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On Capital Structure and Debt Placement in Swedish Companies

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To my parents Abdul Qadeer & Iffat Farooqi
& my children Sophia & Mikael Lind

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Raana Farooqi Lind

Contents

Introduction and Summary

The Miller & Modigliani (1958) capital structure irrelevance theorem notwithstanding, the relevance of capital structure decisions on the value and valuation of firms is clear to academicians and practitioners alike and is evidenced by the amount of research in the area as well as the amount of resources and time firms invest in trying to optimize their capital structures. The existence of market imperfections (absent in the Miller & Modigliani (1958) model) causes capital structure decisions to affect firm value and make it a conduit of information for the markets. Thus a firm trying to minimize its cost of capital needs to take into account the effect of costly bankruptcy and the tax deductibility of interest expenses (as well as profitability in determining its profit exhaustion point in order to take advantage of the debt tax shield) on the required rates of return on debt and equity. Firms with high growth prospects need flexibility. The asset substitution problem (Jensen & Meckling (1976)) and the underinvestment problem (Myers (1977)) are also highly relevant for such firms. In order to deal with these issues, the financing of such firms has a larger share of equity financing or short-term or convertible debt (Myers (1977)). The existence of information asymmetry in conjunction with moral hazard also affects firms financing decisions which in turn affect firm value and valuation. Given that insiders have better information than outsiders, equity issues are generally associated with negative market reaction. The choice of firms in issuing equity or debt (given other constraints such as an optimal or target capital structure) thus affects firm valuation. As pointed out by Myers & Majluf (1984), firms have a preferred pecking order of financing choices. They prefer to finance first by retained earnings (the most informationally insensitive financing alternative), then by debt and lastly by equity (the most informationally sensitive financing alternative). Where active markets for corporate control exist, capital structure can also be used to address the agency problems arising from the separation of ownership and control, i.e. where the interests of managers and owners are not aligned. In this case, a firm might take on high debt levels to restrict the "free cash flow" available to managers in order to curtail their possibilities of making value destroying investments and as a disciplining device (Jensen (1986)). In addition, capital structure might be used as a signal of quality. Thus high debt levels might be used as a signal to the market that the firm expects high earnings in the future (Ross (1977)). Firms without such prospects do not mimic the behavior of successful firms and thus high levels of debt in this case affect firm value positively. In these and a number of other ways, the choice of capital structure is a very important decision for most firms.

Even though the "capital structure puzzle" (Myers 1984) may remain unsolved, there have been tremendous strides in finance in the understanding of the capital structure decisions of firms. Factors such as bankruptcy risk, taxes, agency and information asymmetry costs have emerged as the key accepted drivers

of capital structure decisions. Barclay & Smith (1996) have argued that the single most important determinant of firm capital structure is the investment opportunity set it faces. Explanations other than the extant wisdom have also been offered. Examples include explaining firm capital structure as the cumulative outcome of past attempts to time the equity markets (Baker and Wurgler (2002)) with stock prices being the best predictors of capital structure changes. Ivo Welch (2002) studies inertia and claims that capital structure can be explained by past capital structure adjusted non-linearly for intervening stock price appreciation. Zweibel (1996) studies the effect of management entrenchment on capital structure while Rajan & Zingales (1995) study institutional effects on capital structure choice.

The three empirical essays in this thesis investigate the capital structure decisions of firms from different perspectives. The intention of this thesis is to contribute to this literature by investigating the capital structure of non-listed firms (on which there is relatively little empirical research) and the effects of, inter alia, listing status and organizational form (i.e. whether firms are organized as single limited liability entities or whether they are organized as groups) on the capital structure choices of firms. It also investigates the placement of debt within firms organized as groups.

The first essay investigates the capital structure choices of non-listed firms and compares it to that of listed firms. Although recently, with the availability of detailed data on non-listed firms, there have been studies on the capital structure choices of such firms, it is safe to say that the bulk of empirical work on capital structure has been carried out on (very large) listed firms. Given that non-listed firms comprise a large part of the economy in a large number of countries[1] and have been an important driver of growth[2], it is of interest to receive more empirical evidence on the capital structure choices of such firms. I check for the effect of firm level factors on the debt of non-listed firms and find that all the explanatory variables have the signs predicted by theory. Most of the previous empirical evidence on the effects of firm level factors on firm debt has been on listed firms, for example Rajan & Zinagles (1995) study the capital structure choices of listed firms in the G7 countries and find that factors correlated to leverage in the United States are similarly correlated in the other countries as well. I find that the two most important influences on the capital structure decisions of non-listed firms are tangibility and non-debt tax shields. The positive effect of tangibility on debt levels has been evidenced in a number of studies before. Given that the bulk of my sample is composed of relatively small non-listed firms, it would be plausible to assume that such firms have close banking relationships which would reduce the importance of firms being able to provide collateral. This is not the case here (nor

[1] Rajan & Zingales (1995) state that across the G7 countries, non-listed firms comprised a varying but large part of the total sales in these countries.

[2] According to the USGPO 1996, firms with fewer than 500 employees provide 53% of the employment produce 47% of total sales revenue and comprise over 95% of the total number of firms and are responsible for most of the employment growth in the US in recent years.

in the study by Rajan & Zingales (1995)). There is another possible explanation for the importance of tangibility as one of the most important factors affecting the capital structure of non-listed firms. If one is prepared to make the assumption that the more mature (lower growth) firms are also firms with more tangible assets, then my results on the importance of tangibility lend evidence to the claim by Barclay & Smith (1996) that the single most important determinant of firm capital structure is the investment opportunity set it faces. Thus firms which have high growth prospects should have very little debt in their capital structures. I have weaker evidence on the direct effect of the growth variable. This is due to the fact that I have had to employ a less than ideal proxy for growth (actual growth over one year from the time the capital structure decision was taken, which cannot be assumed to reflect the long-term growth prospects of firms). As I am considering non-listed firms, I am unable to employ the more common market to book proxy for growth.

I then compare the capital structure of non-listed firms to that of listed firms, both in terms of levels as well as in the relationship of the debt levels of these two categories of firms to the explanatory variables commonly employed in most capital structure studies. There are a myriad of reasons for expecting differences in the capital structure of non-listed and listed firms. On a very basic level, the two categories of firms have access to different capital markets for raising equity. In addition, the importance of the agency costs related to debt and equity differ between the two categories of firms. Listed firms, being larger are more subject to the agency costs arising from the separation of ownership and control and an effort to reduce the "free cash flow" (Jensen (1986)) available to managers would impact firm capital structure . This is less likely to be the case for non-listed firms[3]. Non-listed firms, by virtue of their smaller size might have a higher degree of flexibility than listed firms, which in turn could exacerbate the asset substitution problem (Jensen & Meckling (1976)). However, in order for non-listed firms' asset substitution problem to be more acute than in listed firms, it is required that in general such firms have greater investment opportunities (in order to switch the risk level of projects) and this cannot be assumed a priori.

The results in the paper do indicate differences in the capital structure of listed and non-listed firms for the sample as a whole. Non-listed firms are much more highly leveraged than listed firms and have a higher proportion of fixed assets. In order to carry out the regression analysis on the effect of firm level factors on the debt of listed and non-listed firms, I employ a different "matched sample" (where the median assets of listed and non-listed firms are matched) since non-listed firms comprised over 99% of the original sample. In this sample, I find surprisingly small differences between listed and non-listed firms. In considering the effects of firm level factors (on the matched sample), I find that size is negatively related to the debt of both listed and non-listed firms. This result,

[3] Giannetti (2003) found that the majority of non-listed firms in her sample were owner controlled.

although contrary to most empirical findings, is not unique and has been evidenced in Rajan & Zingales (1995) in the case of Germany. This could be viewed as a validation of these authors' contention that larger firms suffer less from information asymmetry and can issue equity at favorable terms. Their reasoning could be extended to non-listed firms' ability to raise private equity especially in light of the fact that for the whole sample of non-listed firms, size was found to be positively related to debt levels. I find that asset tangibility is one of the most important influences on the capital structure of both listed and non-listed firms (with tangibility being positively related to debt levels). The importance of tangibility is higher for non-listed firms, which could be taken to indicate that such firms have a higher level of information asymmetry associated with them compared to listed firms of comparable size. Again, if one is prepared to make the assumption that lower growth, more mature firms are those with the higher asset tangibility in general, this would indicate that although there are some differences in the way listed and non-listed firms choose their capital structures, a firm's investment opportunity set is one of the most important influences on capital structure decisions, regardless of listing status. Again, then the results on tangibility would imply that firms with high growth prospects have lower leverage.

