in a comprehensive way all aspects of regulation governing labor relations.

DLS is available by Deakin, Lele and Siems (2007) for five countries: United States, United Kingdom, Germany, France and India. In this chapter, we exclude India from our analysis since it is a developing economy, which differs massively from the other four countries. We postulate that the capital structure of firms in a developing economy such as India gets affected by various factors at different transition stages. Moreover, there is not much time-variation in the DLS index for India after 1985, since most of the regulatory amendments took place before that date.

In our analysis, we use the aggregate index, which is constructed by cumulating the 40 sub-indices and captures the evolution of labor laws from 1985-2004 in the 4 countries. Each of the 40 indices takes values which range from 0 to 1. Higher scores indicate stricter, pro-worker regulation and vice-versa. In some of our specifications, we also use 5 sub-indices, as defined by Deakin, Lele and Siems (2007), which disaggregate the effects of the cumulative index in each of the 5 categories mentioned above. As shown in Table 4.3, the average DLS score in our sample is about 17.2 and the standard deviation is quite large. The summary

statistics for the components of DLS show that there is significant variation in all components.

4.3.2 Leverage and Control Variables

The main data source employed in the study is Worldscope. This database provides detailed coverage of financial statements of publicly listed firms in more than 50 countries and is widely used in the literature for firm-level analysis across countries. The sample spans the 1985-2004 period and is consisted of manufacturing companies. Sample size varies over time because of missing information on some variables used in the analysis. We follow the 2-digit SIC classification to form our group of manufacturing companies.

Following the literature, we define leverage as debt to assets, where debt is the sum of long-term debt, short-term debt, and current portion of long-term debt. Total assets refers to the book value of firms' assets. As a robustness check, we also consider market leverage, which is defined as the ratio of book value of debt over the market value of the firm (sum of book value of debt and market value of equity). In our regression analysis, we include the standard, firm-level set of explanatory variables for leverage, as identified by Rajan and Zingales (1995) and many others: tangibility (which is defined as net property, plant and equipment over total assets) as a proxy for the amount of collateral that a firm can pledge; size (which is defined as the logarithm of firms' sales) as a control for the degree of diversification and thus the risk of default; profitability (as measured by the Return on Assets, which is the ratio of EBIT over total assets) as a proxy for the availability of internal funds; and the market-to-book ratio, or Q (that is, the ratio of the market value of equity plus book value of debt over the book value of debt plus equity), as an indicator of growth opportunities.

Table 4.1 presents the descriptive statistics of the variables used in our analysis employing union coverage data in 21 OECD economies. The summary statistics for

our main analysis, using the DLS Indicator for the US, UK, France and Germany, are presented in Table 4.3. As shown in Table 4.3, the average total debt to assets of all firms is 22% with a standard deviation of 16%. Firm size is on average 7.6 and Q is on average 1.3. On average, 28% of firms' assets are tangible assets. The average profitability, as measured by ROA, is around 7.6%.

To control for the differences in macroeconomic conditions and income across countries, we include in our set of control variables country-level GDP growth and GDP per capita. An important variable for our analysis is creditor protection since it captures the bargaining power of creditors. Creditors' protection is measured by the creditor rights indicator from Djankov, McLiesh and Shleifer (2007). The creditor rights index takes values from 0 to 4, with higher values indicating stronger creditor rights and it provides time variation in creditor protection.

4.4 Empirical Results

4.4.1 Union Coverage

We start our empirical analysis by examining the relation between union coverage, namely the percent of workers participating in unions, and firms' leverage. The union coverage variable is used as a proxy for labor bargaining power; it is intuitive that the larger the number of workers participating in unions, the higher the bargaining power of labor. Using firm level data, we analyze the following specification:

$$y_{it} = \gamma_t + \lambda_i + \delta \cdot UnionCoverage_{k,t} + \beta \cdot X_{it} + \epsilon_{it}, \tag{4.9}$$

