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Labor Bargaining Power and Capital Structure

A Study of the Impact of Labor Bargaining Power on Financial Leverage in Sweden

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Abstract

In this thesis, data on 277 Swedish listed companies over the period 2005-2011 is used to examine the relationship between labor bargaining power and financial leverage employing two different methods. First, we find that firms with higher unionization rates on average have a lower debt-to-capital ratio. Second, the debt-to-capital ratio is found to be lower in the two quarters before a collective agreement is signed. Both results imply that higher labor bargaining power is related to lower levels of financial leverage. We argue that the Swedish institutional setting, where bargaining is conducted mainly on an industry-wide level and unemployment benefit schemes are relatively extensive, makes debt financing an inefficient strategic tool to enhance the firm's bargaining position toward organized labor. Furthermore, higher labor bargaining power could lead to an increased operating risk, to which firms may respond by lowering their financial leverage in order to keep the total risk at a reasonable level.

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1. Introduction

In this study, we examine the relationship between labor bargaining power and the capital structure of Swedish firms. Deciding on the optimal level of debt is often seen as a trade-off between the benefits of tax shields resulting from increased debt and the costs of a higher risk of financial distress. In addition to these aspects, it is sometimes argued that the firm's relations to its stakeholders, of whom employees are one of the most important, could affect the capital structure decision.

Using data on 277 Swedish listed companies over the period 2005-2011, we employ a panel data approach where the companies' debt-to-capital ratios are regressed on the unionization rates for their respective industries. The unionization rates are used as a proxy for labor bargaining power. Furthermore, dummies are assigned to the quarter during which collective agreements were signed, as well as the two quarters before and after, to see whether firms alter their capital structure in connection to bargaining with the union. This is done because labor bargaining power could be seen as particularly high during periods of negotiation.

Previous research has primarily shown that firms could benefit from increasing their financial leverage in order to enhance their bargaining position, and that this use of debt is observed in practice. The intuition for this can be illustrated with a simple example taken from Dasgupta and Sengupta (1993).

Suppose that a firm has a certain amount of free cash flows, which could be seen as a pie that is divided between shareholders and employees. Given equal bargaining power, the shareholders and employees will each get one half of this divisible pie. If, however, the firm issues debt and the cash received is paid out to shareholders prior to the negotiations, the size of the divisible pie would be decreased. Employees still receive half of this smaller pie, but the total amount that the financiers receive would be higher, and hence it would be in the interest of shareholders to issue debt in this manner.

It has also been argued that it makes sense for firms to lower their financial leverage in the face of high levels of labor bargaining power (Simintzi et al. 2010). One of the reasons is that high levels of labor bargaining power increase the operating risk of a firm due to sticky wages and the higher difficulty and costs associated with layoffs. Furthermore, strong labor unions may be able to intervene in proposed firm restructurings such as plant closures (Chen et al. 2009). These increases in operating risk could potentially have a "crowding out" effect on financial leverage, as firms may want to lower the latter in order to keep the total risk at a reasonable level (Simintzi et al. 2010).

For a number of reasons, studying the relationship between labor bargaining power and capital structure for Swedish firms could be of interest. While cross-country studies have been made in which Swedish companies have been included (Simintzi et al. 2010), empirical work using Swedish data exclusively has, to the best of our knowledge, not yet been made. Furthermore, there are many differences between the Swedish labor market and that of the United States, on which most studies have been conducted. The Swedish

model (sometimes more broadly referred to as the Nordic model) is an established concept which is partly constituted by a labor market which is to a large extent regulated by the labor unions and employers' organizations in negotiations rather than by legislation. Unionization rates are among the highest in the world, while employers also organize to a large extent. Over 90 percent of the Swedish workforce is covered by collective agreements. Due to these distinguishing characteristics of the Swedish labor market, this study could be seen as a valuable contribution to this field of research.

In the study, we find evidence of a negative relationship between unionization rates and the financial leverage of Swedish companies, suggesting that companies in industries with higher levels of unionization tend to have lower financial leverage. Specifically, a ten percentage point increase in unionization rates on average decreases the debt-to-capital ratio by 2.3 percentage points (or by 11 percent compared to the mean) when controlling for a number of commonly used financial variables. This result is statistically significant at the 5 percent level.

Furthermore, we also find evidence that companies have lower financial leverage both one and two quarters prior to signing a collective agreement, by 1.4 and 1.8 percentage points, respectively. Hence, the results from the two methods are in agreement; Swedish companies tend to have lower financial leverage when labor bargaining power is high.

The remainder of the paper is structured as follows. In section 2, we provide some additional institutional background by describing the characteristics that distinguish the Swedish labor market. Section 3 summarizes the previous literature in this area of research, divided into a theoretical and an empirical section. In section 4, the data employed in the study is presented, while section 5 describes the methodology used. In section 6, the results are presented and analyzed. Section 7 concludes.

2. The Swedish Institutional Background

Since the Swedish labor market differs from those of the United States and many other countries, this section outlines some of the distinctive characteristics of the Swedish institutional setting. First, the system of two parties regulating the labor market is presented. Secondly, the collective bargaining process for the private sector is explained in more detail. Finally, the Swedish unemployment benefits are summarized, as these could have implications for the use of debt as a strategic variable in Sweden.

2.1 The Two Parties of the Labor Market

From the signing of the Saltsjöbaden agreement in 1938 and onward, the Swedish labor market has been characterized by a system where employees have been organized in labor unions which have negotiated with employers' organizations to regulate the labor market. One of the key principles of the Saltsjöbaden agreement was that government intervention should be kept to a minimum. For example, there has not been any legislation on minimum wages in Sweden, which instead have been set in collective agreements between unions and employers' organizations (Magnusson, 2006).

The labor union side consists mainly of the unions that together form three umbrella organizations: The Swedish Trade Union Confederation (LO), The Swedish Confederation for Professional Employees (TCO) and The Swedish Confederation of Professional Associations (SACO).[1] Together they organize roughly 3.3 out of the 5 million members of the Swedish workforce (Statistics Sweden, 2012).

Blue-collar workers in both the public and private sector are in most cases members of one of the 14 unions that form The Swedish Trade Union Confederation (LO). Altogether, these unions organize about 1.5 million workers. Which union a potential member is referred to depends on the industry and work tasks. Hence, for most blue-collar workers, what union to join is quite clear. Naturally, they also have the choice of not becoming members at all. LO and its member unions have ties to the Social Democratic Party in Sweden (LO, n.d.).

In Sweden, white-collar workers are organized to a large extent as well. For them, there is a wider variety of unions. The Swedish Confederation for Professional Employees (TCO) is an umbrella organization consisting of 15 member unions, organizing 1.2 million professional and qualified employees. Unlike LO, TCO is not affiliated with any political party (TCO, n.d.).

White-collar workers who are university graduates or have a college degree can also join one of the 22 unions that comprise The Swedish Confederation of Professional Associations (SACO). Together, they organize some 600,000 workers. Like TCO, SACO does not have affiliations with any political parties (SACO, n.d.).

[1] Apart from unions within these three major confederations, workers could also become members of the Central Organisation of the Workers of Sweden (SAC), which is a syndicalist trade union federation. The union, which is a political organization as much as it is a trade union, only has about 7,500 members as of 2006 (Lönnaeus, 2006).

Since many companies have both white- and blue-collar workers, and since there is a certain degree of freedom when choosing what union to join, a single firm can have employees organized in different unions (Björkman, 2005). However, the different unions often coordinate their efforts when negotiating, at least on an industry-wide level (Medlingsinstitutet, 2005-2011).

The employers can, in turn, become members of employers' organizations, of which 49 form The Confederation of Swedish Enterprise (*Svenskt Näringsliv* in Swedish). This umbrella organization has close to 60,000 member companies, together employing 1.5 million people in Sweden. These organizations lobby for pro-business interests, provide different services to their member companies, and engage in collective bargaining with the labor unions in their respective industry (Svenskt Näringsliv, n.d.). There are also employers' organizations for the public sector, as well as organizations in the private sector that are not affiliated with The Confederation of Swedish Enterprise.

Both employees and employers are organized to a large extent, compared to other countries. In spite of a slight decline in the past few years, the unionization rates are still among the highest in the world (Magnusson, 2006). In many sectors, the labor union position approaches that of a monopoly on the supply of labor (Björkman, 2005). The unionization rates in Sweden are shown in Table 1, which also illustrates that the majority of all employers are organized as well.

Table 1
Unionization and Employers' Organization Rate

Panel A shows the percentage of employees who are members of the union for the private and public sector as well as the entire workforce for the years 1993, 2000 and 2005-2010. Panel B shows the percentage of firms who are members of an employers' organization for the private and public sector as well as the entire population of employers for the years 1993, 2000 and 2005-2010. Data for both panels are obtained from the National Mediation Office's yearly report 2011.

Panel A
Unionization Rates (%)

Year	1993	2000	2005	2006	2007	2008	2009	2010
Private	78	74	72	71	68	65	65	65
Public	94	92	89	88	86	84	84	85
All	85	81	78	77	73	71	71	71

Panel B
Employers' Organization Rates (%)

Year	1995	2000	2005	2006	2007	2008	2009	2010
Private	77	75	78	77	77	81	81	80
Public	100	100	100	100	100	100	100	100
All	86	83	86	85	84	87	87	87

2.2 The Collective Bargaining Process in the Private Sector

Between 1958 and 1982, the collective agreements for blue-collar workers in the private sector were negotiated at an economy-wide level by LO and the Swedish Employers Association (SAF, which later merged with The Federation of Swedish Industries to become the aforementioned Confederation of Swedish Enterprise). Since 1982, the collective agreements are reached on a somewhat less centralized industry level between the individual unions and employers' organizations (Meidner and Öhman 1972; Lundh 2008). The different labor unions and employers' organizations often coordinate their negotiation efforts internally (Facken inom industrin 2011; Svenskt Näringsliv 2011). The fact that negotiations are mainly conducted at an industry-wide level is in contrast with the United States, where negotiations are instead predominantly conducted at a firm level (Venn, 2009).

The duration of the collective agreements has in recent years been roughly three years on average, although there are some exceptions (Medlingsinstitutet, 2005-2011). This is approximately the same length as is common in the United States (Abowd, 1989). Since the agreements have a specified duration, both the firms and the unions know in advance when they will expire, and they normally engage in negotiations in advance in order to hopefully reach a new agreement as the old one expires. For example, the agreement on industrial development and wage formation (*Industriavtalet* in Swedish), which is one of the major agreements in Sweden, states that negotiations should be commenced three months before the old agreement expires unless the parties state otherwise (Industrirådet, 2011). Agreements for different industries expire in different years (Medlingsinstitutet, 2005-2011).

Companies which are members of an employers' organization are automatically covered by agreements signed by the organization that applies to their respective industry. Companies which are not members have the opportunity to sign a collective agreement directly with the union that replicates the terms in these collective agreements (which is called *hängavtal* in Swedish). When including these replicating collective agreements, more than 90 percent of the Swedish workforce is covered by collective agreements as of 2010 (Medlingsinstitutet, 2011). As is evident from the fact that collective agreement coverage is higher than the unionization rates, employees who are not members of the union are also covered by the collective agreement if their company has signed one. Conversely, an employee could be a member of the union without being covered by a collective agreement, if the company has not signed any agreement.

After these industry-wide negotiations are finished, the local branches of the labor unions normally engage in negotiations with their respective companies in order to decide on how to distribute the wage increases that were agreed upon at the centralized level. During these negotiations the local branches of the unions also often try to receive benefits in excess of those agreed upon at the industry-wide level. Although the labor unions have given up their right to job actions (such as strikes) when signing the industry-wide agreement (Nationalencyklopedin, n.d.) they are sometimes able to get additional compensation in these local negotiations. The wage increases in excess of what is agreed upon at the industry-wide level are referred to as wage drifts (*löneglidning* in Swedish). Historically, the wage increases negotiated on the compa-

ny level have at times been larger than those negotiated on the industry level (Nationalencyklopedin, n.d.), but nowadays they are usually smaller. During the negotiations of 2012, for example, a 2.6 percent wage increase for the manufacturing industry was agreed upon, which is also assumed to be followed for other industries. The total wage increases are expected to be 3.3 percent, implying wage drifts of 0.7 percentage points (Sveriges Riksbank, 2012).

There are several reasons that the companies agree to these wage increases in excess of what is agreed upon at the industry level. One of them is that the firms compete with each other to attract and retain employees. Another is that they follow from increased productivity at the firm, where performance based wage systems are prevalent (Nationalencyklopedin, 2012).

2.3 Unemployment Benefits

The unemployment benefits in Sweden could be seen as following the Ghent system, in which the government does not handle the administration (Magnusson, 2006). The administration is instead mainly done by the labor unions (Inspektionen för arbetslöshetsförsäkringen, 2012). The government does, however, guarantee, regulate, and to a large extent finance the unemployment benefits. The benefits are based on the wage that the employee had prior to the unemployment. The unemployment benefits in Sweden have historically been seen as generous (Magnusson, 2006). It has, however, been argued that the Swedish unemployment benefits have deteriorated relative to other OECD countries in recent years (Sundén Jelmini and Hennel, 2012).

In case of unemployment, there are two benefit systems that could provide financial support. First, there is a basic insurance that covers everyone above 20 years of age who has worked a certain number of hours during the six months prior to unemployment, is enrolled at the Swedish Public Employment Service, and actively seeks new employment. This benefit is (up to) SEK 320 ($47.50)[2] per working day (Arbetslöshetskassornas Samorganisation, 2012).