Thus essay 1 adds to the growing empirical evidence on the capital structure choices on non-listed firms by using a comprehensive database of Swedish firms and highlights the differences in the capital structures of listed and non-listed firms. Non-listed firms are much more highly leveraged (also evidenced in Giannetti (2003)). This might be due to a number of reasons. One reason is that it is likely that bank debt is a cheaper alternative to private equity financing for the bulk of non-listed firms in my sample. This statement does not in any way presume to judge the efficacy of the private equity market; it simply means to imply that while such markets might be very efficiently employed by some non-listed firms, the bulk of non-listed firms might find bank financing a cheaper source of funds. Comparing listed and non-listed firms in a "matched sample" in order to judge the effect of firm level factors on firm capital structure, I find that although there are some differences between listed and non-listed firms, tangibility is the most important determinant of the capital structure choices of both categories of firms. If it is true that firms with higher tangibility are also firms with lower growth prospects, then this result would lend indirect support to the contention of Barclay & Smith (1996) that firms' investment opportunity sets are the most important determinants of firm capital structure. I do not find any evidence that listed firms in the sample are using debt as a disciplining device or in order to reduce the "free cash flow" available to managers. This could indicate that the market for corporate control in Sweden is not sufficiently active in order for firms to use debt in this fashion.

The second essay is an attempt to gauge the effect (if any) of organizational form on the capital structure decisions of firms. Organizational form (for example

whether a firm is organized as a single limited liability firm or as a group) may affect financing patterns and value creation (Coase (1960) and Williamson (1985)). The characteristics peculiar to groups, such as their larger size, greater complexity, lower transparency, extra tax planning tools and access to internal capital markets affect factors such as bankruptcy risk, taxes and agency and asymmetric information costs. Since these factors are important determinants of capital structure decisions, it follows that the capital structure of groups and stand-alone firms should differ.

There is relatively little empirical research in the capital structure decisions of groups and group-affiliated firms (for ex. Manos, Murinde and Green (2007) and Verschueren and Deloof (2006)). Most research on groups deals with the effect of the group form of organization on value (for ex. Rajan, Servaes and Zingales (2000) and Claessens, Fan and Lang (2002)). In my paper, I compare the capital structure of groups (and group-affiliated firms) to that of stand-alone firms and try to address three questions. Is the capital structure of groups different from that of stand-alone firms? Is the determination of the leverage of groups-affiliated firms different from that of stand-alone firms? And finally, what is the effect of intra-group borrowing on group-affiliated firms' debt levels?

I find that organizational form does indeed affect the financing structure of firms, that the capital structure of groups differs from that of stand-alone firms, that group-affiliated firm capital structure is significantly influenced by group-wide factors and that intra-group debt transactions have a negative effect on the external debt levels of groups. Thus my results corroborate the evidence in Manos, Murinde and Green (2007) as well as those of Verschueren and Deloof (2006). They extend the evidence found in the former study by considering non-listed as well as listed firms and the second by considering firm-wide effects. In addition, I look at the capital structure of groups as a whole (in addition to group-affiliated firms) and find evidence of differences in the capital structure of groups vs. stand-alone firms.

The group form of organization has a positive effect on firms' debt levels, with this effect being lower the more complex or less transparent a group is. This could just be a reflection of the influence of size; however the effect remains after controlling for size. Other explanations for groups carrying higher debt levels include their asset structure (with more tangible assets), higher level of collateralization (possibly to mitigate the complexity and transparency issues related to groups), and effective governance measures in place to circumvent expropriation of creditors. It is also possible that groups may have a comparative advantage in being able to reduce the fixed costs of raising debt (thereby bypassing any deadweight loss of raising debt).

The results of the influence of group-wide variables on the debt levels of group-affiliated firms point to the fact that the leverage of such firms is determined

on the basis of very different considerations than are the leverage decisions of stand-alone firms. Group profitability and group size are found to have strong negative influences on the debt of group-affiliated firms. The latter would indicate the negative effect of complexity on the debt of group-affiliated firms. Thus comparing the capital structure of group-affiliated firms to that of stand-alone firms without taking into account group-wide influences, would only give a partial explanation of their choices. Finally the negative relationship evidenced between the external debt levels of groups and the incidence-and-scale of intra-group debt indicate that group debt is used as a substitute to external debt and/or it exacerbates the problems related to group complexity and lack of transparency.

Essay 3 investigates the placement of debt in groups given the insight provided Bianco & Nicodano (2006) on the advantages and disadvantages of the option of partial liquidation. Given the limited liability of group-affiliated firms, groups have an option of partial liquidation (i.e. the possibility of allowing a subsidiary to go bankrupt without jeopardizing the survival of the group as a whole). This can be welfare enhancing and has a positive effect on the survival of groups, especially if one or more subsidiaries are performing extremely badly. There is a disadvantage to this option, however, since it can pervert the incentives of the parent firm (and ultimately the controlling shareholder) and thereby exacerbate the asset substitution problem. This effect on incentives is known to lenders and minority shareholders who would want some kind of guarantees or higher interest rates to lend to or invest in group-affiliated firms. One way for the parent firms in groups to credibly commit to creditors to not taking advantage of the option of partial liquidation in a perverse way would be place the debt at the top of the group. This ensures that it would not take very high risks since it then jeopardizes the survival of the whole group. Of course, having the parent guarantee all the debt of its subsidiaries would also solve this problem.

I empirically check for how debt is placed in groups in Sweden. The parent firms in my groups have very high ownership stakes (in most cases the subsidiaries are wholly owned by the parent firm) and therefore the issues of minority shareholder expropriation are not that pressing. The concerns of debt providers are all the more pertinent, however, since in my groups, the parent firms can easily reshuffle funds between subsidiaries. I find that parent firms do have higher leverage than their subsidiaries; however the difference is not very large. Closer inspection reveals that the complexity and transparency of groups are important influences in the way debt is placed in groups. I find that the size of the group and the amount of intra-group debt have substantial negative influence on the amount of debt in subsidiaries. This is taken to indicate that lenders in this situation face increased complexity and reduced transparency and cannot be sure of where the funds they lend end up within the group. In groups where the parent firms' main assets are holdings in their subsidiaries, the parent firms do not carry higher debt

levels. This is taken as an indication that such groups are more transparent than groups where the parent firms also have operations of their own.

Bianco & Nicodano (2006) tested their model on pyramids. In essay 3, I extend the use of their insight to other forms of groups, arguing that given the incentives of the parent firms (and thus the controlling shareholders) as well as their ability to reshuffle funds in the groups, the problems highlighted by the aforementioned authors are all the more pertinent when it comes to the types of groups I investigate. By considering different kinds of groups, I am able to identify the effect of greater complexity and lower transparency on the way debt is placed in groups. This is considered to be one of the main contributions of the study as it extends the insight provided by Bianco & Nicodano (2006), who considered pyramids in their study, which per definition are complex structures.