where i denotes a firm, t denotes a year, j is an industry, and k is a country. The dependent variable y_{it} is Debt to Assets; λ_i and γ_t are firm and year fixed effects respectively. We use year fixed effects to control for aggregate fluctuations in financial structure of firms that are driven, for instance, by common shocks that

hit all countries simultaneously and firm fixed effects control for time-invariant, firm-level variables that affect the financial structure of firms. X_{it} is the vector of control variables and ϵ_{it} is the error term. In X_{it} we include the contemporaneous effect of profitability, investment opportunity, size and tangibility, which are important determinants of the costs of financial distress. We also include country level macro variables such as GDP growth to capture country specific shocks as the specification does not allow us to control for country specific shocks using $(\alpha_k * \gamma_t)$ as such a control would absorb the union coverage variable. We cluster the standard errors at the country level, since the union coverage variable is changing at the country level.

The results are reported in Table 4.2. Column 1 controls for industry specific shocks by including interacted industry and year fixed effects but the coefficient of interest, δ, is not statistically significant. In Column 2, we add country fixed effects in the previous specification to control for country time-invariant characteristics. The coefficient, δ, is negative and statistically different from zero at the 1% level. In Column 3 we add the firm fixed effects. The coefficient of the union coverage indicator remains negative and statistically significant at the 1% level. The results remain unchanged in Column 4 when we add interacted country and industry fixed effects to the firm and industry times year fixed effects of the previous specification, which allow for differences across countries within the same industry. The results are also economically significant. As it can be seen, an increase of union coverage by 10 percentage points is associated with a reduction in firms' leverage of 2.5% (in absolute terms) or of 11% (relative to the mean).

The negative correlation between union coverage and leverage is consistent with the hypothesis suggested in Section 4.2, in the case in which debt is renegotiable. However, the causal interpretation of these results relies on the assumption that conditional on observables there is a random assignment of union coverage in these countries. Clearly, countries that differ in union coverage differ in several dimensions (both observable and unobservable). Thus, there are concerns that

the reported estimates are potentially biased. To examine this further, we exploit both time series and cross-sectional variation in labor laws in different countries. Passage of labor laws are believed to be exogenous and therefore this analysis assuages concerns regarding endogeneity.

4.4.2 DLS - Labor Regulation

In this section we employ a difference-in-differences research design to identify the causal impact of labor regulations on the capital structure of firms. Using firm level data as before, we analyze the following specification:

$$y_{it} = \gamma_t + \lambda_i + \delta \cdot DLS_{k,t-1} + \beta \cdot X_{it} + \epsilon_{it}, \tag{4.10}$$

where i denotes a firm, t denotes a year, j is an industry, and k is a country. The dependent variable y_{it} is Debt to Assets; λ_i and γ_t are firm and year fixed effects respectively. X_{it} is the vector of control variables and ϵ_{it} is the error term. Recall that in X_{it} we include firm level controls and country level controls.

We use the DLS index, described in the data section, taking advantage of variation over time as well as across countries. We lag the DLS indicator by one period to capture the gap between the passage of the law and its effective implementation. According to the literature, laws come into force normally one year after they are enacted. Robust standard errors are reported. Since there are only 4 countries included in these regressions, clustering at the country level would likely bias our results. However, the results remain unchanged when we cluster standard errors at the country level.[6] The variable of interest is δ which captures the DID effect.

The results are reported in Table 4.4. Columns 1-4 present the effect of the DSL indicator on leverage. Column 1 takes year and 2-digit industry fixed effects jointly into account to control for industry specific shocks. Column 2 adds country fixed

[6]These results are available from the authors upon request.

effects to control for country time-invariant characteristics. Column 3 includes firm fixed effects instead of the country fixed effects in the previous specification to control for firm time-invariant characteristics. Column 4 adds interacted country and industry fixed effects to the firm and industry times year fixed effects of the previous specification, which allow for differences across countries within the same industry. The coefficient of the DLS indicator is negative and statistically significant at the 1% level in all Columns. Most importantly, our result is also economically significant: an increase of DLS by 10 units, is associated with a reduction in firms' leverage of about 3% (in absolute terms) or of 13% (relative to the mean).