The other system consists of a voluntary membership of an unemployment insurance fund. Roughly 70 percent of the Swedish workforce were members of such an insurance fund as of 2009 (Idling and Wallberg 2010; Statistics Sweden 2009). There are 30 independent unemployment funds where the vast majority is administered by different labor unions. Employees can become members of one of these funds without becoming members of the union. If having been member of one of these unemployment funds for at least 12 months, and if fulfilling the same requirements as for the basic insurance mentioned above, the unemployed can receive compensation covering up to 80 percent of the previous wage. The maximum amount of compensation is SEK 680 ($101) per working day. This compensation is received during the first 200 days of unemployment. For the next 100 days, unemployed workers receive 70 percent of the previous wage up to SEK 680 ($101) per working day (Arbetslöshetskassornas Samorganisation, 2012).

[2] The exchange rate used is 6.73 SEK per USD, which was the exchange rate as of May 1, 2012. This exchange rate is used in the remainder of the paper.

After these 300 days the unemployed can receive 65 percent of the previous wage if enrolling in a government unemployment program called *Jobb- och utvecklingsgarantin* in Swedish (Arbetsförmedlingen, 2012).

People with monthly wages above SEK 18,700 ($2,779) will not receive more than the levels described above from either of the unemployment benefit systems, since they reach the ceiling. In fact, 88 percent of the unemployed that used to work full-time reach this ceiling. (Sundén Jelmini and Hennel, 2012)

For these members, some of the labor unions have started offering a supplementary insurance. For blue-collar workers who are members of such unions, the insurance will cover 80 percent of the previous wage up to SEK 34,000 ($5,052) per month for the first 100 days (LO, 2011). For the white-collar workers, these limits are overall higher. An example is the white-collar union Unionen's insurance that covers 80 percent of wages up to SEK 60,000 ($8,915) per month for 150 working days as part of the membership fee. In addition to this, members can pay extra to make the insurance cover 80 percent of their income up to SEK 150,000 ($22,288) per month for up to 200 days (Unionen, 2012). However, not all labor unions offer these supplementary insurances.

3. Previous Literature

3.1 Theory

This theory section consists of two parts. In the first part, some of the most influential theoretical contributions to the research on the relationship between labor bargaining power and capital structure are presented. Two models inspired by Simintzi et al. (2010), which show that the theoretical relationship is ambiguous, are presented in more depth in Appendix A. In the second part, the viability of some of the assumptions underlying most of these bargaining models is discussed.

3.1.1 Theories on the Impact of Labor Bargaining Power on Debt

In both setups presented in more detail in Appendix A, Simintzi et al. (2010) use a three-period bargaining model where an all-equity firm with risk neutral shareholders negotiates with its employees. The basic idea is that the firm chooses its debt level in order to maximize firm value. In the base case, where debt is assumed to be non-negotiable (i.e. creditors will either be paid in full or liquidate the firm and receive the full liquidation value), they show that the optimal level of debt is strictly increasing in labor bargaining power. The reason is that by issuing debt, the firm decreases the cash flows to be divided between shareholders and workers. If labor bargaining is high, workers are likely to receive a large proportion of this surplus, and firms are incentivized to take on more debt, even if the risk of liquidation increases. This framework is described in more detail in Appendix A, where the conclusion is also shown mathematically.

Although not identical to the first model presented in Appendix A, many papers have theoretically shown a positive relationship between labor bargaining power and the level of debt. One of the first papers to show that debt could be used as a strategic tool in this manner was written by Bronars and Deere (1991). They claim that high levels of debt of an individual firm may reduce the threat that the employees unionize.

Matsa (2010) includes profit variability in his derivation and shows theoretically not only that the optimal level of debt increases with union bargaining power, but also that the positive relationship may be even greater for firms with highly variable profits. While profit variability per se may reduce the optimal level of debt, as it increases the risk of financial distress, the effect of this measure in conjunction with union bargaining power is the opposite. The reason is that, for any level of debt, higher profit variability exposes more liquidity to a strong labor union when profits are higher than expected.

Dasgupta and Sengupta (1993) include two variables that help to explain the capital structure of a firm: asset specificity and unionization. They show both that it would be in the interest of firms with high asset specificity to use more debt, and that unionized firms should have a higher proportion of debt than non-unionized firms, ceteris paribus. Similarly, in the model used by Cavanaugh and Garen (1997), the interaction between asset specificity and unionization is seen as an important determinant of the capital structure of firms. They predict that debt is positively related to union bargaining power, and that the effect is larger when assets are firm-specific.

While Hennessy and Livdan (2009) focus on other aspects of leverage such as debt overhang, their model also implies that higher supplier bargaining power, which includes the bargaining power of employees as measured by unionization rates, increases the leverage of a firm. In the framework employed by Perotti and Spier (1993), finally, it is shown that firms can temporarily increase debt through the use of debt-for-equity swaps, to send a credible signal to unions that the shareholders will not make further investments if the employees do not lower their wage demands.

The literature containing theoretical models that predict a negative relationship between labor bargaining power and the optimal level of debt are scarce. However, in a second model, Simintzi et al. (2010) show that by allowing debt to be renegotiated, the optimal level of debt is strictly decreasing with labor bargaining power. The reason is that creditors may under these circumstances negotiate with workers whenever a firm's output is lower than the face value of debt but higher than the liquidation value. The fact that workers now have an outside option – to negotiate with creditors instead of shareholders – makes debt inefficient as a bargaining tool. A more formal explanation of this result is shown in Appendix A**.**

In addition to Simintzi et al. (2010), Sarig (1998) proposes that firms with unionized workers use less debt than non-unionized firms, ceteris paribus. Even though his derivation is quite different, the conclusion is similar to that of Simintzi et al. (2010).

3.1.2 Discussion

As mentioned in the previous section and described in more detail in Appendix A, altering the assumption regarding the possibility to renegotiate debt changes the outcome of the model drastically. Apart from this assumption, Simintzi et al. (2010) also raise some concerns regarding the viability of other assumptions which underlie many of the models presented above that suggest that debt could be used as a strategic tool when negotiating with workers.

One of these assumptions is that firms are able to choose their level of debt before the wage negotiations commence. While this is a common assumption in bargaining models which include a first mover advantage component, Simintzi et al. (2010) argue that it might not necessarily be the case; in reality, firms both reconsider their capital structure and negotiate with their workers frequently, and it is hard to say that one always precedes the other. Intuitively, debt would not have the same strategic value if firms are not able to decide on the capital structure prior to engaging in labor negotiations.

Moreover, another assumption is that debt claims have seniority over labor claims when a firm defaults. This is not very realistic in a Swedish setting, however, as the employees' claims are prioritized (as stated by § 12 in the Swedish law *Förmånsrättslagen*). An implication of the assumption of debt seniority is that workers are badly hurt if the firm defaults or if wage negotiations fail, as their alternative wage is assumed to be zero. This assumption, that workers will receive nothing in the case of bankruptcy, is not viable even if debt claims did have seniority, if there are unemployment benefit schemes providing workers with some

kind of compensation in case of unemployment. To a large extent, this is the case in Sweden, as described in part 2.3 of the institutional background section.

A perhaps even more fundamental assumption is that wage negotiations are conducted between the workers and shareholders of an individual firm. If, however, negotiations are conducted on a more centralized level, as is the case in Sweden (Venn, 2009), the strategic value of debt may be reduced for any individual firm. This is because the unions will look at the financial position of an entire industry (or economy if negotiations are even more centralized) rather than that of any one firm when deciding on how far to push their demands. For debt to be effective as a strategic variable in this case, firms must coordinate their efforts with their competitors in order to reduce labor cost with the use of debt. If this coordination to increase financial leverage fails, the incentives for an individual firm to take on excess leverage in order to lower labor costs is decidedly lower.

In summary, when comparing the assumptions of the model that predicts a strategic use of debt to enhance the firm's bargaining position to the institutional setting in Sweden, it is evident that some of them are clearly violated. The first is that debt claims have seniority over labor claims, when the law states that the latter is prioritized in Sweden. Furthermore, even if workers would not receive anything from the firm in case of liquidation, their alternative wages are still not zero (which most theoretical models assume) as there are both government wage guarantees and unemployment benefits providing laid-off workers with at least some kind of economic compensation. Lastly, as negotiations are mainly conducted at an industry-wide level rather than a firm level in Sweden, competing firms would have to coordinate their efforts to increase financial leverage as a bargaining tool towards organized labor. Such coordination would, however, likely be difficult to achieve in reality.

3.2 Empirical Research

The amount of empirical research on the topic of labor bargaining power and capital structure is far less extensive than the theory. One reason for this might be the difficulty of obtaining good data, since labor bargaining power is essentially unobservable. However, proxies for the bargaining power parameter are not very hard to find (Dasgupta and Sengupta, 1993). Just as there are two different sets of theory arguing on the one hand that there should be a positive relationship between labor bargaining power and financial leverage, and on the other hand that the relationship should be negative, different papers have found empirical evidence in both directions, depending on the methodology, time period, and the geographic area in which the studies were conducted.

In an American survey where 392 CFOs were asked if they use high debt ratios to bargain for concessions from the employees, none of the respondents claimed that this was the case (Graham and Harvey, 2001). However, many papers have found empirical support that there is indeed a positive relationship between labor bargaining power and debt ratios. Matsa (2010) uses two different methods to study the use of debt as a strategic variable. First, he uses firm-level unionization data from 1977, 1987 and 1999 as a proxy for

labor bargaining power, as well as a measure of profit variability, to study the effect on capital structure in the United States. Secondly, he uses the adoption of the right-to-work (RTW) law and the repeal of the work stoppage provision (WSP) law as a source of (exogenous) change in labor bargaining power.[3] Both methods show a positive relationship between labor bargaining power and debt-to-capital ratios, although the second approach does not always give significant results. More specifically, Matsa (2010) shows that when the unionization rates increase by ten percentage points, the debt-to-capital ratio increases by 0.7 percentage points on average. This is in agreement with Matsa's findings that financial leverage decreased when the RTW laws were adopted, as these laws impaired labor bargaining power. The effect of work stoppage provision laws, however, is somewhat weaker both statistically and economically.

Overall, Matsa also finds that firms with high profit variability use financial leverage to a larger extent in the face of high labor bargaining power, which is in accordance with his theoretical framework. This result holds when profit variability is interacted with unionization rates, as well as with the adoption of right-to-work laws and the repeal of work stoppage provision.

Similarly, Bronars and Deere (1991), who instead use unionization rates from 153 three-digit SIC code industries and data on large, publicly traded companies in the United States from 1973, find significant evidence of a positive relationship between unionization and debt-to-equity ratios. Specifically, they find that a ten-point increase in the industry unionization rate (which is used as proxy for the threat of unionization) is expected to result in a 12 percentage point increase in the debt-to-equity ratio.

Another American study, conducted by Cavanaugh and Garen (1997), uses firm-level union coverage rates from publicly listed U.S. companies between 1973 and 1982. In this study, the authors also find a statistically significant positive relationship between this variable and the debt-to-equity ratio. What is more, they find that the magnitude of the impact of unionization is determined in conjunction with a firm's asset specificity, which is in line with their theory. The conclusion is that the influence of unions on debt is stronger in the presence of high asset specificity, and that the interaction between the two variables is important. This is because firms with high asset specificity lack the opportunity to sell their assets at reasonable prices and thus cannot use the threat of liquidating the firm as a way of reducing labor expropriation. Cavanaugh and Garen (1997) argue that these firms are instead more likely to use debt as a strategic tool when union bargaining power is high.

There are also papers showing the opposite relationship between labor bargaining power and financial leverage. With data from 21 OECD countries during the period 1985-2004, Simintzi et al. (2010) use the Employment Protection Legislation (EPL) indicator as a proxy for the bargaining power of labor and run a difference in differences regression, finding evidence of a negative relationship between labor bargaining

[3] Right-to-work laws ban contracts that require employees to financially support or join a labor union. These laws are argued to decrease union bargaining power. Work stoppage provisions allow strikers to receive unemployment benefits when the employers carry on operations. Matsa (2010) argues that this leads to an increase in union bargaining power.

power and financial leverage (mainly defined as debt to assets). Their interpretation is that higher labor bargaining power increases operating leverage, which in turn leads companies to reduce their financial leverage in order to keep the total risk at a reasonable level. Quantitatively, a one-unit increase in EPL (which ranges from 0 through 6) is found to decrease total debt to assets by roughly 3 percentage points in absolute terms.

In a paper with a slightly different focus, Chen et al. (2009) use unionization rates on an industry level over the period 1984-2006 as an indicator for firm-level unionization rates and find significant evidence that higher rates lead to both lower operating leverage and a higher cost of equity. They claim that strong unions make wages sticky and layoffs more costly. Furthermore, Chen et al. also argue that unions tend to intervene in company restructurings, further increasing operating leverage. This relationship between unionization rates (which are oftentimes used as a proxy for labor bargaining power) and operating leverage is in line with the findings of Simintzi et al. (2010).

4. Data

The data used in this study can essentially be divided into three groups. First, a set of companies primary listed on the NASDAQ OMX Nordic Stockholm is obtained by taking the listed companies as of January 1, 2012 and adding back delisted companies from the period 2005-2011.[4] For these companies, corresponding financial variables are taken from Worldscope, which is a database that contains financial information on more than 45,000 companies globally. Companies without any data in Worldscope are dropped. As is common in the field, financial companies[5] are excluded since their capital structure decisions are primarily driven by other considerations (Rajan and Zingales, 1995) and to a large extent regulated (Sarig, 1998). The result is a set of annual panel data on 277 companies from 2005 through 2011.