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A Comparison of Listed vs. Non-Listed Firm Capital Structure: Evidence from Sweden

Abstract

The importance of a number of agency costs of debt and equity which affect capital structure choice differs between listed and non-listed firms. It follows that there should be differences in the capital structure choices and the relationships between debt levels and the explanatory variables commonly employed in empirical capital structure studies between listed and non-listed firms. This paper investigates the capital structure choices of non-listed firms in Sweden over the period 1997-1999 and later compares it to that of listed firms. I find a number of differences in the capital structure of listed and non-listed firms, as well as differences both in the relationship of debt levels to the explanatory variables employed in most capital structure studies between listed and non-listed firms and in the magnitude of the effect of the variables. This supports the expectation of differences based on listed and non-listed firm differences in the agency costs of debt and equity. Of the most important influences on capital structure, tangibility is common to both listed and non-listed firms. If one makes the assumption that firms with a large proportion of tangible assets in their asset structure are the more mature firms, this would point to the fact that for both listed and non-listed firms, growth options are a major determinant of capital structure choice. This would validate the claim by Barclay and Smith (1996) that a firm's investment opportunity set is the primary determinant of its capital structure.

Keywords: capital structure, listing status, leverage, agency costs, asymmetric information.

I. Introduction

The Miller & Modigliani (1958), capital structure irrelevance theorem notwithstanding, the choice of the mixture of firms' debt and equity (i.e. their capital structure), given market imperfections, effects firm value and valuation. The static trade off theory, the pecking order theory and agency theory are the most prevalent theories explaining capital structure choices. They explain how market inefficiencies such as costly bankruptcy, taxation and information asymmetry in the presence of moral hazard affect capital structure choices and make capital structure a conduit of information[1]. A large body of empirical research has been carried out, investigating (mainly) the capital structure choices of listed firms and on checking the validity of the theories.[2]

More recently, work in the area has analyzed, inter alia, the effects of management entrenchment on capital structure (Zweibel (1996)), institutional effects on capital structure choice (Rajan & Zingales (1995)), and the determination of the maturity and priority of debt in firm capital structure (Barclay & Smith (1995)). Barclay & Smith, who have carried out a number of studies[3] on capital structure and debt maturity, especially in light of the fact that all debt is not the same (that is debt differs based on a number of factors such as covenant restrictions, call provisions, convertibility, maturity, priority etc.), have argued that the single most important determinant of firm capital structure is the investment opportunity set it faces. Other explanations than the prevailing wisdom as to the determinants of capital structure choice have also been suggested. Ivo Welch (2002) studies inertia and claims that capital structure can be explained by past capital structure adjusted non-linearly for intervening stock price appreciation. Baker and Wrugler (2002) explain capital structure as the cumulative outcome of past attempts to time the equity market and find that stock prices are the best predictors of capital structure changes. The different explanations of the determinants of capital structure are not necessarily mutually exclusive; they all have relevance in explaining firms' choice of capital structure. The difference lies in the order of influence of the factors considered; for example whether market timing has a first order influence on firm capital structure while other factors normally considered to affect capital structure only indirectly influence capital structure choice. Thus while tremendous strides have been made in the understanding of and in the empirical validation of the posited theoretical effects of some factors on firm capital structure, the "capital structure puzzle" (to use Stewart Myers (1984) words) remains unsolved.

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[1] For example, according to Grinblatt and Titman (1988), stock prices sometimes move as much as 10-15% when firms announce changes in their investment, dividend or financing choices, implying that these decisions convey information to investors which cause them to re-evaluate, and thus, revalue the firm.

[2] See Titman and Wessles (1988). For a review on capital structure theory and empirical work, see Harris and Raviv (1991).

[3] See for example Barclay, Smith and Ross (1995) and Barclay and Smith (1995 and 1996).

It is safe to say that the bulk of empirical work on capital structure has been carried out on very large listed firms[4]. This is not surprising. By studying these firms one can get a fair idea of the aggregate leverage in a country and in addition, this area is of interest to the financial sector as pointed out by Rajan & Zingales (1995). Furthermore, good data on the smaller non-listed firms has not been available until recently. Given that non-listed firms comprise a large part of the economy in a large number of countries, it is in the interest of academics and practitioners alike to receive evidence on the capital structure choices of these firms. The importance of non-listed firms as a group is illustrated by the fact that in their study of firm capital structure across the G7 countries, Rajan & Zingales (1995) state that non-listed firms comprised a varying but large part of the total sales in these countries.

This paper analyzes the capital structure of non-listed firms and compares it to that of listed firms. In doing so it endeavors to augment the growing empirical evidence on how non-listed firms choose their capital structure. The comparison of non-listed firm capital structure to listed firm capital structure is carried out due to a number of considerations. There are differences between the two categories of firms in access to capital markets as far as raising equity is concerned, differences in the risk and probability of costly bankruptcy, as well as differences in which agency costs are most relevant to each category of firms. All these factors affect capital structure choice. Thus this paper also attempts to answer the following two questions; 1) is the capital structure of non-listed firms different to that of listed firms? and 2) is the relevance and effect of firm level factors identified by theory the same for the two categories of firms?

In order to accomplish the comparison between listed and non-listed firms, I compare the leverage measures of the two categories of firms. I also analyze whether the relation between the factors normally considered to affect capital structure is the same for listed and non-listed firms and how the capital structures of these firms change with changes in the explanatory variables by carrying out multivariate analysis. Lastly, I look at debt composition or more precisely the proportion of short-term debt financing of listed and non-listed firms[5]. Barclay & Smith (1996), consider (besides leverage) the maturity and priority of debt in a large sample of firms. As they point out, all debt is not the same. They show how maturity may help control (or exacerbate) the agency costs of debt using, among other things, the basic insight provided by Myers (1977) that the underinvestment problem (the problem of firms passing up positive NPV projects) may be mitigated by the use of short-term debt.

[4] Recently a few papers have looked at non-listed firms, these include Giannetti (2003) and Scherr and Hulburt (2001).

[5] Titman & Wessels (1998) also consider several definitions of debt based on the differences in the effect of the information asymmetry and moral hazard problems on short versus long-term debt. There sample consisted of 469 large firms.

Cross-section time series analysis is carried out to investigate the effect of the factors generally considered as being the determinants of capital structure on the whole sample as well as on the two sub-divisions of the sample. I also use firm fixed effects (which do not depend of time-varying firm characteristics such as profitability, size etc.) in the leverage equations in order to examine the differences in capital structure across firm types.

I employ a dataset provided by Market Manager Partners and use a restricted sample for the years 1997-1999. Initially I study the whole sample with emphasis on non-listed firm capital structure. The study's extensive sample should avoid the issues of sample bias. The sample allows me to consider small firms which generally have not been the subject of much research. The average number of employees for all firms in the sample is 31 (with the median being 3) and the mean turnover and total assets are approximately SEK 51 and SEK 70 million (median total assets are SEK 1.9 million while the median turnover is SEK 2.8 million). 90% of the sample consists of firms with less than SEK 20 million in total assets. I carry out a comparison of the descriptive statistics and the debt levels of all listed and non-listed firms in my sample. This highlights the differences between the capital structure of non-listed and listed firms in my whole sample. However, to carry out a comparison of the relevance of firm level factors in determining the capital structure of listed and non-listed firms, I refine my sample later. This is done since the panel is highly unbalanced, with approximately 99.6% of the sample being comprised of non-listed firms. I thus employ a much smaller sample to compare the capital structure of listed and non-listed firms and their relationships and responses to changes in the explanatory variables commonly employed in capital structure studies.

In my study of non-listed firm capital structure I find non-debt tax shields and tangibility to have the most effect on the capital structure choices of firms followed by the proxy for growth (based on the beta coefficients of the regressions). Although the beta coefficient of the growth proxy is not as dramatically higher as those of non-debt tax shields and tangibility, it is still higher for the level of long-term debt. All the explanatory variables have the signs predicted by theory. In my comparison of listed and non-listed firm descriptive statistics and leverage measures, I do find a number of differences between listed and non-listed firms. Non-listed firms are much more highly leveraged than listed firms. The have lower growth and higher asset tangibility than listed firms; two factors that would explain why listed firm debt is so much lower than non-listed firm debt given the debt overhang and the asset substitution problem. Non-listed firms do, however, have much higher income variance. The listed firms in my sample are much larger than non-listed firms. Barclay & Smith (1996) have found that larger firms have higher

levels of long-term debt as a fraction of total debt than do smaller firms[6]. I find, however, that listed firms in my sample have a higher proportion of short-term financing.