In columns 5 and 6, we decompose the DLS indicator into its 5 sub-indicators, as described in Section 4.3 and thus laws governing: Alternative Employment Contracts, Working Time, Dismissals, Employee Representation and Industrial Action. Column 5 controls for firm and industry times year fixed effects, while Column 6 adds country times industry fixed effects to the previous specification. When we run a horse-race among the 5 components of DLS, we find that laws governing Employee Representation and Industrial Action are the ones responsible for the negative effect on firms' leverage.[7]

The importance of these two components is consistent with our interpretation that labor regulation affects the bargaining power of employees. These components refer, for example, to laws regulating the right to unionization, right to collective bargaining, duty to bargain, participation of union/workers on the board, lock-outs, right to industrial action, which apparently affect bargaining at firms with workers. Therefore, in all the analysis that follows, we will use both the aggregate DLS indicator and an indicator constructed by adding up these 2 components (Collective Relations Indicator) as proxies for labor bargaining power. Thus, Table 4.5 presents the specifications of Columns 1-4 in Table 4.4 with the Collective Relations Indicator as the proxy for labor bargaining power, instead of the DLS

[7]It is important to acknowledge though that these specifications suffer from the fact that the 5 sub-components of DLS are highly correlated.

Index. The coefficient of interest, δ, is negative and statistically different from zero at the 1% level throughout all specifications.

Finally, Table 4.6 repeats some of the results presented above using the market-based definition of leverage: book value of debt over the sum of book value of debt and market value of equity. Columns 1-3 use the DLS Indicator as the proxy for labor bargaining power: the results are negative in all specifications but they are statistically significant only in Column 1 which controls for industry specific shocks and country time-invariant characteristics. Columns 4-6 use the Collective Relations Indicator as the proxy for labor bargaining power: the difference-in-differences coefficient is negative and statistically significant in all specifications.

Liquidation Value

One of the implications of our model is that firms with higher liquidation values L have greater debt capacity since a higher L increases the outside option of the creditors. As a proxy for L we use firms' tangibility: firms with more tangible assets have higher liquidation values.

We investigate the differential impact of strengthening of labor bargaining power, as measured by the DLS index (Table 4.7) and the Collective Relations index constructed by its two last components (Table 4.8), on capital structure of firms that vary in the liquidation value of the assets. Thus, we estimate the following regression specification:

$$y_{it} = \gamma_t + \lambda_i + \delta \cdot DLS_{k,t-1} + \zeta \cdot L_{it} + \theta \cdot (DLS_{k,t-1} \times L_{it}) + \beta \cdot X_{it} + \epsilon_{it} \quad (4.11)$$

Here L_{it} denotes the liquidation value of the assets and our variable of interest is θ. All the other variables and subscripts are defined as in the previous specification. According to the model presented in Section 4.2.5, we expect θ to be positive and statistically different from zero. In fact, the second mixed derivative of V_D given in equation (4.7) computed with respect to α and L is positive. The reason is that

as the liquidation value of the firm L increases, debt becomes effectively a harder claim. Hence, labor is less able to extract some of the benefits associated with debt, namely the tax shields; and thus firms are willing to take on more debt.

Specification (4.11) essentially represents a difference-in-difference-in-differences analysis. This specification has the added benefit that helps alleviate concerns regarding omitted variables. Thus, in this specification we are allowed to include country times year fixed effects ($\alpha_k * \alpha_t$), which control for any time-varying changes at the country level which might coincide with the labor law changes confounding our results.