Secondly, as a proxy for the labor bargaining power of the above companies, annual data on industry unionization rates were obtained from the Labour Force Survey (LFS) department of Statistics Sweden on a two-digit SNI code level[6] for the period 2005-2011. This measure was constructed by asking Swedish employees between the ages of 15 and 74 whether or not they were members of a union. Summary statistics for the unionization rates as well as the financial variables described above are reported in Table 2.

Table 2
Summary Statistics

The dataset consists of data from 277 Swedish firms for the years 2005-2011. Data on the unionization rate, which is measured as the proportion of the workforce within each sector between the ages of 15-74 who have answered that they are members of a union, is obtained from Statistics Sweden. Financial data are obtained from Worldscope. Variability is measured as the standard deviation of the change in EBITDA divided by lagged total assets. This variable is then divided by the standard deviation in the dataset. Variability is calculated using data for all non-missing years 2005-2011 for each firm in the dataset. Worldscope variables are winsorized at 1 % tails.

Variable	Obs.	Mean	Median	Std. Dev.	25th percentile	75th percentile
Market Debt to Capital	1,557	0.209	0.146	0.215	0.021	0.329
Book Debt to Capital	1,592	0.291	0.265	0.249	0.050	0.481
Unionization	1,672	0.669	0.629	0.124	0.581	0.770
Variability	1,365	0.276	0.132	1.000	0.080	0.250
Logsales	1,658	13.950	13.967	2.159	12.726	15.140
FixedProportion	1,658	0.214	0.106	0.262	0.029	0.288
ROA	1,615	0.035	0.067	0.176	0.012	0.113
Market-to-Book	1,565	3.130	2.114	3.695	1.160	3.648
Z-Score	1,437	1.514	1.822	2.367	1.078	2.601

The two measures of financial leverage are defined in the following way:

$$Market\ Debt\ to\ Capital = \frac{Book\ value\ of\ debt}{Market\ value\ of\ equity + book\ value\ of\ debt}$$

[4] This information was obtained from NASDAQ OMX's website.
[5] Defined as SNI code 64 – "Financial service activities, except insurance and pension funding". Also see footnote 6.
[6] SNI is the Swedish Standard Industrial Classification and is based on the recommended standard NACE Rev. 2 from the European Union. At the two-digit level, it consists of 88 groups which are based on the companies' activities.

$$Book\ Debt\ to\ Capital = \frac{Book\ value\ of\ debt}{Book\ value\ of\ equity + book\ value\ of\ debt}$$

The profit variability measure is taken from Matsa (2010) and is calculated by dividing the standard deviation of the change in earnings before interest, tax, depreciation and amortization (EBITDA) by the firm's lagged total assets. It is then demeaned by dividing it by the standard deviation of all observations (hence the standard deviation of 1 in Table 2).

Compared to previous studies, the variables displayed in the table have some notable differences in terms of averages and standard deviations. Overall, the financial leverage of the Swedish companies seems to be slightly lower than that of the firms examined by Matsa (2010) and Simintzi et al. (2010), but the standard deviation is a bit higher, indicating that there is larger variation in the data.

What is more, it is worth noting that the unionization rate in our dataset is on average 66.9 percent, which is very close to the unionization rates for the entire private sector in Sweden shown in Table 1**.** The standard deviation of the unionization rate in our dataset is 12.4 percent. This can be compared to the union coverage in Matsa (2010) which had a mean of 27.0 percent and a standard deviation of 26.6 percent. Hence, the unionization in Sweden 2005-2011 was decidedly higher than it was in the United States for the years 1977, 1987, and 1999. Moreover, there is significantly less variation in the measure in our Swedish dataset.

To make use of these unionization rates, SNI codes are assigned to companies to match them with their respective industries using the Swedish resource Affärsdata. The procedure according to which this is done is described in Appendix B. Summary statistics showing the number of companies from each industry, as well as their average unionization rates, are presented in Table C1 and Table C2 for SNI 2002 and SNI 2007, respectively. These tables are found in Appendix C.

The third group of data employed in this study is the dates when collective agreements were reached, which is obtained for the period 2005-2011 from the National Mediation Office (*Medlingsinstitutet* in Swedish). Using quarterly firm data and these dates, a dummy variable taking on the value 1 for companies in industries in which an agreement was written during the quarter in question is constructed. We also construct dummy variables that take on the value 1 during the periods before and after the agreements were reached. The companies are matched with the industry-wide collective agreements according to their SNI codes. The method raises the question of delimitation, as hundreds of collective agreements could be reached in a single year (some of which only cover less than a hundred workers in companies and industries that are not part of our dataset). For instance, more than 500 collective agreements expired in 2007 (Medlingsinstitutet, 2007).

The industries are chosen in order to get a variation in the periods during which the agreements were reached (so that not all agreements are in the same period) and to get a good variation of industries. Fur-

thermore, we want to include enough agreements so that a majority of the companies in the dataset is included. We also want to include only "major" agreements in order to make sure that they cover enough workers to potentially have a substantial effect on the companies in the dataset. The agreements chosen, the employers' organizations that signed them and the SNI codes they were matched with are shown in Table C3 in Appendix C. The timing of the agreements is shown in figure C1 in Appendix C.

5. Methodology

In order to study the effect of labor bargaining power on firms' choice of capital structure, two different methods are employed.

In the main method, industry unionization rates for the period 2005-2011 are used as a proxy for the labor bargaining power (see Bronars and Deere (1991) and Matsa (2010) for similar methods). Specifically, using the dataset described above, we run the following fixed effects panel regression:

$$Y_{ijt} = \alpha_0 + \alpha_1 Unionization_{jt} + \beta X_{ijt} + \omega_t + \gamma_{ij} + \left(\alpha_2 Variability_{ijt} + \alpha_3 Unionization_{jt} * Variability_{ijt}\right) + \varepsilon_{ijt},$$

where Y_{ijt} is some measure of financial leverage for company *i* in industry *j* at time *t*. The right-hand side contains

(i) An intercept α_0.

(ii) The proxy for labor bargaining power, Unionization, which is measured as the fraction of the employees in industry *j* that are members of a union at time *t*.

(iii) A vector X_{ijt} of time varying financial control variables that are commonly used in the literature on capital structure. It consists of the natural logarithm of net sales (proxy for firm size), fixed assets as a proportion of total assets (proxy for a firm's collateral), return on assets (proxy for firm profitability), the market-to-book ratio (proxy for the investment or growth opportunities) and finally the modified Z-score (proxy for the probability of bankruptcy).[7] These variables were taken from Matsa (2010) but the factors are mentioned as important determinants of capital structure in many other papers, such as Rajan and Zingales (1995), Harris and Raviv (1991), Simintzi et al. (2010), and Biörck and Lagercrantz (2011).

(iv) Yearly time dummies ω_t.

(v) Firm fixed effects γ_{ij}.

(vi) Some specifications also include a measure of the companies' variability of earnings before interest, taxes, depreciation and amortization and its interaction term with the unionization rates (for the intuition behind including these variables, see the theory section as well as Matsa (2010)).

The main reason that firm fixed effects are used rather than industry fixed effects like in other papers such as Matsa (2010) is that the fixed effects should be placed on a level that displays a certain amount of ho-

[7] Altman's Z-Score is calculated using the formula below. As Worldscope only reports retained earnings annually for most firms, the data for the fourth quarters replaces the missing values for the previous three quarters in order not to lose too many observations.

$$Z\ Score = 3.3 * \frac{EBIT}{Total\ Assets} + 1.0 * \frac{Sales}{Total\ Assets} + 1.4 * \frac{Retained\ Earnings}{Total\ Assets} + 1.2 * \frac{Working\ Capital}{Total\ Assets}$$

mogeneity.[8] In Table C4 in Appendix C**,** the standard deviations of different measures of financial leverage are reported, broken down into different levels of aggregation. Regardless of measure, the standard deviation on firm level is considerably lower than the industry standard deviation. This suggests that the variation within an industry is much higher than that of a firm over time, and hence, it makes more sense to use firm fixed effects.

Since both the Breusch-Pagan and the White test show clear signs of heteroskedasticity (see Table C5 in Appendix C), all regressions are performed using robust standard errors.

As the dependent variable, the debt-to-capital ratio using the market value of equity is predominantly used. This measure gives a better representation of a firm's financial position at a specific point in time, and is less vulnerable to any individual firm's accounting policies. It is also a commonly used measure of financial leverage in previous papers (Sarig 1998; Matsa 2010). However, to test the robustness of the model, the regression is run using book leverage as the dependent variable, as well.

Moreover, further regressions are run as a way of testing the robustness. Specifically, regressions are also run in which the data are restricted to various subsamples, such as manufacturing companies,[9] since some previous studies (e.g. Simintzi et al. 2010) restrict their data to such companies. Two other subsamples are large and small companies.[10]

Matsa (2010), who uses an approach very similar to the one outlined above, raises some concerns that his method might suffer from endogeneity due to the fact that unions may be more likely to organize in established and profitable firms and industries, which may in turn be able to take on higher financial leverage. To somewhat mitigate this risk, and to simultaneously test whether or not the capital structure varies over time, particularly in connection with labor negotiations, regressions using the collective agreement dummies described in the data section are run.

The selection of agreements proceeded as described in the data section, and all companies that did not belong to industries that had at least one agreement during the sample period were dropped. The fact that some industries are included and others excluded (mostly industries with few companies in our dataset) could raise some concerns about selection bias. To the extent that larger industries are more or less sensitive to the outcome of collective agreements, this might be an issue, but we have no reason to believe that the industries chosen have such traits.

For this second method, quarterly rather than annual data are used as we do not need to rely on the annual unionization rates. The specification for the method looks as follows:

[8] We thank Jan Eklöf, Associate Professor at the Center for Economic Statistics at the Stockholm School of Economics, for valuable input regarding the use of fixed effects.
[9] Manufacturing companies are defined as SNI codes 10 through 33 according to Statistics Sweden.
[10] Large companies are defined as companies with net sales above the sample median, i.e. the larger half in terms of sales.

$$Y_{ijt} = \alpha_0 + \alpha_1 Agreement_{ijt} + \alpha_2 Y_{ijt-1} + \beta X_{ijt} + \omega_t + \gamma_{ij} + \left(\alpha_3 Variability_{ijt} + \alpha_4 Agreement_{ijt} * Variability_{ijt}\right) + \varepsilon_{ijt},$$

where all variables are defined as in the first approach with the exception that the unionization rates have been replaced by the agreement dummy which takes on the value 1 if an agreement is reached at time *t* for industry *j,* to which firm *i* belongs. Otherwise, the dummy takes on the value 0.

To alleviate the issue of autocorrelation, which stems from the fact that a company's financial leverage will most likely depend on the financial position of the company in the previous period, the regression includes the lagged debt-to-capital ratio as an independent variable.[11]

In these regressions, the pre- and post-agreement periods are explored by altering the specification so that the dummy variables that take on the value 1 for the quarters before and after the agreements were reached are included in turn. This is of interest as it might be intuitive for companies to change their debt just before negotiations rather than at the time when the agreement was settled, and perhaps also to revert the debt levels shortly thereafter. The concept of temporarily altering the capital structure is discussed by Perotti and Spier (1993).

The same additional robustness tests as in the first approach are used. That is, the regressions are run on a subsample of manufacturing companies, and on small and large companies. Also, book leverage is used as the dependent variable in some regressions.

The potential issue of endogeneity caused by omitted variables is likely to be less severe with this second method, as the unions do not decide when or in which industries agreements are reached; rather, the agreements are settled approximately every three years, with a certain element of uncertainty as to the exact date. Therefore, these agreements could provide a source of exogenous variation in the labor bargaining power, as unions, at the time when the agreements expire, regain their right to job actions such as going on strike (Nationalencyklopedin, n.d.).

Given these features, we argue that this second approach could be a valuable complement to the main approach, which has been explored more extensively in previous literature in this area of research.

[11] Again, we thank Jan Eklöf for suggesting this approach.

6. Results

The outline of this section is that we first present and interpret the results from the first method, where the debt-to-capital ratio is regressed on the unionization rates and a set of control variables. We then proceed to the results of the second method, in which the financial leverage is regressed on the collective agreement dummy. In the subsequent section, the results from the two methods are compared and analyzed further.

6.1 Unionization Rates and Financial Leverage

6.1.1 Main Results

As described in the methodology section, the specification for the main approach looks as follows:

$$Y_{ijt} = \alpha_0 + \alpha_1 Unionization_{jt} + \beta X_{ijt} + \omega_t + \gamma_{ij} + \left(\alpha_2 Variability_{ijt} + \alpha_3 Unionization_{jt} * Variability_{ijt}\right) + \varepsilon_{ijt}.$$

Regression results, when not including the variability measure and its interaction term with unionization, are presented in Table 3. Note that all of the regressions are adjusted for firm and year fixed effects. In the first column, only the unionization rate is included as an independent variable. The result from this univariate regression shows a negative relationship between unionization rates and the debt-to-capital ratio, which is significant at the 1 percent level. More specifically, the coefficient suggests that companies with 10 percentage points higher unionization rates are expected to have 2.7 percentage points lower debt-to-capital ratios. Since the mean debt-to-capital ratio is 20.9 percent this means these companies are expected to have almost 13 percent lower financial leverage compared to the mean, which can be considered economically significant as well.

In columns 2 through 6, financial controls are added successively to see how they affect the regression results. First, we note that the coefficient for the unionization variable remains negative for all specifications, and is still statistically significant, but now at a 5 percent level for columns 3 through 6. In column 6, where all control variables are included, a ten percentage point increase in unionization rate is expected to decrease the debt-to-capital ratio by 2.3 percentage points, or by 11 percent compared to the mean.