In a smaller sample, consisting of only the larger non-listed firms, I check the effects of firm level factors on the capital structure of listed vs. non-listed firms. As far as the relationship of the explanatory variables on the debt levels of listed and non-listed firms is concerned, although some differences do exist, these differences are surprisingly little. The major difference in firm level factors is of the effect of non-debt tax shields on the leverage of listed vs. non-listed firms. Whereas the effect of non-debt tax shields on non-listed firm leverage is negative (in accordance to theory), the opposite is true for listed firms. Although the result for listed firms is contrary to theoretical predictions, it has been evidenced in earlier studies. Tangibility, while important to both categories of firms, is more important to the leverage of non-listed firms. Contrary to most previous studies, I find that for the largest firms (that are represented in the smaller sample), size is negatively related to debt levels of both listed and non-listed firms. Once again, this result has also been reported in previous studies. I get econometrically weak results on growth in the regressions which might be a result of an inadequate proxy for the growth of non-listed firms. Income variance has a negative effect on the leverage of both listed and non-listed firms. I find that size and profitability are positively related to the proportion of short-term financing for both listed and non-listed firms (the result on the relationship between size and the short-term financing of listed firms is not significant, however). Tangibility is negatively related to the proportion of short-term financing, which is what theory suggests.

The above suggests a number of things. First, the greater importance of tangibility for non-listed firm debt as well as their higher level of collateralization suggests that (possibly) close relationships with banks do not override the importance of asset structure in determining the capital structure of non-listed firms. It also suggests that for the larger non-listed firms, close banking relations might not reduce information asymmetry more than for listed firms. In addition, the use of debt as a disciplining device and in order to reduce the "free cash flow" does not seem to be used more in listed firms vs. non-listed firms. This in turn would cast doubt on the assumption that the listed firms (larger and with more diffuse ownership) suffer more from the problems due to the separation of ownership and management than large non-listed firms (in the matched sample), since this should have been reflected in the analysis above. Alternatively, it is possible that there are other measures in place to deal with these agency problems and that capital structure need not be the most efficient way to deal with these problems, for example effective governance or legal requirements. In addition, it

[6] Their comparison is on the debt levels of listed firms.

might reflect the fact that the market for corporate control in Sweden is not sufficiently active to make the use of debt in this fashion efficient.

The negative relation of firm size to debt and the positive relationship of the same to short-term financing for both non-listed and listed firms are puzzling. This might be a validation of Rajan & Zingales (1995) contention that larger (listed) firms suffer less from information asymmetry and thus can issue equity at favorable terms. This reasoning might be extended to non-listed firms ability to raise private capital. The difference in the relationship of size to non-listed firm debt when looking at the whole sample and then only the larger firms, might point in the same direction.

Asset tangibility remains the most important influence on the capital structure of both non-listed and listed firms. Unfortunately, the proxy for growth has a number of short-comings. However, if one is prepared to make the assumption that firms with more tangible assets are the more mature firms, this would indirectly support the claim by Barclay & Smith (1996) that a firm's investment opportunity set has a primary effect on the debt levels of firms.

The results of this paper add to the evidence on how non-listed firms choose their capital structure and validate a number of contentions made by theory (which previously have mostly been checked against listed firm capital structure choice). In addition I find a number of differences in non-listed firm and listed firm capital structure with non-listed firms carrying higher levels of debt than non-listed firms. When it comes to the determinants of capital structure, although I do find some differences in the magnitude of the effect of some determinants, tangibility remains the most important influence on the capital structure choice of firms, regardless of listing status. If one is willing to assume that firms with tangible assets are the more mature firms this would validate the claim by Barclay & Smith (1996) that growth options are the most important influence on the choice of capital structure.

The rest of the paper is organized as follows. Section II briefly discusses the reasons why non-listed and listed firm capital structure is expected to differ. Section III is a brief overview of the factors I will employ in this study in light of capital structure theory as well as a description of the expected differences in the relationship of listed and non-listed firm debt to these factors. Section IV describes the leverage measures and the variables employed in the study of non-listed firm capital structure and used in the comparison of listed and non-listed firm capital structure. The determinants of non-listed firm capital structure are investigated in Section V which also compares the descriptive statistics and leverage measures of the whole sample of non-listed firms to that of listed firms. Section VI reports the results of a more detailed comparison of the capital structures of a "matched" sample of listed and non-listed firms. Section VII is a summary and discussion of the results. Section VIII concludes.

II. Reasons for Expecting Non-Listed vs. Listed Firm Capital Structure to Differ

There are a myriad of reasons for non-listed firms' capital structure to differ from that of listed firms. Their capital structures might differ trivially since non-listed firms' universe of financing options differs compared to listed firms which can approach public equity markets for outside financing. Non-listed firms are faced with different trade-offs and agency costs compared to listed firms. One of the most important agency costs due to the separation of ownership and control is the distorted incentive of managers to invest in projects that reduce firm value. Thus where ownership and control is separated, one concern is to reduce the level of "free cash flow" (Jensen (1986)) available to management thus curbing their ability to take on value destroying investments. There are two main agency costs associated with debt. The first is what is termed the under-investment or debt overhang problem. In this situation, a firm which is highly leveraged but has good investment opportunities is not able to raise outside financing due to existing debt levels. Equity investors are reluctant to invest in such firms. Firms which have a large investment opportunity set should have low levels of long-term debt in their capital structure (and preferably finance with equity since this gives them the highest level of flexibility to take on projects as they appear) in order to avoid the under-investment problem. The second problem is what is termed the asset substitution problem (Jensen & Meckling (1976)), and refers to a firm's ability to change the projects (and most importantly the riskiness of the projects they undertake) once they have obtained outside (long-term) financing. This is again more relevant for firms which are flexible and which have a relatively large number of investment projects to choose from. Since lenders are aware of this problem, they charge such firms higher rates of interest, and such firms would find the most feasible source of debt financing to be short-term (since the short-term debt would generally mature before new projects with different risk become available). This implies that both the under-investment problem and the asset substitution problem can be solved with the use of short-term debt (Myers (1977) or the use of convertible debt. Thus these agency problems affect not only the level of debt in firm capital structure but also the composition of debt, i.e. short-term vs. long-term debt.

Non-listed firms are generally much smaller than listed firms. Such firms are generally more flexible than larger firms and are also more likely to be owner-managed. Thus the importance of the agency costs due to the separation of ownership and control and the need to restrict the "free cash flow" available to managers will be lower in such firms. Given this, it is more likely that higher levels of debt are more useful as disciplinary devices in listed firms than in non-listed firms. On the other hand, non-listed firms, by virtue of being smaller than listed

firms may be considered to have a higher degree of flexibility than listed firms. The question then arises whether such firms have a larger investment opportunity set than listed firms, such that high levels of debt could result in higher agency costs (due to the under-investment problem or the asset substitution problem) for such firms. Without going into the details of the different reasons for which firms might go public, it seems innocuous to assume that one reason firms go public is that they have relatively large numbers of investment opportunities available for which they require the most flexible form of financing, i.e. equity financing. Thus at the time firms go public they should, in the aggregate at least, have higher growth opportunities than non-listed firms. Do these higher growth options of listed firms persist many years after they have gone public? There is no a priori reason to assume that this is the case for all public firms even if going public generally involves under-pricing and always involves some dilution of the controlling shareholders stake, which should make going public worthwhile only if the growth opportunities in the distant future are also judged to be high. Thus it is not possible to say whether the flexibility of small firms results in their suffering more from the underinvestment or asset substitution problem. It is most likely that the greater flexibility of non-listed firms affect these costs, which is why we should observe differences in the capital structure of the two categories of firms.