The results are reported in Tables 4.7 and 4.8. Table 4.7 reports the results with DLS as the labor regulation indicator and Tables 4.8 reports the results with the Collective Relations indicator (constructed by adding the Employee Representation and Industrial Action components of the DLS index). In column 1 in both Tables, we control for firm fixed effects and the two-digit industry times year fixed effects. In column 2, we control for firm fixed effects and the interacted country times year fixed effects. In column 3, we control for firm fixed effects and both industry and country fixed effects interacted with year. Finally, in column 4 we add country times industry fixed effects in the previous specification. Across all specifications, we find that an increase in the labor indicator is associated with a smaller reduction in leverage if firms have more tangible assets. The coefficient θ is positive and statistically significant at the 1% level across all specifications. Our results are also economically significant. For a 10-unit increase in DLS, a one-standard deviation increase in tangibility leads to a 1.4% differential increase in leverage (Table 4.7, column 4). Similarly, a 5-unit increase in Collective Relations and a one-standard deviation increase in tangibility is associated (Table 4.4, column 4) with a 1.7% differential increase in leverage.

4.5 Discussion and Conclusion

This chapter examines the link between labor bargaining power and capital structure in a panel of firms. We provide evidence that firms reduce leverage when bargaining power of labor increases using two different approaches. First, we use data on the participation of employees in unions in 21 OECD countries as a proxy for labor bargaining power. Second, we employ a difference-in-differences methodology in a panel of 4 countries and use a time-varying indicator of labor regulation.

Furthermore, we find that the negative effect of labor-friendly legislation on firms' leverage is more pronounced when the liquidation value of firms' assets is lower. Intuitively, this is the case when firms do not possess many tangible assets, i.e. assets easier to secure and thus more valuable to the secured creditors in case of liquidation.

Comparing this chapter with the existing literature, we can identify several differences in the methodology and the measures of labor bargaining power, which may partly account for the different results. First, this chapter studies a more recent time period than Bronars and Deere (1991) and Matsa (2010a). For instance, Matsa (2010a) focuses on data from the 1950-1973 period, well before the introduction of the 1978 bankruptcy law. One of the consequence of this reform was the introduction of the Chapter 11 reorganization procedure, which made violation of absolute priority more likely, particularly in favor of labor claims. Hence, debt was a harder claim, and therefore a more effective bargaining tool, before the 1978 reform than after. Moreover, Gilson (1995) argues that in recent years, debt renegotiation, even for public debt, has become easier because of the role played by hedge funds and other investors trading in distressed claims.

Second, the cited evidence comes from US data, while we rely on cross-country data. Systematic differences between the US and the average country in our sample may explain the different results. For instance, debt is a better bargaining tool when it is a harder claim that cannot be credibly renegotiated. US firms may rely

more on public debt as compared to bank debt than firms from other countries. Hence, debt in the US may be more difficult to renegotiate.

Our findings suggest that the dominant effect of labor bargaining on firms' leverage is negative, consistent with our view that labor contracts are *de-facto* like debt contracts, causing operating leverage to crowd out financial leverage. However, we do not rule out the fact that debt can sometimes be used strategically by firms, as in the case of not renegotiable (or hard) creditor claims.

Whether or not debt can be renegotiated critically depends on the nature of the debt contract and the rights that debtholders have in case of default. The negative relationship between debt and bargaining power may simply be due to the fact that debt is not as hard a claim as the literature assumes. If debt takes the form of dispersely-held public debt, it can be argued that coordination problems prevent creditors from renegotiating debt even if it is ex-post in their interest to do so. However, bonds get renegotiated in bankruptcy. Moreover, if most debt is in the form of bank loans (as in bank-centered countries) or if creditors have little rights in case of bankruptcy, creditors are likely to renegotiate their claims if it is efficient to do so. Thus, in reality there may be limits to the strategic use of debt as a bargaining tool.

Table 4.1: Main Variables: Descriptive Statistics

This table reports summary statistics for the main variables used in the first part of the analysis. The Union Coverage Indicator, available for 21 OECD countries is time-varying and its value range is from 8.6% to 87.4%. Total debt/Assets is the ratio of total debt (which is the sum of long-term and short-term debt) and the book value of assets. Tangibility is the ratio of net property, plant and equipment and total assets. Size is measured as the logarithm of firms' real assets. Q is the ratio of market value of assets over book value of assets. ROA is calculated as earnings before interest and taxes (EBIT) over total assets. Worldscope variables are winsorized at the 1% tails. GDP per Capita is the logarithm of GDP per Capita expressed in current prices. Creditor Rights takes values from 0-4. The sample period is from 1985 to 2004.