While not the main focus of our study, it is interesting to see whether or not the financial controls are significant as well, since that tells us if they help to explain the capital structure of the companies in our dataset. Generally speaking, all of them except for the Z-score are statistically significant, and in most cases at the 1 percent level. The inclusion of the Z-score also seems to make the other controls slightly less significant. Moreover, we can see that including more financial controls decreases the number of observations as some companies lack data for these controls in Worldscope.

Table 3
Unionization Rates and Financial Leverage – Main Results

The table shows the main results from regressing the firms' debt-to-capital ratio on the unionization rate of their respective industries. Financial controls are added successively. The unionization coefficient measures the impact of differences in unionization rate on the firms' debt-to-capital ratio. All Worldscope variables are winsorized at 1 % tails. Robust standard errors are used to correct for heteroskedasticity. All regressions include firm fixed effects as well as year fixed effects. The t-statistics are reported within parentheses. *, **, and *** denote statistical significance at the 10 %, 5 % and 1 % levels, respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Unionization	-0.269***	-0.296***	-0.242**	-0.213**	-0.224**	-0.233**
	(-2.66)	(-2.83)	(-2.42)	(-2.09)	(-2.27)	(-2.25)
Logsales		0.036**	0.015**	0.026***	0.024***	0.021**
		(2.49)	(1.98)	(2.89)	(2.80)	(2.25)
FixedProportion			0.479***	0.488***	0.487***	0.293**
			(6.45)	(6.47)	(6.43)	(2.37)
ROA				-0.126***	-0.128***	-0.099**
				(-3.60)	(-3.68)	(-2.30)
Market-to-Book					-0.004**	-0.005***
					(-2.19)	(-2.60)
Z-Score						-0.011
						(-1.60)
Firm FE	X	X	X	X	X	X
Year FE	X	X	X	X	X	X
N	1,529	1,526	1,524	1,509	1,509	1,317
R^2	0.241	0.267	0.338	0.357	0.363	0.304

In Table 4, the results are presented for the regressions in which the variability measure and its interaction term with unionization employed by Matsa (2010) are included. As for the main variable of interest, the unionization rate, the coefficients are still negative and roughly of the same magnitude as above. If anything, the magnitude of the negative coefficients is slightly larger on average. All unionization coefficients are statistically different from zero at least at the 5 percent significance level. In the second column, the coefficient is significant even at the 1 percent level.

While they do not distort the unionization coefficients, the variability measure and the interaction term are themselves not significant on conventional levels. Also, the explanatory value as measured by the adjusted R-squared when including all financial controls, is actually a bit lower than before. The signs are, however, the same as in Matsa's paper; the coefficient on profit variability is negative in all specifications, whereas the variability combined with unionization is positive. Judging only by the signs of these coefficients, one would be led to believe that firms with high profit variability have less financial leverage, ceteris paribus. Firms with high levels of profit variability are, however, expected to increase their financial leverage more than other firms in the face of high unionization rates. Once again, the lack of statistical significance means that the results should be interpreted with caution.

Finally, the financial controls are largely unaffected when adding the new variables. However, they overall become a bit less significant.

Table 4
Unionization Rates and Financial Leverage – Including Profit Variability

The table shows the main results from regressing the firms' debt-to-capital ratio on the industry unionization rate as well as the firms' profit variability and its interaction term with unionization. Variability is measured as the standard deviation of the change in EBITDA divided by lagged total assets. This variable is then divided by its standard deviation in the dataset. Financial controls are added successively. When uninteracted, the unionization coefficient measures the impact of differences in unionization rate on the firms' debt-to-capital ratio at the mean of profit variability. The variability coefficient shows the effect of profit variability when unionization is zero. The interaction term shows the joint effect of unionization and profit variability. All Worldscope variables are winsorized at 1 % tails. Robust standard errors are used to correct for heteroskedasticity. All regressions include firm fixed effects as well as year fixed effects. The t-statistics are reported within parentheses. *, **, and *** denote statistical significance at the 10 %, 5 % and 1 % levels, respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Unionization	-0.239**	-0.279***	-0.239**	-0.234**	-0.238**	-0.270**
	(-2.60)	(-2.91)	(-2.53)	(-2.34)	(-2.44)	(-2.52)
Variability	-0.056	-0.062	-0.044	-0.041	-0.036	-0.060
	(-0.83)	(-1.01)	(-1.18)	(-0.86)	(-0.70)	(-0.59)
Unionization*Variability	0.058	0.072	0.056	0.052	0.046	0.093
	(0.59)	(0.81)	(1.04)	(0.76)	(0.61)	(0.72)
Logsales		0.019*	0.012	0.022**	0.020**	0.020*
		(1.78)	(1.34)	(2.21)	(2.15)	(1.84)
FixedProportion			0.411***	0.407***	0.413***	0.274**
			(4.92)	(4.58)	(4.70)	(2.39)
ROA				-0.114***	-0.120***	-0.081*
				(-3.10)	(-3.23)	(-1.79)
Market-to-Book					-0.003**	-0.005**
					(-2.07)	(-2.41)
Z-Score						-0.011
						(-1.55)
Firm FE	X	X	X	X	X	X
Year FE	X	X	X	X	X	X
N	1,280	1,278	1,278	1,273	1,273	1,106
R^2	0.268	0.275	0.313	0.323	0.327	0.299

6.1.2 Additional Tests

In Table 5, some additional regressions are run in order to test for robustness, using the same specification as in column 6 of Table 3, i.e. including all financial controls. However, for the first three columns, different subsamples are studied, whereas the fourth column uses the book value of equity when calculating the debt-to-capital ratio.

Table 5
Unionization Rates and Financial Leverage – Additional Tests

The table shows the results from the additional (robustness) tests described in the section. In column 1, the regression is performed on a subsample consisting only of manufacturing firms. Columns 2 and 3 show the results from regressions performed on large and small firms, respectively, where the dividing line is the median of net sales. The difference in number of observations between large and small companies is due to the fact that small companies lack data for some of the variables to a larger extent. Column 4 uses book leverage instead. The unionization coefficient measures the impact of differences in unionization rates on the firms' debt-to-capital ratio. All Worldscope variables are winsorized at 1 % tails. Robust standard errors are used to correct for heteroskedasticity. All regressions include firm fixed effects as well as year fixed effects. The t-statistics are reported within parentheses. *, **, and *** denote statistical significance at the 10 %, 5 % and 1 % levels, respectively.

Variable	(1)	(2)	(3)	(4)
Unionization	-0.399*	-0.225**	-0.207	-0.030
	(-1.98)	(-2.17)	(-1.05)	(-0.26)
Logsales	0.027	0.066*	0.013	0.049***
	(0.82)	(1.88)	(1.35)	(3.66)
FixedProportion	0.259	0.174	0.371**	0.287***
	(1.47)	(1.56)	(2.12)	(2.74)
ROA	-0.036	0.147	-0.083**	-0.092
	(-0.43)	(1.32)	(-2.09)	(-1.35)
Market-to-Book	-0.006***	-0.009*	-0.003	0.000
	(-2.84)	(-1.96)	(-1.16)	(0.20)
Z-Score	-0.034***	-0.139***	-0.001	-0.017*
	(-2.69)	(-8.65)	(-0.23)	(-1.92)
Firm FE	X	X	X	X
Year FE	X	X	X	X
N	389	692	625	1,316
R^2	0.444	0.536	0.225	0.107

In column 1, the observations are limited to manufacturing companies as those are the ones who have received the most attention in previous literature. For manufacturing firms, the coefficient for the unionization variable remains negative. Moreover, the economic significance as measured by the magnitude of the coefficient is now larger, suggesting that manufacturing companies are expected to have 4 percentage points lower debt-to-capital ratios (or 17.2 percent lower compared to the subsample mean)[12] when unionization rates are 10 percentage points higher. The statistical significance is lower, albeit still significant at the 10 percent level. One potential explanation for this lower statistical significance is that the number of observations is much lower than when including all industries.

In the second and third column, the observations are limited to large and small companies, respectively. Both these unionization coefficients are negative and roughly of the same magnitude as when using the entire dataset, implying that there are no discernible differences between companies of different size when it comes to how their capital structure is affected by changes in the unionization rate. There are, however, differences when it comes to statistical significance; the coefficient for large companies is significant at the 5 percent level, whereas that of small companies is not significant on conventional levels.

[12] The annual data on manufacturing firms' debt-to-capital ratio has a mean value of 23.2 percent.

The last column uses the book leverage as the dependent variable. The coefficient remains negative, but much less so in magnitude. Also, the t-statistic is much lower, thus making it hard to draw the conclusion that there is any relationship between unionization and capital structure when using book values.

Having presented the results from the first method, we now move on to the second approach.

6.2 Collective Agreements and Financial Leverage

6.2.1 Main Results

In the second method, where the debt-to-capital ratio is regressed on the dummies which take on the value 1 for the quarters before, during, and after a collective agreement was reached within a firm's industry, the specification looks as follows:

$$Y_{ijt} = \alpha_0 + \alpha_1 Agreement_{ijt} + \alpha_2 Y_{ijt-1} + \beta X_{ijt} + \omega_t + \gamma_{ij} + \left(\alpha_3 Variability_{ijt} + \alpha_4 Agreement_{ijt} * Variability_{ijt}\right) + \varepsilon_{ijt}$$

In table 6, we show the results from running this regression where the dummy that takes on the value 1 during the period when the agreement is signed (*t*) is included, but also from replacing it with dummies that take on the value 1 for the two periods before (*t – 2* and *t – 1*) and the two periods after (*t + 1* and *t + 2*), to see whether firms seem to alter their capital structure in connection to bargaining with organized labor.

The coefficients for the period the agreement was signed, as well as the two periods prior to this, suggest that companies have lower financial leverage before and during negotiations with the union. However, only the coefficients for the periods one and two quarters before reaching the agreement are statistically significant at the 10 and 5 percent level, respectively. The size of the coefficients suggests that companies' debt-to-capital ratios are 1.8 percentage points (or 7.7 percent compared to the mean)[13] lower two periods prior to reaching an agreement with the union (*t – 2*), and 1.4 percentage points (or 6 percent compared to the mean) lower one period prior to reaching the agreement (*t – 1*), which could be considered economically significant.

The two periods after reaching a collective agreement (*t + 1* and *t + 2*) have positive coefficients, albeit not statistically significant. This means that while one cannot with certainty conclude that there is a reversal affect in these periods, one cannot rule out the possibility either.

[13] The mean debt-to-capital ratio for the quarterly data used in this method is 23.5 percent.

Table 6
Collective Agreements and Financial Leverage – Main Results

The table shows the results from regressing the debt-to-capital ratio on dummies for the period when a collective agreement was signed as well as the two periods before and after. Financial controls are included. The dummy variable for t-2 takes on the value 1 if an agreement is signed two periods after the observation in question and is otherwise zero. The dummies for the other quarters are constructed in the same way. Their coefficients show the effect of the agreement on the firm's debt-to-capital ratio in each period. To correct for autocorrelation, the debt-to-capital ratio for the period before is included as an independent variable, although its coefficients are not reported below. All Worldscope variables are winsorized at 1 % tails. Robust standard errors are used to correct for heteroskedasticity. All regressions include firm fixed effects as well as year fixed effects. The t-statistics are reported within parentheses. *, **, and *** denote statistical significance at the 10 %, 5 % and 1 % levels, respectively.

Period	t-2	t-1	t	t+1	t+2
Agreement	-0.018**	-0.014*	-0.008	0.002	0.001
	(-2.03)	(-1.77)	(-1.61)	(0.39)	(0.23)
Logsales	0.017***	0.017***	0.017***	0.017***	0.017***
	(3.65)	(3.69)	(3.54)	(3.64)	(3.68)
FixedProportion	0.030	0.027	0.025	0.027	0.026
	(0.17)	(0.16)	(0.15)	(0.15)	(0.15)
ROA	-0.180***	-0.178***	-0.176***	-0.177***	-0.177***
	(-4.21)	(-4.21)	(-4.16)	(-4.20)	(-4.17)
Market-to-Book	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***
	(-3.27)	(-3.36)	(-3.33)	(-3.32)	(-3.32)
Z-Score	-0.001	-0.001	-0.001	-0.001	-0.001
	(-0.14)	(-0.16)	(-0.18)	(-0.15)	(-0.15)
Firm FE	X	X	X	X	X
Year FE	X	X	X	X	X
N	1,354	1,354	1,354	1,354	1,354
R^2	0.520	0.519	0.519	0.518	0.518

Since the debt-to-capital ratio seems to be affected the most one and two periods prior to the signing of the agreement, we proceed to test these results further by adding the financial controls successively, and also including profit variability and its interaction with the agreement dummies. These results are presented in Table C6 and Table C7 in Appendix C, respectively. As can be seen, all agreement coefficients are negative, but the univariate regressions and the ones using only a few of the financial controls are not statistically significant. In columns 6 and 7 in Table C6, where all financial controls are added as well as the profit variability and its interaction term for the quarter prior to the agreement ($t-1$), the agreement coefficients are significant at the 10 percent level. For the period two quarters prior to the agreement ($t-2$), columns 6 and 7 are significant at the 5 percent level, as shown in Table C7.

The variability term and the interaction term are also negative in both periods prior to the agreement, implying that companies with high profit variability reduce their financial leverage further prior to collective agreements. This result is, however, not statistically significant at conventional levels.

6.2.2 Additional Tests

To test the robustness of the model, additional regressions are run. These are presented in Table 7**.** In this section, the dummy for the periods one and two quarters prior to when the agreement was signed are used, as these are the periods when companies seem to alter their capital structure the most. In columns 1 through 4, robustness tests two quarters prior to the agreement ($t-2$) are presented, whereas columns 5 through 8 exhibits the same regressions for the subsequent quarter ($t-1$).