In addition to differences in agency costs, there are differences in the level of information asymmetry, bankruptcy risk and bankruptcy costs between listed and non-listed firms which imply differences in the capital structures of these two categories of firms.

Given that a number of moral hazard and asymmetric information problems affect the capital structure choices of firms and given that the relevance and magnitude of these problems are different for listed firms and non-listed firms, I should find a number of differences. The differences should not only be in the capital structure of the firms based on whether they are listed or not, but also in the magnitude (and possibly the sign) of the effect of the variables that have been identified as being the key determinants of capital structure. Differences in information asymmetry and the agency costs of the separation of ownership and management as well as the agency costs of debt between the two categories of firms also imply differences in the debt composition of listed vs. non-listed firms. I therefore include debt composition in my analysis. The current study thus considers the capital structure and debt composition of non-listed firms and later compares it to that of listed firms.

III. Factors Affecting Capital Structure

In this section I discuss the factors which according to the theory of capital structure affect capital structure choice and which have been widely used in empirical research on capital structure. These include; firm size, profitability, non-

debt tax shields, asset tangibility, growth options and income variance. I consider the relationship of these variables to the leverage levels and debt composition of both listed and non-listed firms.

A. Firm size

A number of authors imply that the relationship between firm debt levels and firm size should be positive. Given that larger firms are generally more diversified, size can be viewed as an inverse proxy of the probability of default and the costs associated with it and should thus be positively associated with debt (Titman & Wessels (1988)). Larger firms are generally also older firms, suggesting that the moral hazard problems associated with debt are less severe for such firms since they are eager to maintain their hard earned reputations (Diamond (1989)). This should make it easier for them to obtain debt at favorable terms and they should thus have more debt in their capital structures. Rajan & Zingales' (1995) argument, on the other hand, implies that size should be negatively related to leverage. Their argument applies to listed firms only. According to them, large firms suffer less from information asymmetry, making it is possible for them to issue equity at favorable terms. This would suggest that they have less debt in their capital structures since they would prefer to issue equity. They conclude that "the effect of size on equilibrium leverage is ambiguous".

All arguments except Rajan & Zingales (1995) predict that leverage should increase with size and apply to both listed and non-listed firms. As far as listed firms are concerned, there is no a priori reason to favor any one argument over the other (although previous studies generally confirm that debt increases with firm size). I do expect to find the positive relation between size and non-listed firm total and long-term debt levels in the cross-section and expect them to increase leverage as they grow. In case I find the same results for listed firms (i.e. a positive relation between size and leverage), I expect the magnitude of the effect on the debt levels of non-listed firms to be larger since they do not have the extra option of accessing public equity markets.

Firm size should also affect the composition of debt financing. Small firms are associated with higher levels of asymmetric information and are more flexible as far as project choice is concerned. This exacerbates the asset substitution problem (Jensen & Meckling (1976) and Galai & Masulis (1976)), whereby there is a transfer of wealth from debt-holders to the owners/equity holders. One way to solve the asset substitution problem is to finance by using short-term debt[7]. This would imply that small firms should have a higher proportion of short-term financing and lower levels of long-term debt (or more convertible debt) in their capital structures.

[7] The use of convertible debt should also solve this problem. I do not consider the use of convertible debt since the data used does not provide information on convertible debt, making it impossible to consider it in the empirical tests.

Thus smaller non-listed firms should have a higher proportion of short-term financing than larger non-listed firms. The same should be true for listed firms.

B. Profitability

There are competing views on the effect of profitability on leverage. Higher debt levels could be used as a signal of firm quality by profitable firms (Ross (1977)). The managers of firms with fewer profitable investments or opportunities do not mimic these signals, given the high costs associated with bankruptcy. This model applies mainly to large firms where management and ownership is separate. Firms are also likely to increase debt with increases in profitability to reduce the "free cash flow" at management's disposal in order to reduce moral hazard (Jensen (1986) and Stulz (1990)). The latter also arises in cases where there is a separation between ownership and management and where the incentives of managers and owners are not in complete alignment. A requirement for the free cash flow argument to hold is that there is an active market for corporate control.

On the other hand, Myers & Majluf's (1984) model identifies a pecking order of financing choices preferred by managers,[8] and predicts a negative relation between profitability and leverage. The authors show that, given information asymmetry, firms prefer to raise funds first by the most informationally insensitive venues and subsequently by more informationally sensitive securities. This leads them to prefer financing projects first by retained earnings, then debt and only lastly by equity. Thus profitable firms with slack should finance their projects by retained earnings. Another implication of their model is that firms with slack should reduce debt levels with increases in profitability. The pecking order theory has been validated in a number of studies[9]. However, based only on the theories discussed above, it is not possible to say a priori what the relationship between listed firm profitability and debt levels should be.

The mass of non-listed firms are generally not plagued with the problems arising from the separation of ownership and control. This assumption is based on the large number of small firms in this category[10]. Thus the "free cash flow" arguments might not be relevant for a large number of such firms. Furthermore, since non-listed firm outside financing consists mainly of bank debt[11], it would be natural to assume that such firms have close relationships to the banks and do not need to signal firm quality by high debt levels as in Ross (1977). There is also reason to assume that the debt of non-listed firms is more expensive (in general)

[8] The pecking order of financing choices was first pointed out by Gordon Donaldson (1961).
[9] For example in Rajan & Zingales (1995), Kester (1986), Friend & Lang (1988) and Titman & Wessles (1988).
[10] Giannetti (2003) looks at the share of the first shareholders in her sample of mostly non-listed firms across eight countries. She finds that the first shareholder has more than 50% of the capital in all countries and more than 80% of the capital in the UK. This suggests that making the assumption that a large number of the small non-listed firms in Sweden are owner-managed might not be too far fetched.
[11] Where there are other sources of financing, these are concentrated to relatively few institutions or individuals.

compared to listed firms, and that they therefore have a high incentive to reduce debt when they can. If this is true, we should find a negative relation between non-listed firm leverage and profitability. The assumption of non-listed firm debt being more expensive is based on the following considerations.

The different venue of outside financing options leaves the mass of non-listed firms at the mercy of banks. Such banks need to invest their resources investigating firm prospects and in monitoring firms. Thus banks often can and do, either provide debt to non-listed firms at higher interest rates or are able to invoke highly stringent debt covenants[12]. Of course, limited liability lies at the heart of all the agency costs. In the cases where banks are able to waive such clauses, the owners of the firms carry a very high degree of risk. Even if banks do not waive limited liability, but provide other restrictions in debt covenants, the debt of such firms becomes very costly to them. If one believes that the information asymmetry associated with the (smaller) non-listed firms is higher, there is all the more reason for banks to charge such firms more for their debt. In general, this would lead one to conclude that debt is more expensive and restrictive for non-listed firms. Ceteris paribus, this would indicate that debt falls with profitability for non-listed firms, in particular the level of long-term debt if there is a high level of information asymmetry. Again, as in the case of firm size, I have no compelling reason to assume a certain relationship between profitability and leverage and between the profitability and debt composition of listed firms. As before since most of the agency problems of debt are related to long-term debt financing, I should find that profitability (and increases thereof) are negatively related to the level of long-term debt of non-listed firms. This would cause the proportion of financing that is short-term for non-listed firms to increase with increases in profitability.

C. Non-debt tax shields

According to the static trade off theory, target debt ratios balance the trade-off inherent in the use of debt i.e. the corporate tax break vs. the increased risk of financial distress (with the ensuing costs). Tax deductions for depreciation and investment tax credits function as substitutes for the tax shield provided by debt (De Angelo & Masulis (1980)). Thus firms that have substantial amounts of non-debt tax shields do not need the tax shield provided by debt and should have less debt in their capital structure[13]. Of course this depends on the level of profitable income firms have in order to be able to take advantage of the non-debt tax shields. To the extent that the firms have not exhausted their earnings, the tax shields provided by debt and non-debt tax shields could just be complements. Thus we might not find a negative relation between non-debt tax shields and total leverage.