	Source	Observations	Mean	Median	Std. Dev.
Labor Indicators					
Union Coverage	OECD		36.59	34.45	20.94
Firm-level Variables					
Total Debt/Assets	Worldscope	80,022	0.245	0.228	0.164
Tangibility	Worldscope	84,037	0.300	0.287	0.152
Size	Worldscope	82,222	7.853	7.757	1.757
Q	Worldscope	76,839	1.199	0.931	0.903
ROA	Worldscope	82,235	0.063	0.069	0.105
Country Factors					
GDP Growth (%)	IMF, WEO		2.466	2.673	1.762
log (GDP Per Capita)	IMF, WEO		10.126	10.150	0.317
Creditor Rights	Djankov et al (2007)		2.151	2.000	1.182

Table 4.2: Union Coverage and Leverage

This table reports the results of regressions of leverage on the union coverage indicator and a set of controls. Leverage is defined as total debt over book value of assets. Columns 1 and 2 include interacted year times two-digit industry fixed effects; column 2 also includes country fixed effects; column 3 includes firm and year times two-digit industry fixed effects and column 4 adds country times two-digit industry fixed effects. Other Control variables refer to macro factors (GDP Growth, log (GDP per Capita), Creditor Rights). All variables are defined in Table 4.1. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% respectively. Standard errors are clustered at the country level. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in 21 countries. Coverage: 1985-2004.

	Total Debt/Assets			
	(1)	(2)	(3)	(4)
Union Coverage	0.0002	-0.0015	-0.0024	-0.0025
	(0.0003)	(0.0005)***	(0.0008)***	(0.0008)***
Tangibility	0.1453	0.1451	0.1384	0.1402
	(0.0421)***	(0.0459)**	(0.0255)***	(0.0256)***
Size	0.0117	0.0113	0.0494	0.0497
	(0.0022)***	(0.0021)***	(0.0076)***	(0.0078)***
ROA	-0.3608	-0.3517	-0.3439	-0.3425
	(0.0880)***	(0.0883)***	(0.0340)***	(0.0339)***
Q	-0.0116	-0.0113	0.0024	0.0024
	(0.0079)***	(0.0081)	(0.0058)	(0.0057)
Other Control Var.	X	X	X	X
Country*Industry FE				Yes
Country FE		Yes		
Ind*Year FE	Yes	Yes	Yes	Yes
Firm FE			Yes	Yes
Observations	63,060	63,060	63,060	63,060
Adjusted R^2	0.14	0.14	0.71	0.71

Table 4.3: Main Variables: Descriptive Statistics

This table reports summary statistics for the main variables used in the main analysis. The DLS Indicator available for 4 countries (US, UK, France and Germany) is time-varying and its value range is from 4.42 to 31.55. It consists of 5 sub-indicators: Alternative Employment Contracts, Working Time, Dismissal Regulation, Employee Representation and Industrial Action, all of which are presented below. Total debt/Assets is the ratio of total debt (which is the sum of long-term and short-term debt) and the book value of assets. Tangibility is the ratio of net property, plant and equipment and total assets. Size is measured as the logarithm of firms' real assets. Q is the ratio of market value of assets over book value of assets. ROA is calculated as earnings before interest and taxes (EBIT) over total assets. Worldscope variables are winsorized at the 1% tails. GDP per Capita is the logarithm of GDP per Capita expressed in current prices. Creditor Rights takes values from 0-4. The sample period is from 1985 to 2004.