In column one, the regression is run on a subsample consisting exclusively of manufacturing companies. The coefficient suggests that these companies have about 2.9 percent (or 11 percent of the subsample's mean)[14] lower debt-to-capital ratios two quarters before an agreement is reached. Furthermore, the t-statistic is higher than for any of the regressions in Table 6, making it significantly different from zero even at the 1 percent level. As seen in column 5, this result does not, however, hold in the following quarter ($t-1$), in which the coefficient is positive, and the t-statistic is low.

In columns 2 and 3, tests are run to see if there are any discernible differences between companies above and below the median in terms of size. For large companies, the negative coefficient is larger in magnitude than for the entire dataset, suggesting that they tend to lower their leverage to a slightly higher degree before negotiating with the union. The coefficient is statistically significant at the 5 percent level. For small companies, however, the coefficient is statistically insignificant, albeit still negative. The same can be said for the relationship one quarter prior to the agreement ($t-1$), although the negative coefficient for large companies is significant only at the 10 percent level.

The fourth and eighth columns contain the results from the regression where book leverage is used as the dependent variable. Unlike in the first method, the second approach is robust to this alteration; the relationship between financial leverage and an upcoming collective agreement is significantly negative at the 5 percent level when using book values as well, both one and two periods prior to the agreement. Compared to when using market leverage, however, the magnitude is somewhat smaller.

Having presented the results from both methods, we now move on to comparing and analyzing them further.

[14] Manufacturing firms have an average debt-to-capital ratio of 26.4 percent as opposed to 23.5 percent for the entire dataset.

Table 7
Collective Agreements and Financial Leverage – Additional Tests

The table shows the results from the additional (robustness) tests described in the section. Columns 1 through 4 show the tests for the dummy two quarters prior to the agreement, while columns 5 through 8 display the tests for the dummy one quarter prior to the agreement. In columns 1 and 5, the regressions are performed on a subsample consisting only of manufacturing firms. Columns 2 and 6 show the regression results from using a subsample of large firms, whereas columns 3 and 7 use a subsample of small firms. The difference in number of observations between large and small companies is due to the fact that small companies lack data for some of the variables to a larger extent. Columns 4 and 8 use book leverage instead of market leverage as the dependent variable. The coefficient on the agreement variable shows the effect of the agreement on the firm's debt-to-capital ratio in each period. To correct for autocorrelation, the debt-to-capital ratio for the period before is included as an independent variable, although its coefficients are not reported below. All Worldscope variables are winsorized at 1 % tails. Robust standard errors are used to correct for heteroskedasticity. All regressions include firm fixed effects as well as year fixed effects. The t-statistics are reported within parentheses. *, **, and *** denote statistical significance at the 10 %, 5 % and 1 % levels, respectively.

Period	t-2				t-1			
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Agreement	-0.029***	-0.019**	-0.011	-0.013**	0.007	-0.012*	-0.012	-0.007**
	(-3.12)	(-2.20)	(-0.57)	(-2.37)	(0.55)	(-1.81)	(-0.81)	(-2.10)
Logsales	0.029	0.029	0.014**	0.016**	0.028	0.026	0.014**	0.015**
	(0.86)	(1.38)	(2.20)	(2.25)	(0.82)	(1.25)	(2.24)	(2.21)
FixedProportion	0.447	-0.186	0.343***	0.135	0.410	-0.189	0.338***	0.133
	(1.50)	(-0.74)	(3.24)	(1.39)	(1.38)	(-0.75)	(3.25)	(1.37)
ROA	-0.252***	-0.017	-0.127***	-0.028	-0.244***	-0.010	-0.128***	-0.027
	(-2.87)	(-0.16)	(-2.74)	(-0.69)	(-2.90)	(-0.09)	(-2.74)	(-0.67)
Market-to-Book	-0.012	-0.021***	-0.002	0.002	-0.013	-0.021***	-0.002	0.001
	(-1.65)	(-3.16)	(-1.11)	(0.80)	(-1.63)	(-3.21)	(-1.25)	(0.67)
Z-Score	0.003	-0.143***	0.001	-0.025*	0.003	-0.144***	0.001	-0.026*
	(1.42)	(-8.48)	(0.60)	(-1.81)	(1.32)	(-8.50)	(0.56)	(-1.81)
Firm FE	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X
N	333	799	555	1053	333	799	555	1,053
R^2	0.577	0.639	0.400	0.327	0.573	0.638	0.400	0.324

6.3 Further Analysis

The results of the two methods point in the same direction. Firms seem to have lower financial leverage when unionization rates are high, and they also tend to have lower debt-to-capital ratios prior to reaching agreements with the union. These results are overall significant, both economically and statistically. Furthermore, our robustness tests show that the results are not very vulnerable to changes in specification, as the coefficients remain negative (with the exception of column 5 in Table 7) and roughly at the same level, albeit not in all cases as statistically significant as the main results.

The profit variability term and its interaction term with the unionization rates in the first approach and the agreement dummies in the second approach are not significant in any of the regressions, suggesting that they do not help to explain the capital structure of Swedish firms. This lack of significance also suggests that there are no clear differences in the relationship between labor bargaining power and capital structure depending on the level of profit variability. However, the fact that they do not change the coefficient of the main variable considerably could be seen as a sign of robustness for the original specification.

The results contradict those obtained in many U.S. studies (e.g. Bronars and Deere 1991; Perotti and Spier 1993; Matsa 2010). They are also in contrast with the predictions from the first model presented in the Appendix A, where the possibility to renegotiate debt was disregarded. Instead, the results suggest that Swedish companies do not increase their debt strategically in order to enhance their bargaining power toward organized labor.

The results are, however, in line with the recent findings of Simintzi et al. (2010). When explaining their results, Simintzi et al. (2010) first point to the fact that the theoretical models that predict a strategic use of debt to enhance bargaining positions rely on a number of crucial assumptions that may not be entirely realistic.

One of the assumptions that is clearly violated in a Swedish setting is that debt claims always have seniority over labor claims in case of liquidation. This is in fact not true in Sweden, as employees are prioritized in the event of bankruptcy. This assumption is also crucial since it leads to another assumption; that employees are severely hit by default and therefore lower their wage demands in order to avoid bankruptcy. In the model, their alternative wage is therefore assumed to be zero. As described in the section on institutional setting, this is clearly not the case in Sweden, where the government guarantees the employees the wages that the defaulted firm was obligated to pay, and where employees after their employment is terminated can get unemployment benefits covering up to 80 percent of their previous wage (although with certain upper limits) for 300 days. Of course, losing your job still causes large social and economic difficulties (Berk et al. 2010), but the negative consequences could still be less severe in Sweden than what is assumed in most models.

Another fundamental assumption of these models, which is not discussed by Simintzi et al. (2010), is that negotiations are conducted between the firm and its employees. In Sweden, however, negotiations are

instead mainly conducted on a more centralized industry level. As the unions look at the financial state of an entire industry rather than that of an individual firm, there might be a free rider problem, as firms would have to coordinate their efforts to be able to use increased financial leverage strategically. Although it might be in the interest of the firms to do so, such coordination is likely to be difficult to achieve in reality. Because higher financial leverage comes at the cost of a higher risk of financial distress, firms would be hesitant to increase their debt levels if not sure that other firms would do the same so that the joint effort could actually have an effect on their collective bargaining position. This potential coordination problem would likely make increased financial leverage even less viable as a strategic tool to enhance bargaining positions toward organized labor.

These violations of the model could help explain why we do not see the same positive relationship between labor bargaining power and financial leverage in our empirical study. They do not, however, clearly explain why the relationship is actually the opposite. Simintzi et al. (2010) suggest that the negative relationship that they find could be explained by the fact that high levels of labor bargaining power lead to a higher operating leverage, which crowds out financial leverage. Chen et al. (2009) have also shown this relationship between unionization rates and operating leverage empirically using American data.

This crowding out effect could be a plausible explanation for our findings from both the first and the second method. If higher labor bargaining power (as measured by the unionization rate proxy) increases the operating leverage of a firm it would make sense to lower the financial leverage in order to balance total risk. This is especially true if the possibility to use debt strategically to enhance the firm's bargaining position towards organized labor is limited anyway, as argued above.

That higher bargaining power increases the operating risk also in Sweden seems sensible for a number of reasons. Although the firm may be able to more flexibly choose which employees to lay off by negotiating with the local branch of the labor union rather than by following the "last in first out" rule stated in the law,[15] the unions would normally demand compensation for the laid-off workers in excess of what is otherwise regulated to approve these layoffs, making them more costly. Furthermore, it seems likely that job actions such as strikes have a more severe impact on the firm's operations when the union is strong, since a larger proportion of employees might participate and the duration could be longer due to a better financial position of the union. Finally, firms may also be more hesitant to undertake large restructurings, such as closing down factories, if the unions are strong, as these decisions might then face a stronger opposition, which could have a negative affect both on the employee morale and on the company's reputation. For these reasons, it seems likely that operating risk increases with unionization.

As for the second method, it seems reasonable that both labor bargaining power and operating risk increases during periods when a collective agreement expires, as labor unions regain their right to job ac-

[15] § 22 in the Swedish law *Lag om anställningsskydd* states that employees with short tenure should be made redundant first in case of layoffs. § 2 of the same law states that this rule can be circumvented by negotiating with the union if the company is covered by a collective agreement.

tions such as strikes. If debt lacks the strategic implications emphasized in many papers, it would make sense for any individual firm to lower the financial leverage prior to negotiations, which our results suggest that they do. When the new agreement is signed and the labor unions have again committed to maintain industry peace, it would also make sense for firms to revert their financial leverage to the pre-negotiation levels. As the coefficients for the two quarters after reaching a new agreement are positive, although close to zero and statistically weak, the possibility of such a reversal cannot be ruled out.

In summary, the results suggest that there is a negative relationship between labor bargaining power and financial leverage. We argue that there are two main reasons for this. The first is that debt is inefficient as a strategic tool to enhance bargaining positions toward organized labor in Sweden, as competitors would have to coordinate their efforts in order for financial leverage to have an impact on the outcome of negotiations. Such coordination is unlikely to occur. Furthermore, using debt to increase the threat of bankruptcy in order to bargain for wage concessions should be less efficient if the workers are not as badly hurt in case of bankruptcy as is assumed by the model. The other reason, which could explain why the relationship is actually negative, is that firms may want to decrease their financial leverage in the face of higher labor bargaining power, since the latter arguably increases operating risk.

6.4 Problematization

There are two potential concerns with using industry unionization rates as our independent variable. First, as with all proxies, one can never be sure that it accurately captures what it is supposed to capture, which, in this case, is labor bargaining power. The second concern is regarding the fact that the unionization rates are aggregated at an industry level.

The use of a proxy is inevitable as labor bargaining power is essentially unobservable. Unionization rates are commonly used in previous literature as a proxy for labor bargaining power. Furthermore, we argue that it is a good proxy for a number of reasons. First of all, union activity is likely to be higher where unionization rates are high. If a larger proportion of employees are members of the union, the company may also be more reluctant to deny union demands as this could have a more negative impact on employee morale. Furthermore, if a large proportion of employees are organized, the threat of job actions such as strikes may be more credible for several reasons. One is that the labor unions may be more likely to take job actions such as strikes against a company if the company's proportion of unionized employees is high, as the job actions would be less likely to fail due to low participation. Another is that unions with high membership figures are likely to be in a better financial position to support the striking members financially, which could make the job actions more severe as their duration could potentially be longer. To the extent that the employers take these threats more seriously and concede to union demands, labor bargaining power could be seen as higher.

Secondly, the fact that the unionization rates are on an industry level is an obvious source of measurement error, as we would ideally have liked to use unionization rates on a firm level. This higher level of aggrega-

tion may weaken the results as there is less variation in the independent variable, but there is no reason to believe that it should bias the results in one way or another. The use of industry unionization rates rather than firm levels should also be less problematic in Sweden, as negotiations are to a large extent conducted on an industry-wide level.

Another potential source of concern is that of endogeneity stemming from the fact that there might be an omitted variable that affects both the unionization rates and the debt-to-capital ratio. As mentioned in section 5, there is a possibility that unions may be more likely to organize in mature, profitable industries, which potentially also have an inherently higher capacity for financial leverage. However, the fact that a negative relationship between unionization and financial leverage is found, even though there is a possibility of an omitted variable which is likely to be pulling in the opposite direction, should make us somewhat more confident that the relationship is indeed negative.

Even so, we try to somewhat overcome this endogeneity problem by employing a second method. As mentioned earlier, it seems less likely that there is an omitted variable which affects both the capital structure of a firm and the date at which a collective agreement is reached. As this method does not include unionization rates, but rather uses collective agreements as a source of exogenous change in labor bargaining power, it also lacks the other concerns mentioned above. One can, however, never be entirely sure that endogeneity is not present.

7. Conclusion

This study aims to examine whether or not there is a relationship between labor bargaining power and the capital structure decision of Swedish listed companies, using industry level unionization rates as a proxy for labor bargaining power. It also aims to study if Swedish firms tend to alter their capital structure in connection with negotiations with the union, as labor bargaining power could be seen as particularly high during periods of negotiation. For this second approach, dummies assigned to the quarters during which agreements were reached, as well as the two quarters before and after, are used.

The first approach shows a negative relationship between unionization rates and the debt-to-capital ratios of the studied companies. Furthermore, the results from the second approach suggest that firms have lower financial leverage during the two quarters prior to signing collective agreements with the union, which is in line with the results from the first method.