[12] In a number of cases banks are able to waive the limited liability clauses, which are at the heart of all agency problems.
[13] Bradley, Jarrell and Kim's (1984) model of optimal capital structure also predicts a negative relation between non-debt tax shields and debt.

The basic source driving the negative theoretically postulated relation between non-debt tax shields and debt stated above is that firms have reached a profit exhaustion point (such that the two tax shields, the debt tax shield and the non-debt tax shields, function as substitutes and not complements). Given the same degree of profit exhaustion, there might be a difference between the magnitude of the response of listed and non-listed firms to increases in non-debt tax shields. Since listed firms have the option of raising funds in the public equity market, it seems natural to assume that the negative relation between their debt ratios and the level of non-debt tax shields should be stronger than that for non-listed firms. Based on the same line of reasoning, listed firms should decrease leverage more in response to the same increase in non-debt tax shields compared to non-listed firms. There is no reason to assume that the reduction in debt is long-term or short-term debt. Therefore I do not predict the effect of non-debt tax shields on the proportion of short-term financing of listed and non-listed firms. In the analysis to be carried out, I do not check whether firms decrease debt with increases in non-debt tax shields depending on whether they have reached a profit exhaustion point or not. In particular, I use one particular proxy for non-debt tax shields and check its effect on firm leverage.

D. Asset tangibility

According to Harris & Raviv (1990) leverage is positively associated with liquidation value. Fixed assets can be used as collateral and thus increase the ease and improve the terms at which debt financing is available by reducing the agency costs of debt. Scott's (1977) secured debt hypothesis states that, ceteris paribus, firms can borrow at lower interest rates if their debt is secured with tangible assets. In the asymmetric information framework, Myers and Majluf (1984) also maintain that secured debt results in lower borrowing costs. Higher tangibility should imply easier access to long-term debt since a number of agency costs (such as the asset substitution or the debt overhang problem) can be mitigated by the use of short-term debt or convertible debt.

Tangibility should be important to listed firms based on the above arguments and we should see a positive relation between listed firm long-term debt and tangibility. There seem to be two opposing factors to take into account when considering the effect of tangibility on the long term debt levels of non-listed firms. On the one hand, if we accept that the level of information asymmetry is higher for such firms compared to listed firms, then asset tangibility should be more important for them in obtaining long-term debt financing from banks. Non-listed firms also have higher bankruptcy risk (with the associated costs, by virtue of the mass of such firms being smaller firms than listed firms), once again making tangibility very important in their ability to obtain long-term debt financing. On the other hand, banks are often able to apply very stringent debt covenants when

lending to such firms and in many cases may even waive limited liability clauses[14]. Agency theory hinges on limited liability, the fact that there is a difference between the upside and downside potential for owners in the case of debt financing. This is what makes equity analogous to a call option. To the extent that banks may be able to waive limited liability for non-listed firms, the importance of agency costs should diminish. This would also imply that the importance of collateral or tangibility for gaining debt financing should decrease dramatically for such firms. The factors that would become more important then would be the owner's wealth and the level of riskiness of the business in relation to the former. Which of the two effects is more important to the debt levels of non-listed firms depends on how often and to what extent banks are able to waive limited liability clauses. It is plausible that the application of very stringent debt covenants to non-listed firms is prevalent (in the form of guarantees, collateral pledges etc.), but the extent to which limited liability is waived is highly uncertain. Given no a priori reason to assume that this is a universal practice, I am inclined to expect that tangibility remains very important to non-listed firms, even more so than for listed firms. I expect to find tangibility to have a positive relationship to the long-term debt levels of both listed and non-listed firms, which would imply that the relationship between tangibility and the proportion of short-term financing should be negative for both categories of firms.

There is another reason why tangibility is expected to be positively related to the debt levels of listed and non-listed firms. Firms with high asset tangibility are generally also the more mature firms. As such they have lower growth options. Thus it is likely that tangibility also reflects the growth options (with high tangibility implying lower growth options). The effect of growth options is discussed next.

E. Growth opportunities

Given the asset substitution problem (Jensen & Meckling (1976) and Stulz (1990)), where firms are able to change the riskiness of the projects undertaken after having obtained debt financing, debt should be negatively related to growth opportunities. The debt overhang problem i.e. highly leveraged firms passing up positive NPV investments (Myers (1977)) also implies that firms with a large number of growth options should have less debt in their capital structures. This is because it becomes difficult to induce investors/equity holders to invest new funds in the additional projects. Both these arguments apply to long-term debt finance since short-term debt financing (or the use of convertible debt) can mitigate both these problems.

[14] As Rajan & Zingales (1995) mention, close banking relationships should decrease the importance of tangibility in getting access to debt. A cursory review of business practices in Sweden would suggest that banks do have close relations to both listed and non-listed firms. As such the importance of tangibility in gaining debt financing seems to be affected in the same way for both listed and non-listed firms. However, the crucial difference is that banks are able to dictate more stringent terms in providing debt financing to non-listed firms. Unfortunately, I do not have the information on the debt covenants employed in the database.

Both listed and non-listed firms' levels of long-term debt should be negatively related to the amount of growth options in the firms. It is plausible that this negative relationship is stronger for listed firms, since they can access public equity markets. Non-listed firms, comprised mostly of small firms, do not have the option of this alternative financing. It is plausible that raising funds from the private equity markets is expensive or difficult for a number of non-listed firms. To deal with the asset substitution problem and the debt overhang problem, they are likely to be forced to use more short-term financing in the face of high growth options[15]. This would cause the relationship between proportion of short-term financing and growth options to be positive for non-listed firms. Thus increases in the level of growth options should result in a reduction of total and long-term debt of listed firms, but a switch from long-term to short-term debt for non-listed firms without affecting the level of total debt of such firms.

F. Income variability

High income volatility is associated with a higher probability of bankruptcy. Given that bankruptcy is costly, a number of theories have shown that leverage should be negatively related to the level of income variability (Bradley, Jarrell and Kim (1984) and Castanias and DeAngelo (1981)). I expect to find that the relationship between income variability and long-term debt for both listed and non-listed firms is negative. In addition, the relationship between listed firm total debt and income variability is also expected to be negative. I do not make any predictions about how income variability is related to the composition of debt of listed firms. For non-listed firms (whose major source of financing is bank debt), I expect that firms with higher income variance have lower levels of long-term debt but not necessarily total debt, which would imply that they have a higher proportion of short-term financing.

To sum up, there are several reasons non-listed firms should respond differently to changes in the variables considered above compared to listed firms. As pointed out above, differences exist between the availability of financing options, agency costs and bankruptcy costs between these two types of firms. A number of agency costs and the lack of financing alternatives for non-listed firms imply that they will have to resort to short-term financing or more expensive debt with stringent covenants.

IV. Leverage Measures and Variables

According to Rajan & Zingales (1995), a number of agency problems, such as the asset substitution and the debt overhang problem are best investigated using

[15] I do not consider the use of convertible debt in this paper since the data does not allow me to investigate its importance for the firms I consider. However, in general, it may be said that the use of convertible debt in Sweden is very limited and should not alter the results of my findings.

stock measures of leverage. If, on the other hand, one is interested in the role of debt as a means of transferring control from equity to bond-holders, a flow measure such as the interest coverage ratio is of interest. Since I am not interested in investigating the latter, I use stock measures of leverage. Most of the previous studies on capital structure also employ stock measures of leverage. In the spirit of Titman & Wessles (1988), I employ several measures of leverage and investigate any differences in the debt composition of listed vs. non-listed firms. Different agency costs have different implications for the different measures of leverage as indicated in the last section (long-term debt vs. short-term debt). My measure for total debt is the sum of corporate bonds (very few) and amounts owed to credit institutes scaled by total assets. To make my analysis comparable with a number of previous studies that use long-term debt as the only measure of firm leverage, I use the measure long-term debt defined as the sum of corporate bonds and long-term debt owed to credit institutes scaled by total assets. Short-term debt is defined analogously. The proportion of financing that is short-term is the ratio of short-term debt to total debt. Given that most of the firms in the database are non-listed firms, I use book values of debt in my analysis. However, as Bowman (1980) shows, the cross sectional correlation between the book and market value of debt is very large, implying that the use of book values should not create significant problems

As mentioned, the explanatory variables employed in this study include firm size, profitability, non-debt tax shields, tangibility, growth and income variability. Most of the definitions employed have been used in previous studies as well. The proxies for growth opportunities and non-debt tax shields are far from perfect, but as argued below, the proxy for non-debt tax shields might give us some rough measure of their importance in affecting leverage choices while the proxy for growth is employed due to the absence of a better proxy for measuring the growth opportunities of non-listed firms. The factors/explanatory variables are defined as follows.