	Source	Observations	Mean	Median	Std. Dev.
Labor Indicators					
DLS Indicator	Dieken et al (2007)		17.23	18.48	10.04
Alternative Employment Contracts	Dieken et al (2007)		4.25	4.40	2.36
Working Time	Dieken et al (2007)		2.71	2.59	2.04
Dismissal Regulation	Dieken et al (2007)		3.86	3.83	2.11
Employee Representation	Dieken et al (2007)		2.62	2.42	1.91
Industrial Action	Dieken et al (2007)		3.80	3.65	2.39
Firm-level Variables					
Total Debt/Assets	Worldscope	37,053	0.22	0.21	0.16
Total Debt/Market Value	Worldscope	33,640	0.25	0.20	0.16
Tangibility	Worldscope	39,174	0.28	0.027	0.15
Size	Worldscope	38,640	7.63	7.39	1.88
Q	Worldscope	35,474	1.31	1.00	1.01
ROA	Worldscope	38,402	0.076	0.090	0.118
Country Factors					
GDP Growth (%)	IMF, WEO		2.75	3.04	1.44
log (GDP Per Capita)	IMF, WEO		10.05	10.10	0.25
Creditor Rights	Djankov et al (2007)		1.90	1.00	1.47

Table 4.4: DLS Indicator and Leverage

This table reports the results of regressions of leverage on the Deakin, Lele and Siems (2007) Indicator (DLS) (Columns 1-4) and its five Components (Columns 5-6) and a set of controls. The DLS Indicator and its components are lagged by one year. Leverage is defined as total debt over book value of assets. Columns 1 and 2 include interacted year times two-digit industry fixed effects; column 2 also includes country fixed effects; columns 3 and 5 include firm and year times two-digit industry fixed effects and columns 4 and 6 add country times two-digit industry fixed effects. Other Control variables refer to macro factors (GDP Growth, log (GDP per Capita), Creditor Rights). All variables are defined in Table 4.3. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% respectively. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in the US, UK, France and Germany. Coverage: 1985-2004.

	Total Debt/Assets					
	(1)	(2)	(3)	(4)	(5)	(6)
DLS	-0.0008	-0.0054	-0.0029	-0.0029		
	(0.0001)***	(0.0012)***	(0.0010)***	(0.0010)***		
Alternative Employment Contracts					-0.0012	-0.0014
					(0.0026)	(0.0026)
Working Time					0.0062	0.0065
					(0.0044)	(0.0044)
Dismissal Regulation					0.0013	0.0008
					(0.0024)	(0.0024)
Employee Representation					-0.0135	-0.0129
					(0.0062)**	(0.0062)**
Industrial Action					-0.0093	-0.0100
					(0.0035)***	(0.0035)***
Tangibility	0.0868	0.0860	0.1340	0.1351	0.1325	0.1336
	(0.0073)***	(0.0073)***	(0.0123)***	(0.0123)***	(0.0123)***	(0.0124)***
Size	0.0091	0.0090	0.0441	0.0440	0.0444	0.0444
	(0.0005)***	(0.0005)***	(0.0021)***	(0.0021)***	(0.0021)***	(0.0021)***
ROA	-0.2883	-0.2894	-0.3190	-0.3185	-0.3182	-0.3177
	(0.0106)***	(0.0106)***	(0.0104)***	(0.0105)***	(0.0105)***	(0.0105)***
Q	-0.0177	-0.0177	-0.0027	-0.0027	-0.0026	-0.0040
	(0.0011)***	(0.0011)***	(0.0014)*	(0.0014)*	(0.0015)*	(0.0015)*
Other Control Var.	X	X	X	X	X	X
Country*Industry FE				Yes		Yes
Country FE		Yes				
Ind*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE			Yes	Yes	Yes	Yes
Observations	28,076	28,076	28,076	28,076	28,076	28,076
Adjusted R^2	0.14	0.13	0.68	0.68	0.68	0.68

Table 4.5: Collective Relations and Leverage

This table reports the results of regressions of leverage on the Collective Relations Indicator and a set of controls. The Collective Relations Indicator is constructed by simply adding up the 4th and 5th sub-indicators of DLS (Employee Representation and Industrial Action Indices). The Collective Relations Indicator is lagged by one year. Leverage is defined as total debt over book value of assets. Columns 1 and 2 include interacted year times two-digit industry fixed effects; column 2 also includes country fixed effects; column 3 includes firm and year times two-digit industry fixed effects and column 4 adds country times two-digit industry fixed effects. Other Control variables refer to macro factors (GDP Growth, log (GDP per Capita), Creditor Rights). All variables are defined in Table 4.3. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% respectively. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in the US, UK, France and Germany. Coverage: 1985-2004.