We argue that the institutional setting in Sweden makes debt inefficient as a strategic tool to enhance bargaining position. The first reason is that workers may be less willing to accept wage concessions to avoid bankruptcy as the economic consequences of unemployment may be less severe than assumed in most bargaining models, because of the government wage guarantee and the relatively extensive unemployment benefit schemes. The second reason is that wage demands are mainly based on the financial state of an entire industry, rather than the financial state of an individual firm. This could lead to a free rider problem as companies would have to coordinate their efforts to increase financial leverage in order for it to have an effect on the outcome of negotiations.

The negative relationship found could instead, at least in part, be explained by a crowding out effect where high levels of labor bargaining power increases the operating leverage of a firm, thus leading firms to lower financial leverage to balance total risk. Also, the fact that firms have lower financial leverage before reaching collective agreements points towards this, as the labor bargaining power, as well as operating risk, could be seen as particularly high when an agreement expires and workers are no longer obligated to maintain industrial peace.

The results of this study differ from most research conducted in the United States. This implies that differences in institutional settings could have a profound effect on the relationship between labor bargaining power and firm capital structure. The results are likely to be relevant for other countries with a similar institutional setting to that of Sweden. One should, however, be wary of predicting whether or not the results of this study hold in other countries. Future research conducted in other countries could therefore be a valuable contribution to this body of research.

References

Abowd, John M. (1989) "The Effect of Wage Bargains on the Stock Market Value of the Firm", *The American Economic Review*, Vol. 79 (4), pp. 774-800.

Arbetsförmedlingen (2012) "Faktablad för arbetssökande januari 2012". Available from: http://www.arbetsformedlingen.se/download/18.4b7cba481279b57bec180002294/job_sok.pdf [Accessed 2012-05-20].

Arbetslöshetskassornas Samorganisation (2012) "Bra att veta om arbetslöshetsförsäkringen". Available from: http://www.samorg.org/so/filer.aspx?typ=dokument&id=-16346561211692 [Accessed 2012-05-20].

Berk, Jonathan B., Richard Stanton and Josef Zechner (2010) "Human Capital, Bankruptcy, and Capital Structure", *The Journal of Finance,* Vol. 65 (3), pp.891-926.

Biörck, Jonas and Axel Lagercrantz (2011) "The Determinants of Capital Structure". Unpublished Thesis (BSc), Stockholm School of Economics.

Björkman, Hans (2005) "Learning from members. Tools for strategic positioning and service innovation in trade unions". Doctoral dissertation, Stockholm School of Economics, pp. 9-10.

Bronars, Stephen G. and Donald R. Deere (1991) "The Threat of Unionization, the Use of Debt, and the Preservation of Shareholder Wealth", *The Quarterly Journal of Economics*, Vol. 106 (1), pp. 231-254.

Cavanaugh, Joseph K. and John Garen (1997) "Unionization and the Firm's Use of Debt", *Managerial and Decision Economics*, Vol. 18 (3), pp. 255-269.

Chen, Huafeng (Jason), Marcin Kacperczyk and Hernán Ortiz-Molina (2009) "Labor Unions, Operating Flexibility, and the Cost of Equity", working paper, University of British Columbia, January.

Dasgupta, Sudipto and Kunal Sengupta (1993) "Sunk Investment, Bargaining and Choice of Capital Structure", *International Economic Review*, Vol. 34 (1), pp. 203-220.

Facken inom industrin (2011) "Avsiktsförklaring". Available from: http://www.fackeninomindustrin.se/home/fi2/home.nsf/unidView/298210199E1E97EEC125782A0050247F [Accessed 2012-05-19].

Graham, John R. and Campbell R. Harvey (2001) "The theory and practice of corporate finance: evidence from the field", *Journal of Financial Economics*, Vol. 60, pp. 187-243.

Harris, Milton and Artur Raviv (1991) "The Theory of Capital Structure", *The Journal of Finance*, Vol. 46 (1), pp. 297-355.

Hennessy, Christopher A. and Dmitry Livdan (2009) "Debt, bargaining, and credibility in firm-supplier relationships", *Journal of Financial Economics*, Vol. 93, pp. 382-389.

Idling, Lillemor and Wallberg, Peter (2010) "Äldre och förmögna lämnade a-kassan" Dagens Nyheter. Available from: http://www.dn.se/ekonomi/aldre-och-formogna-lamnade-a-kassan [Accessed 2012-05-19].

Industrirådet (2011) "Industriavtalet: Industrins samarbetsavtal och förhandlingsavtal". Available from: http://www.industriradet.se/home/ik2/res.nsf/vRes/ik_1281698172484_industriavtalet_pdf/$File/Indstriavtalet.pdf [Accessed 2012-05-19].

Inspektionen för arbetslöhetsförsäkringen (2012) ”Förteckning över arbetslöshetskassor”. Available from: www.iaf.se/Fakta/Forteckning-over-arbetsloshetskassor/ [Accessed 2012-05-18].

LO (n.d.) ”Kort om LO”. Available from: http://lo.se/home/lo/home.nsf/unidView/D7C1C105931B2A83C1256E510048E873 [Accessed 2012-05-18].

LO (2011) “LOs styrelse beslutade om inkomstförsäkring vid arbetslöshet”. Available from: http://www.lo.se/home/lo/home.nsf/unidView/328F2E651A7B0A9AC125729C00577EBF [Accessed 2912-05-20].

Lundh, Christer (2008) ”Arbetsmarknadens karteller”. Stockholm: Norstedts akademiska förlag.

Lönnaeus, Olle (2006) ”’Bråkmakarna’ i Malmö splittrar SAC” *Sydsvenskan*. Available from: http://www.sydsvenskan.se/sverige/brakmakarna-i-malmo-splittrar-sac/ [Accessed 2012-05-18].

Magnusson, Lars (2006) “Håller den svenska modellen? Arbete och välfärd i en global värld”. Stockholm: Norstedts akademiska förlag.

Matsa, David A. (2010) “Capital Structure as a Strategic Variable: Evidence from Collective Bargaining”, *The Journal of Finance*, Vol. 65 (3), pp. 1197-1232.

Medlingsinstitutet (2005) ”Avtalsrörelsen och lönebildningen 2005”.

Medlingsinstitutet (2006) ”Avtalsrörelsen och lönebildningen 2006”.

Medlingsinstitutet (2007) ”Avtalsrörelsen och lönebildningen 2007”.

Medlingsinstitutet (2008) ”Avtalsrörelsen och lönebildningen 2008”.

Medlingsinstitutet (2009) ”Avtalsrörelsen och lönebildningen 2009”.

Medlingsinstitutet (2010) ”Avtalsrörelsen och lönebildningen 2010”.

Medlingsinstitutet (2011) “Avtalsrörelsen och lönebildningen 2011”.

Meidner, Rudolf and Berndt Öhman (1972) ”Solidarisk lönepolitik”. Stockholm: Tidens Förlag.

NASDAQ OMX Group (2012) ”Changes to the list”. Available from: http://nordic.nasdaqomxtrader.com/newsstatistics/corporateactions/Stockholm/Changes_to_the_List/ [Accessed 2012-05-18].

NASDAQ OMX Group (2012) “The Nordic List”. Available from: http://www.nasdaqomxnordic.com/digitalAssets/77/77417_thenordiclistjan22012.xls [Accessed 2012-05-20].

Nash, John (1953) “Two-Person Cooperative Games”, *Econometrica*, Vol. 21 (1), pp. 128-140.

Nationalencyklopedin (n.d.) “Avtalsförhandling”. Available from: http://www.ne.se/avtalsförhandling [Accessed 2012-05-18].

Nationalencyklopedin (n.d.) ”Fackliga stridsåtgärder”. Available from: http://www.ne.se/fackliga-stridsåtgärder [Accessed 2012-05-18].

Nationalencyklopedin (n.d.) "Löneglidning". Available from: http://www.ne.se/löneglidning [Accessed 2012-05-18].

Perotti, Enrico C. and Kathryn E. Spier (1993) "Capital Structure as a Bargaining Tool: The Role of Leverage in Contract Renegotiation", *The American Economic Review*, Vol. 83 (5), pp. 1131-1141.

Rajan, Raghuram G. and Luigi Zingales (1995) "What Do We Know about Capital Structure? Some Evidence from International Data", *The Journal of Finance*, Vol. 50 (5), pp. 1421-1460.

Sarig, Oded H. (1998) "The effect of leverage on bargaining with a corporation", *The Financial Review*, Vol. 33, pp. 1-16.

SFS 1970:979 "Förmånsrättslag", Justitiedepartementet.

SFS 1982:80 "Lag om anställningsskydd", Arbetsmarknadsdepartementet.

Simintzi, Elena, Vikrant Vig and Paolo Volpin (2010) "Labor and Capital: Is Debt a Bargaining Tool?", working paper, London Business School, October.

Statistics Sweden (2010) "AKU Grundtabeller år 2009". Available from: http://www.scb.se/Pages/PublishingCalendarViewInfo____259923.aspx?PublObjId=11665 [Accessed 2012-05-19]

Statistics Sweden (2011) "Tjänstemän inom den privata sektorn har den högsta genomsnittliga månadslönen". Available from http://www.scb.se/Pages/PressRelease____314918.aspx [Accessed 2012-05-20]

Statistics Sweden (2012) "Labour Force Survey". Available from: http://www.scb.se/Pages/Product____23276.aspx [Accessed 2012-05-19].

Sundén Jelmini, Maria and Lena Hennel (2012) "Sverige faller i trygghetsligan" *Svenska Dagbladet*, May 21, pp.6-7.

Svenskt Näringsliv (n.d.) "Så föddes Svenskt Näringsliv". Available from: http://www.svensktnaringsliv.se/om_oss/sa-foddes-svenskt-naringsliv_9758.html [Accessed 2012-05-20].

Svenskt Näringsliv (2011) "Avtalsrörelse-ABC" [Online video]. Available from: http://www.svensktnaringsliv.se/fragor/avtalsrorelsen2011_2012/avtalsrorelsens-abc_139152.html [Accessed 2012-05-19]

Sveriges Akademikers Centralorganisation (n.d.) "About SACO". Available from: http://www.saco.se/en/About-Saco/ [Accessed 2012-05-18].

Sveriges Riksbank (2012) "Monetary Policy Report". Stockholm, February 2012.

TCO (n.d.) "Detta är TCO". Available from: http://www.tco.se/Templates/Page2____668.aspx [Accessed 2012-05-18].

Unionen (n.d.) "Bättre villkor 1 januari 2012". Available from: http://www.unionen.se/Templates/Article____64703.aspx [Accessed 2012-05-12].

Venn, Danielle (2009) "Legislation, collective bargaining and enforcement: Updating the OECD Employment protection indicators", working paper, OECD.

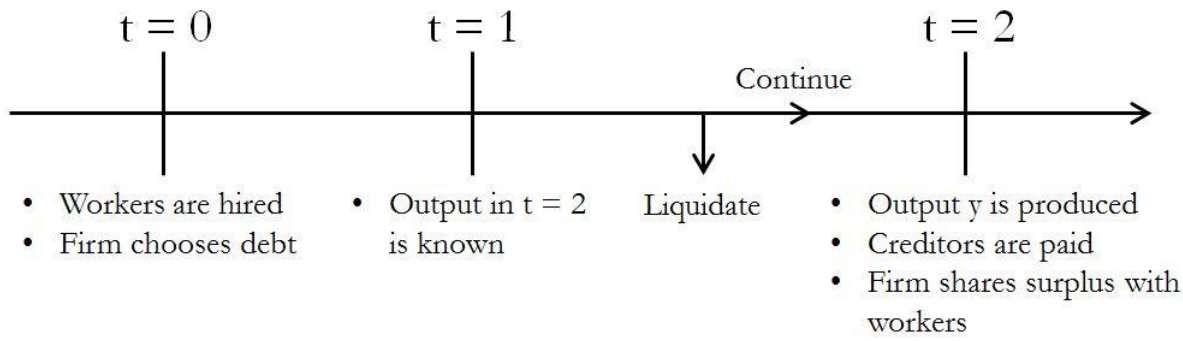
Appendix A – Bargaining Models

Setup and timeline

In this framework, it is assumed that an all-equity firm with risk neutral[16] shareholders negotiates with its employees, who are assumed to be risk neutral as well. The model also includes risk neutral creditors, which offer the shareholders the opportunity of a debt-for-equity swap.

Figure A1
Timeline

The figure shows the setup of the theoretical model described in this section. At t = 1, the shareholders choose whether to continue operations or to liquidate the firm.



The framework consists of three periods, as illustrated in Figure A1. The variables used in the models are presented in Table A1. In the first period (t = 0), the firm hires workers and chooses how much debt it wants to issue. The shareholders (or managers working on their behalf) promise the workers a wage W, which can be (re)negotiated in period t = 1. The face value of debt is denoted by $D \in [0, \overline{D}]$ (that is, debt cannot be negative in this model, and it has a theoretical upper boundary of $\overline{D}$). The firm receives this debt in the first period, and the creditors are assumed to be competitive and require a gross return R, which is normalized to 1 (i.e. a net return of zero). The money received from issuing the debt is paid out to shareholders either as a special dividend or through a share repurchase (hence the term debt-for-equity swap). Besides this recapitalization, the use of debt financing leads to both benefits and costs for the firm; on the one hand, it generates a tax shield of $B(D)$, since interest expenses are tax deductible. On the other hand, the debt leads to a loss of value for the firm in case of liquidation, if the liquidation value is lower than what would be obtained if continuing operations.