Firm size is proxied by the log of total assets at time t. Profitability is measured by the lagged ratio of net operating income to total assets. Thus the effect of profitability on leverage at time t is measured by the ratio of net operating income to total assets at time t-1. Measuring profitability during the earlier period allows one to determine whether profitability has more than just a short-term effect on observed leverage ratios (Titman & Wessels (1988)).

I use depreciation divided by total assets at time t as a measure of non-debt tax shields at time t. Clearly, a number of objections can be raised with regards to my proxy for non-debt tax shields. Rajan & Zingales (1995) do not use non-debt tax shields in their cross sectional analysis, since the only proxy available to them was, in fact, depreciation. I realize that that this is much less than a perfect proxy, since tax shields such as those provided by R&D and selling expenses are not

included in this measure[16]. However, alternative methods of proxying non-debt tax shields have their own short-comings. Keeping in mind that my proxy has a number of short-comings, it still might give us a rough idea of the importance of non-debt tax shields and is thus included in the analysis.

I use the measure fixed assets to total assets to measure asset tangibility. My measure of fixed assets does not include any intangible assets. Following Bergström et al. (2000), I proxy growth opportunities facing a firm in the current period by the percentage change in the log of sales from the current to the next period. Realized values are thus used as proxies of the values expected when the capital structure decision was made. There are a number of objections that can be raised to my proxy of growth. The main objection, and one that I am acutely aware of, is that the actual growth of a firm over a year does not necessarily reflect the growth opportunities that it faces over a longer horizon. The effect of growth options on the leverage of firms is based on the long-term growth prospects of firms. A natural measure of growth opportunities would have been the ratio of the market value of equity to the book value of equity[17]. As Barclay & Smith (1996) state, "Because stock prices should reflect intangible assets such as growth opportunities but corporate balance sheets do not, we reasoned that the larger a company's "growth options" relative to its "assets in place" the higher on average will be its market value in relation to its book value"[18]. They use a company's market to book ratio as a proxy for its investment opportunity set. However, since most of the firms in my sample are not listed, I needed to employ an alternative measure. In the absence of a better proxy for the growth opportunities facing non-listed firms, I reasoned that the proxy I employed, which is the actual growth over a year, should provide a rough indication of the importance of growth opportunities (it should be noted, however, that my proxy for growth was employed by the above named authors as a proxy of firm quality in testing the signaling theory's implications for capital structure decisions). Lastly, following Titman & Wessels (1988), income variability is measured by the standard deviation of the percentage change in operating income between the current and past period.

[16] R&D expenses are not important for a large number of small firms, since this post is mostly zero for such firms in the statements.
[17] This measure of growth is also employed in other studies, for example in Rajan & Zingales (1995), Barclay & Smith (1996).
[18] Barclay and Smith (1996).

V. A Comparison of Non-Listed & Listed Firm Leverage and an Investigation of the Determinants of Non-Listed Firm Capital Structure Choice

A. Data & Sample Selection

I utilize data provided by Market Manager Partners, which includes accounting information for all firms and agencies (both private and governmental) registered in Sweden. The information in the database is not back-filled and should not suffer from survivorship bias. Their main source of information is comprised of the financial statements filed by all firms at the Swedish patent registration office[19]. Information is available on both an unconsolidated as well as on a consolidated basis, with the former being available from 1984 and the latter from 1992. I employ consolidated statements in my analysis. The analysis is carried out using data from 1997-1999 since detailed measures of leverage are present from 1997 onwards, when Sweden adopted the EU standards in accounting statements.

The database contains general information (such as industry membership and legal form) on all firms registered in Sweden, over the period under consideration, 1997-1999. However, a large number of these firms are extremely small and a number of the observations are for inactive firms. I apply a number of restrictions on the sample. I choose to limit the sample to firms which have at least SEK 100,000 in total assets. To be included in the sample, the firm must also have positive sales and have either short or long-term debt outstanding.

A number of firms drop in and out of the sample due to the restriction on total assets, but given the sample size, this should not be a serious problem. In addition to the restrictions above, I exclude the relatively few questionable values for almost all the items included in the condensed balance sheet as well as turnover (for e.g. negative values for total assets, depreciation, short–or-long-term debt, total fixed assets, trade credits, etc.). I also exclude observations where shareholders equity is negative.

All financial firms are excluded since the capital structure of financial firms is not comparable to that of non-financial firms, given their liability structure and regulations governing the amount of capital they are required to hold. This results in the loss of a number of listed financial firms from the sample. The final econometric sample is composed of 168,427 firm year observations on a total of 89,299 different firms of which 269 firms are listed. There are approximately

[19] A number of foreign firms registered at the patent registration office are included in the sample. However, in the final econometric sample, the number of such firms is quite small, leaving the sample representing predominantly Swedish firms.

between 33,000 and 68,000 firm year observations each year. Table I reports the breakdown of firms in the econometric sample into the two categories.

Table I. Number of Firms in the Econometric Sample per Year

This table shows the number of firm-year observations in the sample and breaks the observations down by year and category. The final sample consists of 168,427 firm year observations on a total of 89,299 different firms of which 269 are listed firms. The number of observations per year varies between 33,203 and 67,858 observations.

Year	*Total*	*Listed firms*	*Non-listed Firms*
1997	33,486	184	33,203
1998	68,065	207	67,858
1999	66,873	214	66,659
Total no. of observations.	168,427	605	167,822

As is obvious, non-listed firms represent more than 99% of the sample in every year. Thus given the highly unbalanced panel, no detailed comparison is to be carried out here between listed and non-listed firms. However, I do compare the descriptive statistics and leverage measures of listed vs. non-listed firms in the whole sample here. This provides interesting information on the sample population, which given its comprehensiveness should reflect information on the whole population of firms and how as groups listed vs. non-listed firms look. A deeper investigation into the importance of the factors affecting capital structure calls for a refinement of the sample and is left to a later section.

B. Comparing Non-listed vs. Listed Firm Leverage Levels and Descriptive Statistics

The bulk of my sample is composed mostly of small non-listed firms (90% of the sample is comprised of firms with less SEK 20 million in total assets) as can be seen in table II. There is relatively little empirical research that has been carried out on such firms, which is a pity given the aggregate economic significance of such firms across economies[20]. The sample seems to be fairly representative of the population of firms in Sweden, with relatively few medium sized firms. Of the listed firms, more than 94% fall into the largest size decile (where the size deciles are based on total assets).

Table III reports the different leverage ratios for listed vs. non-listed firms for the year 1998. Listed firms have much lower debt ratios than non-listed firms. The difference in the debt level is in the level of long-term debt, which is much higher for non-listed firms. The proportion of short-term financing is also much higher

[20] As Scherr and Hulburt (2001) point out, according to the USGPO 1996, firms with fewer than 500 employees provide 53% of employment, produce 47% of total sales revenue and comprise over 95% of the total number of firms and are responsible for most of the employment growth in the US in recent years.

for listed firms. Non-listed firms have much higher levels of collateral outstanding as well as higher levels of trade credits. Although I do not look at trade credits in the rest of the analysis in any detail, the difference in the size of trade credits of non-listed vs. listed firms suggests that trade credits might be utilized as an important source of financing by non-listed firms[21].