	Total Debt/Assets			
	(1)	(2)	(3)	(4)
Collective Relations	-0.0018	-0.0110	-0.0098	-0.0099
	(0.0003)***	(0.0026)***	(0.0020)***	(0.0020)***
Tangibility	0.0867	0.0861	0.1324	0.1336
	(0.0073)***	(0.0073)***	(0.0123)***	(0.0124)***
Size	0.0091	0.0091	0.0443	0.0442
	(0.0005)***	(0.0005)***	(0.0021)***	(0.0021)***
ROA	-0.2881	-0.2881	-0.3183	-0.3178
	(0.0106)***	(0.0106)***	(0.0105)***	(0.0105)***
Q	-0.0177	-0.0176	-0.0027	-0.0027
	(0.0011)***	(0.0011)***	(0.0014)*	(0.0015)*
Other Control Var.	X	X	X	X
Country*Industry FE		Yes		Yes
Ind*Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	28,076	28,076	28,076	28,076
Adjusted R^2	0.14	0.13	0.68	0.68

Table 4.6: Market Leverage

This table reports the results of regressions of leverage on the Deakin, Lele and Siems (2007) Indicator (DLS) (Columns 1-3) and the Collective Relations Indicator (Columns 4-6) and a set of controls. The Collective Relations Indicator is constructed by simply adding up the 4th and 5th sub-indicators of DLS (Employee Representation and Industrial Action Indices). The DLS and Collective Relations Indicators are lagged by one year. Leverage is defined as total debt over market value of assets. Columns 1 and 4 include interacted year times two-digit industry fixed effects and country fixed effects; columns 2 and 5 include firm and year times two-digit industry fixed effects and columns 3 and 6 add country times two-digit industry fixed effects. Other Control variables refer to macro factors (GDP Growth, log (GDP per Capita), Creditor Rights). All variables are defined in Table 4.3. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% respectively. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in the US, UK, France and Germany. Coverage: 1985-2004.

	Total Debt/Market Value of Assets					
	(1)	(2)	(3)	(4)	(5)	(6)
DLS	-0.0042	-0.00003	-0.0002			
	(0.0014)***	(0.0012)	(0.0012)			
Collective Relations				-0.0147	-0.0100	-0.0100
				(0.0031)***	(0.0026)***	(0.0026)***
Tangibility	0.0813	0.1983	0.1993	0.0808	0.1947	0.1960
	(0.0084)***	(0.0144)***	(0.0144)***	(0.0084)***	(0.0144)***	(0.0144)***
Size	0.0070	0.0535	0.0532	0.0071	0.0533	0.0530
	(0.0006)***	(0.0025)***	(0.0025)***	(0.0006)***	(0.0025)***	(0.0025)***
ROA	-0.4638	-0.4659	-0.4655	-0.4630	-0.4657	-0.4654
	(0.0121)***	(0.0125)***	(0.0125)***	(0.0120)***	(0.0125)***	(0.0125)***
Q	-0.0894	-0.0581	-0.0580	-0.0893	-0.0583	-0.0581
	(0.0014)***	(0.0017)***	(0.0017)***	(0.0011)***	(0.0017)***	(0.0017)***
Other Control Var.	X	X	X	X	X	X
Country*Industry FE			Yes			Yes
Country FE	Yes			Yes		
Ind*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE		Yes	Yes		Yes	Yes
Observations	28,018	28,018	28,018	28,018	28,018	28,018
Adjusted R^2	0.34	0.73	0.73	0.34	0.73	0.73