[16] A risk neutral person only cares about the expected payoff, but not the volatility.

Table A1
Variable Definitions

The table shows the variables used in the theory section.

Variable	Description
F	The total assets of the firm
D	The face value of any issued debt
R	The gross return demanded by creditors
Y	The firm's output
τ	The marginal corporate tax rate
$B(D)$	The benefit of tax shields
L	The value from liquidation of the firm
$C(D)$	The cost of debt
α	The labor bargaining power
W	The wage of the workers

The value of the tax shields can be expressed as:

$$B(D) = \tau * \min[y, D]$$

where τ is the firm's marginal tax rate, and y is the output that the firm produces in the third period (t = 2), which is distributed uniformly within the interval $[0, \bar{Y}]$. This definition of the benefit of the tax shield states that either the firm's output or the amount to pay creditors sets the maximum amount that the firm can deduct from taxation.

The expression for the cost of debt is:

$$C(D) = y - L \; for \; any \; y \geq L$$

where L is the liquidation value of the firm. The reason is that when the value of the firm's output is greater than that of liquidation, it would have been more efficient to continue the operations. This inefficiency occurs when the firm is unable to meet its debt obligations ($y < D$) and is declared bankrupt.

In the second period (t = 1), all parties (i.e. shareholders, workers, and creditors) are informed of the value of the firm's output y, after which they decide if they want to liquidate the firm or continue operations. If $y \geq D$, the shareholders and employees will engage in negotiations regarding labor compensation W. These negotiations are assumed to result in a cooperative Nash bargaining solution (Nash, 1953) that depends on the labor bargaining power α, which is distributed between 0 and 1. Thus, the employees receive the following fraction of the surplus:

$$W = \alpha[y - D]$$

while the shareholders receive the remainder:

$$(1-\alpha)[y-D]$$

If negotiations fail or, as previously mentioned, the output y is less than the face value of debt, the firm is liquidated instead and the creditors receive L.

In the final period (t = 2), creditors are paid what they have been promised, and the firm shares any additional surplus with the employees, given that the negotiations in the previous period succeeded. In case of failed negotiations, or if y is less than D, the firm is liquidated, creditors are paid the liquidation value L, and the firm's shareholders and its employees receive nothing.

Non-negotiable debt

In order to see how labor bargaining power affects the optimal level of debt when debt is assumed to be non-negotiable,[17] we work through the model backwards, starting in period t = 2. Given that the firm produces an output larger than the face value of debt, and that labor negotiations succeed, the creditors receive D, the employees receive W, and the shareholders receive the remaining after-tax profits of $(1-\tau)(y-D-W)$ as a dividend. Again, if y is less than D or if the negotiations between the firm and its employees fail, the firm is liquidated and creditors receive the liquidation value L, while shareholders and employees get nothing.

Moving back in time to period t = 1, shareholders will bargain with employees as long as the output y is larger than D. They are both incentivized to do so, and to reach an agreement, since their alternative payoffs are assumed to be zero if negotiations fail. These negotiations will result in the aforementioned Nash bargaining solution where workers receive $W=\alpha[y-D]$ and the shareholders receive the remaining $(1-\alpha)[y-D]$.

In the first period, t = 0, the firm makes its financing decision by choosing the debt level that maximizes the firm value, as both the value of equity and debt at t = 0 will accrue to shareholders (the latter in the form of the debt-for-equity swap). In their best interest, the shareholder will, according to Simintzi et al. (2010), maximize the following expression:

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

The first parenthesis shows the market value of debt; it consists of the liquidation value L (in case $y<D$) and the difference between face value and liquidation value when the firm's output is larger than D. The second term shows the market value of equity, i.e. the after-tax proceeds after paying employees and creditors. This occurs when the firm's output is larger than D and labor negotiations succeed so that the firm continues its operations.

[17] Non-negotiable debt means that creditors are either paid in full or the company is liquidated, after which they are paid L.

Simintzi et al. (2010) proceed to show that the marginal benefit of debt is

$$[\tau + \alpha(1-\tau)](\bar{Y} - D)$$

whereas the marginal cost is $D - L$. Since the benefit is strictly increasing in labor bargaining power α, while the marginal cost is unaffected by α, Simintzi et al. (2010) reach the following conclusion:

Conclusion 1: The optimal choice of debt is strictly increasing in labor bargaining power when debt is non-negotiable.[18]

Negotiable debt

As briefly mentioned in the previous section, the positive relationship between labor bargaining power and the optimal level of debt relies on the underlying assumption that the creditors will not renegotiate the debt. That is, up until now, they either received the full face value of debt, or the liquidation value. In reality, however, creditors may be willing to renegotiate the debt whenever the firm's output y is between the liquidation value L and the original face value of the debt D, i.e. when $y \in [L, D]$. Although they will not get the full face value when writing down the debt, they would still get more than the liquidation value. This is done by negotiating with the workers to split the surplus $y - L$. The workers are assumed to have the same bargaining power as before and thus receive $W = \alpha(y - L)$, while creditors receive the liquidation value plus their share of the surplus, which totals $L + (1 - \alpha)(y - L)$. This is clearly in the interest of both parties, as creditors would otherwise receive L, whereas workers would not get anything at all.

In addition to the different payoffs for creditors and workers, the introduction of debt renegotiation also affects the negotiations between employees and shareholders. The workers' bargaining position is enhanced since they now have an outside option. For negotiations to succeed when debt is renegotiable, the surplus $y - D$ must be bigger than the workers' outside option. This difference, S, must be larger than zero, which can be written as:

$$S = [y - D - \alpha(y - L)] \geq 0$$

This condition states that whenever $y - D < \alpha(y - L)$ it would be more beneficial for workers to negotiate with creditors than with the firm, even if they would receive get the entire surplus from negotiations with the firm, i.e. $y - D$. By rearranging the condition, we can see that the lowest level of output at which an agreement between shareholders and workers could be met is:

$$\hat{y} \equiv \frac{D - \alpha L}{1 - \alpha}$$

[18] The optimal level of debt is denoted by D_α^* and is shown to be equal to $D_\alpha^* = \frac{L + [r + \alpha(1-\tau)]\bar{Y}}{1 + \tau + \alpha(1-\tau)}$.

Because of these higher demands from workers, the firm will default on its debt (and hence not repay the face value D) even when $y \in [D, \hat{y}]$. This is because workers will find it more attractive to negotiate with the creditors than with shareholders within this interval, as their payoffs from the negotiation will be better. Therefore, depending on the output, the workers will receive one of the following wages:

$$W = \alpha(y - L) \; when \; y \in [D, \hat{y}]$$

$$W = \alpha(y - L) + \alpha S \; when \; y \geq \hat{y}$$

In this scenario, Simintzi et al. (2010) write the expression for the firm value that would be in the interest of shareholders to maximize as:

$$\max_{D} \left[L + (1 - \alpha) \int_{L}^{\hat{y}} \frac{y - L}{\bar{Y}} dy + \int_{\hat{y}}^{\bar{Y}} \frac{D - L}{\bar{Y}} dy \right] + (1 - \tau) \int_{\hat{y}}^{\bar{Y}} \frac{(1 - \alpha)[y - D - \alpha(y - L)]}{\bar{Y}} dy$$

This expression is similar to the expression for firm value presented above. The square bracket is the market value of debt, which is now divided into three separate parts. The variable L is, as before, the value that creditors receive in case of liquidation. The second term is the value (in excess of L) received whenever the output of the firm is between L and $\hat{y}$, under which circumstances creditors renegotiate the debt and split the surplus with the workers, who threaten to leave the firm and thereby receive a fraction α of the surplus $y - L$, leaving the creditors with the remainder.

The last term within the square bracket shows the additional value when the output exceeds the cutoff value at which workers negotiate with the shareholders instead. When this happens, creditors will receive the full face value of debt. The term after the square brackets still constitutes the market value of equity, which is the after-tax payoff that shareholders receive after paying the workers. Note that the numerator is the fraction of the surplus S that the shareholders get. The equity will only have a value above zero when the output is above the cutoff value $\hat{y}$, at which workers choose to negotiate with shareholders instead of creditors, and is always less than when renegotiation was not allowed even when the output is greater than this cutoff. Therefore, the value of equity is strictly lower when the possibility of renegotiation is included in the model. The reason is that workers have an overall stronger bargaining position when they have an outside option, and they therefore extract a larger proportion of the firm value.

Under these revised assumptions, Simintzi et al. (2010) reach a different conclusion, where, using the first order conditions of the expression above, the optimal level of debt can be written as:

$$D_{\alpha}^{*} = \bar{Y}(1 - \alpha) + \alpha L$$

Since $\bar{Y}$ is larger than L, a higher labor bargaining power, α, increases the optimal level of debt. The following conclusion is therefore reached:

Conclusion 2: The optimal level of debt is strictly decreasing in labor bargaining power α when debt is renegotiable.

This conclusion is opposite to the conclusion reached earlier. Intuitively, this is because the ability to re-negotiate debt no longer makes it inefficient. As workers' alternative wage in the case of default is no longer zero, they will not lower their demands when debt levels are high as they did when debt was non-negotiable and creditors were either paid in full or drove the firm into liquidation.

It would still be in the interest of the firm to have a high level of debt to maximize the tax shields, but the firm would be hesitant to do so if labor bargaining power is high, since workers would in this case be able to extract a larger fraction of the output.

Finally, Simintzi et al. (2010) also point out that since the optimal level of debt is predicted to affect the amount of debt that is actually used in the debt-for-equity swap, the relationships in the two settings hold for measures of financial leverage as well.

Appendix B – Procedures for Assigning SNI Codes

When assigning SNI codes, the following procedure is used. The SNI code for the company at the highest level of the corporate group structure is chosen, and in the case of multiple industry codes, the first code listed for that company is chosen as the codes are, according to Affärsdata as well as Statistics Sweden, ranked in order of relevance. When there are several companies on the same level, the one with the highest net sales for the last reported year is chosen.

Codes that are clearly of an administrative nature and thus not representative of the operations of the group are ignored, and the code next in order is chosen instead. If the company only has such an administrative code, we move down to the next level in the corporate group structure and choose a code according to the rules listed above.[19]

In some cases, we have to deviate further from our rules. This is done when (i) codes are lacking entirely (which is especially true for delisted companies), (ii) the otherwise neglected administrative codes seem appropriate or (iii) when the results seem obviously inappropriate due to common knowledge about the firm's operations.[20] It is of course slightly problematic to have to rely too much on personal judgment, but this has to be weighed against the fact that following specified rules in some cases clearly leads to incorrect results. Furthermore, this is in most cases not an issue, especially since we only make use of two-digit SNI codes, often making the choice of the most detailed five-digit SNI code irrelevant for the study.

Finally, as the Swedish industry classification standard changed from SNI 2002 to SNI 2007 in 2009, the SNI codes are also translated into the corresponding SNI 2002 codes using a conversion tool found on Statistics Sweden's homepage. On a two-digit level, the choice of industry code for the pre-2009 period is unambiguous in most cases. However, for a few companies, a bit of judgment is again used.[21]

[19] The codes that are considered to be unsuitable are 64201 (Activities of financial holding companies), 64920 (Other credit granting), 68201 (Renting and operating of own or leased dwellings), 68202 (Renting and operating of own or leased industrial premises), 70100 (Activities of head offices), and 70220 (Business and other management consultancy activities).

[20] These companies are (with the chosen two-digit SNI code in parentheses): Acando AB (70), ACAP Invest AB (70), Ainax AB (29), Alliance Oil Company (06), Audiodev AB (26), Black Earth Farming Ltd. (01), BTS Group AB (70), Byggmax Group AB (47), Cybercom Group Europe AB (62), Doro AB (26), Ework Scandinavia AB (74), G & L Beijer AB (46), Holmen AB (17), Klippans Finpappersbruk AB (17), Lindex AB (47), Lundbergföretagen AB (68), Medicover Holding S.A. (86), Novacast Technologies AB (58), PA Resources AB (06), Resco AB (74), Sandvik AB (25), SAS AB (51), SCA AB (17), ScanMining AB (07), Svithoid Tankers AB (50), Tanganyika Oil Company Ltd. (06), Telelogic AB (62), Teligent AB (62), Unibet Group Plc. (92), Vostok Gas Ltd. (06), and Vostok Nafta Investment Ltd. SDB (06).

[21] When there are multiple codes, the one that has the same description as the SNI 2007 code is chosen. This only leaves the following companies where we have to decide which code that seems the most appropriate (with the chosen SNI 2002 code in parentheses): Consilium AB (33), Micronic Mydata AB (30), and Securitas Direct AB (45).

Appendix C – Additional Figures and Tables

Figure C1
Timing of Collective Agreements

The figure shows the years and quarters during which collective agreements for different industries were reached. The industries are shown on a two-digit SNI 2007 code level.

	Time																											
	2005				2006				2007				2008				2009				2010				2011			
SNI Code	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1										X												X						
7										X											X							X
10										X											X							X
13										X												X						
17										X												X						X
20									X												X							X
22, 24-30, 32									X												X							X
41-43				X						X								X				X						
46									X												X							
47									X													X						
55-56										X												X						
62									X												X							
65					X												X								X			
68										X												X						
86										X													X					

Table C1
SNI 2002 Codes

SNI 2002 is divided into 62 groups on a two digit level, of which 41 are represented in our dataset. The table presents these SNI 2002 codes, their explanations, the number of companies as well as the fraction of the number of total companies. In the rightmost column, the average unionization rate of each industry for the period 2005-2008 is presented.