Table 4.7: DLS Indicator, Leverage and Tangibility

This table reports the results of regressions of leverage on the interaction of DLS with tangibility and a set of controls. The DLS Indicator is lagged by one year. Leverage is defined as total debt over book value of assets. All Columns include firm fixed effects. Column 1 includes also interacted year times two-digit industry fixed effects; column 2 adds interacted country and year fixed effects to the firm fixed effects; column 3 includes both interacted year times two-digit industry fixed effects and country times year fixed effects and column 4 adds to the fixed effects of column 3 country times two-digit industry fixed effects. Other Control variables refer to macro factors (GDP Growth, log (GDP per Capita), Creditor Rights). All variables are defined in Table 4.3. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% respectively. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in the US, UK, France and Germany. Coverage: 1985-2004.

	Total Debt/Assets			
	(1)	(2)	(3)	(4)
DLS	-0.0056			
	(0.0010)***			
DLS*Tangibility	0.0095	0.0099	0.0093	0.0095
	(0.0013)***	(0.0013)***	(0.0013)***	(0.0013)***
Tangibility	0.0217	0.0166	0.0204	0.0196
	(0.0202)	(0.0206)	(0.0206)	(0.0207)
Size	0.0432	0.0434	0.0439	0.0438
	(0.0021)***	(0.0021)***	(0.0021)***	(0.0021)***
ROA	-0.3191	-0.3217	-0.3197	-0.3192
	(0.0104)***	(0.0105)***	(0.0105)***	(0.0105)***
Q	-0.0029	-0.0027	-0.0029	-0.0029
	(0.0014)**	(0.0014)*	(0.0015)**	(0.0015)**
Other Control Var.	X			
Ind.*Country FE				Yes
Country*Year FE		Yes	Yes	Yes
Ind*Year FE	Yes		Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	28,076	28,076	28,076	28,076
Adjusted R^2	0.68	0.68	0.68	0.73

Table 4.8: Collective Relations, Leverage and Tangibility

This table reports the results of regressions of leverage on the interaction of the Collective Relations Indicator with tangibility and a set of controls. The Collective Relations Indicator is constructed by simply adding up the 4th and 5th sub-indicators of DLS (Employee Representation and Industrial Action Indices). The Collective Relations Indicator is lagged by one year. Leverage is defined as total debt over book value of assets. All Columns include firm fixed effects. Column 1 includes also interacted year times two-digit industry fixed effects; column 2 adds interacted country and year fixed effects to the firm fixed effects; column 3 includes both interacted year times two-digit industry fixed effects and country times year fixed effects and column 4 adds to the fixed effects of column 3 country times two-digit industry fixed effects. Other Control variables refer to macro factors (GDP Growth, log (GDP per Capita), Creditor Rights). All variables are defined in Table 4.3. Robust standard errors are reported in parentheses. *, **, ***, indicates significance at the 10%, 5% and 1% respectively. Firm-level variables are winsorized at the 1% tails. The sample consists of manufacturing firms in the US, UK, France and Germany. Coverage: 1985-2004.

	Total Debt/Assets			
	(1)	(2)	(3)	(4)
Collective Relations	-0.0165			
	(0.0023)***			
Collective Relations*Tangibility	0.0221	0.0234	0.0221	0.0230
	(0.0031)***	(0.0032)***	(0.0032)***	(0.0032)***
Tangibility	0.0417	0.0389	0.04048	0.04013
	(0.0182)**	(0.0186)**	(0.0186)**	(0.0187)**
Size	0.0433	0.0433	0.0439	0.0438
	(0.0021)***	(0.0021)***	(0.0021)***	(0.0021)***
ROA	-0.3186	-0.3215	-0.3197	-0.3193
	(0.0104)***	(0.0105)***	(0.0105)***	(0.0105)***
Q	-0.0029	-0.0028	-0.0030	-0.0029
	(0.0014)**	(0.0015)*	(0.0015)**	(0.0015)**
Other Control Var.	X			
Ind.*Country FE				Yes
Country*Year FE		Yes	Yes	Yes
Ind*Year FE	Yes		Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	28,076	28,076	28,076	28,076
Adjusted R^2	0.68	0.68	0.73	0.68

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