SNI 2002 code	Description	Number of Companies	Fraction of total companies	Mean unionization rate 2005-2008
1	Agriculture, hunting and related service activities	1	0.4%	43.0%
11	Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction excluding surveying	5	1.8%	39.2%
13	Mining of metal ores	3	1.1%	96.7%
15	Manufacture of food products and beverages	3	1.1%	71.4%
16	Manufacture of tobacco products	1	0.4%	100.0%
17	Manufacture of textiles	1	0.4%	78.5%
21	Manufacture of pulp, paper and paper products	5	1.8%	90.5%
22	Publishing, printing and reproduction of recorded media	5	1.8%	65.4%

24	Manufacture of chemicals and chemical products	4	1.4%	78.4%
25	Manufacture of rubber and plastic products	5	1.8%	74.9%
26	Manufacture of other non-metallic mineral products	1	0.4%	80.2%
27	Manufacture of basic metals	3	1.1%	91.7%
28	Manufacture of fabricated metal products, except machinery and equipment	5	1.8%	77.1%
29	Manufacture of machinery and equipment n.e.c.	13	4.7%	82.4%
30	Manufacture of office machinery and computers	2	0.7%	70.0%
31	Manufacture of electrical machinery and apparatus n.e.c.	6	2.2%	82.1%
32	Manufacture of radio, television and communication equipment and apparatus	5	1.8%	80.4%
33	Manufacture of medical, precision and optical instruments, watches and clocks	3	1.1%	73.1%
34	Manufacture of motor vehicles, trailers and semi-trailers	6	2.2%	87.6%
35	Manufacture of other transport equipment	2	0.7%	85.4%
36	Manufacture of furniture; manufacturing n.e.c.	5	1.8%	81.1%
45	Construction	8	2.9%	75.4%
50	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel	2	0.7%	61.5%
51	Wholesale trade and commission trade, except of motor vehicles and motorcycles	41	14.8%	58.2%
52	Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods	11	4.0%	55.6%
55	Hotels and restaurants	2	0.7%	42.0%
61	Water transport	3	1.1%	76.6%
62	Air transport	1	0.4%	77.7%
63	Supporting and auxiliary transport activities; activities of travel agencies	1	0.4%	67.4%
64	Post and telecommunications	5	1.8%	75.8%
66	Insurance and pension funding, except compulsory social security	1	0.4%	69.5%
67	Activities auxiliary to financial intermediation	4	1.4%	48.1%
70	Real estate activities	18	6.5%	68.0%
71	Renting of machinery and equipment without operator and of personal and household goods	1	0.4%	57.4%
72	Computer and related activities	39	14.1%	58.9%
73	Research and development	18	6.5%	73.9%
74	Other business activities	28	10.1%	57.5%
80	Education	1	0.4%	83.4%
85	Health and social work	3	1.1%	80.7%
92	Recreational, cultural and sporting activities	5	1.8%	60.6%
93	Other service activities	1	0.4%	55.7%
Total		277	100.0%	

Table C2
SNI 2007 Codes

SNI 2007 is divided into 88 groups on a two digit level, of which 55 are represented in our dataset. The table presents these SNI 2007 codes, their explanations, the number of companies as well as the fraction of the number of total companies. In the rightmost column, the average unionization rate of each industry for the period 2009-2011 is presented. The unionization rate for SNI 2007 code 6 is missing for all years.

SNI 2007 code	Description	Number of Companies	Fraction of total companies	Mean unionization rate 2009-2011
1	Crop and animal production, hunting and related service activities	1	0.4%	33.0%
6	Extraction of crude petroleum and natural gas	4	1.4%	-
7	Mining of metal ores	2	0.7%	93.4%
9	Mining support service activities	2	0.7%	64.4%
10	Manufacture of food products	3	1.1%	64.4%
12	Manufacture of tobacco products	1	0.4%	82.4%
13	Manufacture of textiles	1	0.4%	71.6%
17	Manufacture of paper and paper products	5	1.8%	90.7%
18	Printing and reproduction of recorded media	4	1.4%	64.2%
20	Manufacture of chemicals and chemical products	2	0.7%	79.6%
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	1	0.4%	69.2%
22	Manufacture of rubber and plastic products	5	1.8%	77.4%
23	Manufacture of other non-metallic mineral products	1	0.4%	79.1%
24	Manufacture of basic metals	3	1.1%	89.3%
25	Manufacture of fabricated metal products, except machinery and equipment	5	1.8%	74.1%
26	Manufacture of computer, electronic and optical products	8	2.9%	72.1%
27	Manufacture of electrical equipment	5	1.8%	82.0%
28	Manufacture of machinery and equipment n.e.c.	13	4.7%	83.8%
29	Manufacture of motor vehicles, trailers and semi-trailers	7	2.5%	86.0%
30	Manufacture of other transport equipment	2	0.7%	84.5%
31	Manufacture of furniture	5	1.8%	77.2%
32	Other manufacturing	1	0.4%	71.5%
33	Repair and installation of machinery and equipment	1	0.4%	73.9%
41	Construction of buildings	5	1.8%	70.7%
42	Civil engineering	1	0.4%	82.4%
43	Specialised construction activities	1	0.4%	66.1%
45	Wholesale and retail trade and repair of motor vehicles and motorcycles	2	0.7%	60.7%
46	Wholesale trade, except of motor vehicles and motorcycles	41	14.8%	56.8%
47	Retail trade, except of motor vehicles and motorcycles	11	4.0%	49.7%
50	Water transport	3	1.1%	72.2%
51	Air transport	1	0.4%	72.1%
55	Accommodation	1	0.4%	42.9%

56	Food and beverage service activities	1	0.4%	27.5%
58	Publishing activities	9	3.2%	64.8%
59	Motion picture, video and television programme production, sound recording and music publishing activities	2	0.7%	44.5%
61	Telecommunications	5	1.8%	76.5%
62	Computer programming, consultancy and related activities	30	10.8%	60.5%
63	Information service activities	1	0.4%	58.8%
65	Insurance, reinsurance and pension funding, except compulsory social security	1	0.4%	74.0%
66	Activities auxiliary to financial services and insurance activities	4	1.4%	46.8%
68	Real estate activities	18	6.5%	58.0%
70	Activities of head offices; management consultancy activities	6	2.2%	59.2%
71	Architectural and engineering activities; technical testing and analysis	7	2.5%	67.5%
72	Scientific research and development	19	6.9%	73.3%
73	Advertising and market research	3	1.1%	36.8%
74	Other professional, scientific and technical activities	5	1.8%	43.8%
77	Rental and leasing activities	1	0.4%	46.1%
78	Employment activities	4	1.4%	58.7%
79	Travel agency, tour operator and other reservation service and related activities	1	0.4%	50.4%
80	Security and investigation activities	3	1.1%	54.6%
82	Office administrative, office support and other business support activities	2	0.7%	60.1%
85	Education	1	0.4%	80.3%
86	Human health activities	3	1.1%	80.2%
92	Gambling and betting activities	2	0.7%	45.4%
93	Sports activities and amusement and recreation activities	1	0.4%	44.3%
Total		277	100.0%	

Table C3
Collective Agreements

The table shows the employers' organizations whose collective agreements are included in the second method of the study. As their Swedish names are reported, the second column describes what industries they represent. The third column shows the industry codes to which the employers' organizations were matched.

Employers' organization	**Industry**	**SNI 2007**
FAO – Försäkringsbranschens Arbetsgivareorganisation	Insurance	65
Fastigo – Fastighetsbranschens Arbetsgivarorganisation	Real Estate	68
Föreningen Vårdföretagarna	Health Care	86
Gruvornas Arbetsgivareförbund	Mining	7
Industri- och KemiGruppen	Chemicals	20
IT- & Telekomföretagen	IT	62
Livsmedelsföretagen	Food	10
SLA – Skogs- och Lantarbetsgivareförbundet	Agriculture	1
Svensk Handel	Wholesale	46
Svensk Handel	Retail	47
Sveriges Byggindustrier	Construction	41-43
Sveriges Hotell- och Restaurangföretagare	Hotels and Restaurants	55-56
Sveriges Skogsindustrier	Forestry	17
Teknikarbetsgivarna	Technology	22, 24-30, 32
TEKO Sveriges Textil och Modeföretag	Textile	13

Table C4
Standard Deviations of Financial Leverage

The table shows the standard deviation in the debt-to-capital ratio using both market and book values of equity. Column 1 shows the standard deviation for the entire dataset, whereas column 2 and 3 show the standard deviations at an industry and firm level, respectively.

		(1)	(2)	(3)
Variable	Mean	Standard Deviation	Standard Deviation	Standard Deviation
Market Debt to Capital	0.209	0.215	0.157	0.091
Book Debt to Capital	0.291	0.249	0.197	0.099

Table C5
White and Breusch-Pagan Tests for Heteroskedasticity

The table shows the results from a White test and a Breusch-Pagan test, respectively. The tests were conducted after regressing the debt-to-capital ratio (using market values of equity) on unionization rates and including year fixed effects and all financial controls described in the methodology section. The profit variability measure, its interaction term with unionization and firm fixed effects were not included. The p-value shows the lowest significance level at which the null hypothesis of homoskedasticity can be rejected.

	White Test			Breusch-Pagan Test	
Source	Chi-squared	df	P	Chi-squared	P
Heteroskedasticity	342.67	62	0.000	129.49	0.000
Skewness	98.28	11	0.000		
Kurtosis	12.37	1	0.000		
Total	453.32	74	0.000		

Table C6

Adding Controls Successively for the Regression One Quarter Prior to Agreements

The table shows the results from regressing the debt-to-capital ratio on an agreement dummy that takes on the value 1 if an agreement is reached one quarter after the observation in question, and is otherwise zero. Financial controls are added successively. The regression in the last column also includes profit variability and its interaction term with the agreement dummy. For column 7, the uninteracted agreement coefficient shows the effect of the agreement in the period one quarter before the agreement is reached for a firm with mean profit variability. The variability coefficient shows the impact of profit variability on the debt-to-capital ratio for periods that are not one quarter before reaching an agreement. The interaction term coefficient shows the effect of profit variability on the debt-to-capital ratio during the period one quarter prior to reaching an agreement. All Worldscope variables are winsorized at 1 % tails. Robust standard errors are used to correct for heteroskedasticity. All regressions include firm fixed effects as well as year fixed effects. The t-statistics are reported within parentheses. *, **, and *** denote statistical significance at the 10 %, 5 % and 1 % levels, respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Agreement	-0.003	-0.004	-0.005	-0.005	-0.005	-0.014*	-0.015*
	(-0.64	(-0.85)	(-0.95)	(-0.94)	(-0.93)	(-1.77)	(-1.84)
Logsales		0.019***	0.012**	0.026***	0.024***	0.017***	0.015***
		(3.05)	(2.57)	(3.85)	(3.85)	(3.69)	(3.38)
FixedProportion			0.117***	0.132***	0.134***	0.027	0.022
			(3.07)	(2.99)	(3.07)	(0.16)	(0.12)
ROA				-0.129***	-0.133***	-0.178***	-0.186***
				(-4.70)	(-4.94)	(-4.21)	(-4.24)
Market-to-Book					-0.005***	-0.008***	-0.007***
					(-3.73)	(-3.36)	(-3.12)
Z-Score						-0.001	-0.002
						(-0.16)	(-0.34)
Variability							-0.013
							(-0.81)
Agreement							-0.031
*Variability							(-1.34)
Firm FE	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X
N	3,021	3,020	2,928	2,510	2,510	1,354	1,320
R^2	0.670	0.677	0.683	0.666	0.669	0.519	0.516

Table C7

Adding Controls Successively for the Regression Two Quarters Prior to Agreements

The table shows the results from regressing the debt-to-capital ratio on an agreement dummy that takes on the value 1 if an agreement is reached two quarters after the observation in question, and is otherwise zero. Financial controls are added successively. The regression in the last column also includes profit variability and its interaction term with the agreement dummy. For column 7, the uninteracted agreement coefficient shows the effect of the agreement in the period two quarters before the agreement is reached for a firm with mean profit variability. The variability coefficient shows the impact of profit variability on the debt-to-capital ratio for periods that are not two quarters before reaching an agreement. The interaction term coefficient shows the effect of profit variability on the debt-to-capital ratio during the period two quarters prior to reaching an agreement. All Worldscope variables are winsorized at 1 % tails. Robust standard errors are used to correct for heteroskedasticity. All regressions include firm fixed effects as well as year fixed effects. The t-statistics are reported within parentheses. *, **, and *** denote statistical significance at the 10 %, 5 % and 1 % levels, respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Agreement	-0.006	-0.007	-0.008	-0.010	-0.010	-0.018**	-0.019**
	(-1.02)	(-1.21)	(-1.38)	(-1.60)	(-1.52)	(-2.03)	(-2.40)
Logsales		0.019***	0.012**	0.026***	0.024***	0.017***	0.016***
		(3.05)	(2.56)	(3.81)	(3.81)	(3.65)	(3.41)
FixedProportion			0.117***	0.133***	0.135***	0.030	0.025
			(3.09)	(3.02)	(3.09)	(0.17)	(0.14)
ROA				-0.128***	-0.133***	-0.180***	-0.182***
				(-4.67)	(-4.90)	(-4.21)	(-4.20)
Market-to-Book					-0.005***	-0.008***	-0.007***
					(-3.72)	(-3.27)	(-3.02)
Z-Score						-0.001	-0.002
						(-0.14)	(-0.30)
Variability							-0.014
							(-0.80)
Agreement*Variability							-0.005
							(-0.30)
Firm FE	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X
N	3,021	3,020	2,928	2,510	2,510	1,354	1,320
R^2	0.670	0.677	0.684	0.666	0.669	0.520	0.516