Table II. Size Distribution of Listed and Non-listed Firms

Average and median (in parentheses) total assets and number of firms represented in the size deciles. Total assets of both listed and unlisted firms in the econometric sample in 1998 are used in forming size deciles. As can been seen, more than 80% of listed firms belong to the largest size decile. The distribution of firms is for the year 1998.

	Average Total Assets	*Non-listed Firms*	*Listed Firms*
Smallest	281,446 (290,8249)	6,807	0
2	514,500 (512,784)	6,806	0
3	767,921 (767,841)	6,806	1
4	1,084,142 (1,079,000)	6,809	0
5	1,517,986 (1,510,000)	6,808	0
6	2,131,770 (2,115,000)	6,804	1
7	3,143,572 (3,113,508)	6,802	2
8	5,085,685 (4,974,500)	6,803	3
9	10,405,506 (9,781,000)	6,802	5
Largest	516,941,282 (41,546,500)	6,611	195
Total no. of observations.		67,858	207

The fact that non-listed firms have much higher long-term debt levels compared to listed firms (which are the larger firms), might indicate that the power of banks in being able to dictate very stringent debt covenants for non-listed firms is quite high. As discussed previously, banks provide the main source of funding for such firms. It might also indicate that the level of information asymmetry between the debt providers and non-listed firms is not necessarily higher than for listed firms. A prevalent assumption is that small firms are associated with higher levels of information asymmetry than are large firms. This information asymmetry is between insiders and outside investors, either equity holders or creditors. A number of theoretical arguments apply to listed firms and most empirical studies on capital structure consider the largest firms in an economy. Firms are classified as small when falling into the smallest quartile or decile of the samples involved. It is plausible to assume that these "small" firms are complex organizational structures

[21] However, inasmuch as non-listed firms may be operating in different industries than listed firms, the levels and proportion of trade credits might differ.

with a higher degree of information asymmetry associated with them, since the number of analysts following such listed companies might be relatively fewer. Most of the firms employed in this study are non-listed firms and are much smaller than the firms studied previously. It is not inconceivable that the organizational structures of such firms are simple and that they are relatively focused in their operations. If one assumes close investor/creditor relations, it is pertinent to question whether the assumption of information asymmetry being higher for small firms still stands. If one was considering a sample of listed and non-listed firms with approximately the same size distribution, there would be more reason to accept the argument that smaller firms and especially non-listed firms would have a higher degree of information asymmetry associated with them. This is due to the fact that, in this case, the difference in the complexity of the organizational structures in the two groups is not likely to be too large. Given that listed companies must follow listing requirements which have high disclosure standards and the fact that any number of equity analysts dissect the implications of the various actions announced by these firms, the level of asymmetric information for listed firms would then be much lower than for non-listed firms. However, since the non-listed firms in the sample are smaller than the listed firms, it might be that the banks have lower information asymmetry when it comes to these firms. Of course, as stated before, listed firms might be using more short-term financing since they have higher growth options.

Table III. Leverage Measure of the Firms in the Sample

Leverage measures are calculated for all firms in the preliminary sample in 1998 (where observations have not been dropped due to missing values). The ratios are calculated by summing the numerator across all reporting firms in the category and dividing by the denominator summed across the same firms. The leverage measures are defined as follows: total debt is defined as the sum of corporate bonds (very few) and amounts owed to credit institutions scaled by total assets. Long-and-short term debt is defined analogously. The proportion of short-term financing is defined as the ratio of short-term debt to total debt. The values of fixed financial assets and trade credit have been scaled by total assets of the firm in question. Note that not all measure reported are employed in the regression analysis.

	All Firms	*Listed*	*Non-listed*
Total debt	.32 (.27)	.21 (.15)	.32 (.27)
Total long-term debt	.30 (.25)	.17 (.12)	.30 (.25)
Total short-term debt	.02 (0)	.03 (.003)	.02 (0)
Proportion short-term financing	.10 (0)	.23 (.03)	.10 (0)
Collateral	.57 (.49)	.28 (.18)	.57 (.49)
Fixed financial assets	.006 (0)	.02 (0)	.006 (0)
Total trade credit	.14 (.09)	.10 (.08)	.14 (.09)

Table IV reports the descriptive statistics and main firm attributes for the year 1998. Listed firms are, as to be expected, on the whole much larger than non-listed

firms. Non-listed firms have higher levels of current assets, interest coverage and tangible assets (all of which point out to their ability to carry higher debt). Average growth opportunities as measured by sales growth are lower for non-listed firms. Of course, realized growth or performance of the firms might not be the best proxy for growth opportunities since they do not necessarily reflect the investment and growth options of the firms, as mentioned previously. Non-listed firm income variance is much higher than that of listed firms. Non-listed firms are on the average more profitable than listed firms.

Table IV. Firm Attributes of the Firms in the Sample

The sample includes only non-financial firms. The ratios are calculated by summing the numerator across all reporting firms in the category and dividing by the denominator summed across the same firms. The variables are defined as follows; profitability=lagged profitability, non-debt tax shields=depreciation/total assets, tang= tangibility=fixed assets/total assets, sales growth=log of percentage change in sales from t to t+1, interest coverage= square root of income plus depreciation minus financial costs divided by financial costs, income variance = income variance measured as the standard deviation of change in income from t-1 to t. Current assets are scaled by the total assets of the firms in question. Total assets, number of employees and turnover are raw posts from the balance sheets. The values reported pertain to the mean and median values (in parentheses) of the categories and are for the year 1998.

	All Firms	***Listed***	***Non-listed***
Profitability	.06 (.06)	.02 (.06)	.06 (.06)
Non-debt tax shields	.07 (.04)	.05 (.04)	.07 (.04)
Tangibility	.37 (.30)	.30 (.21)	.37 (.30)
Sales growth	.005 (.003)	.01 (.005)	.005 (.003)
Current assets	.58 (.61)	.54 (.56)	.58 (.61)
Interest coverage	12.29 (3.24)	7.09 (5.75)	12.30 (3.24)
Income variance	5.28 (.87)	3.31 (.62)	5.30 (.87)
Total assets	54,177,338 (1,779,530)	5,638,938,620 (593,824,000)	37,141,845 (1,771,000)
No. of employees	26 (3)	2,850 (274)	18 (3)
Turnover	43,987,932 (2,673,476)	4,680,813,308 (607,124,000)	29,837,097 (2,662,000)

To check whether the two categories of firms are different, I employ the student's t-test and the Mann-Whitney test of differences between the total, long-term and short-term debt levels and the proportion of short-term financing of listed vs. non-listed firms. The results are reported in table V and indicate that the leverage of listed and non-listed firms does indeed differ as does the composition of their debt.

Table V. Univariate Tests of Differences between Various Leverage Measures of Listed and Non-listed Firms

Mean debt ratios and the results of the student's t-test and the Mann-Whitney test of differences between listed and non-listed firms' different measures of leverage are presented in the table below. All leverage measures are as defined in table III.

	Non-listed Firms	*Listed Firms*	*Student's t-test*	*Mann-Whitney (z)*
Observations	164,883	591		
Total debt	.32	.21	11.44	12.30
Observations	164,579	593		
Total long-term debt	.30	.17	12.93	14.45
Observations	163,969	601		
Total short-term debt	.02	.03	-5.12	-12.65
Observations	163,919	590		
Proportion short-term financing	.10	.225	-11.91	-14.32

C: Evidence on the Determinants of Non-listed firm Capital Structure

To test the effect of the explanatory variables discussed in the theory section on the different leverage measures of non-listed firms, I carry out the following pooled cross sectional regression:

$$Leverage_{it} = \alpha_i + \beta_1 size_{it} + \beta_2 profitability_{it-1} + \beta_3 non\text{-}debt\ tax\ shields_{it} + \beta_4 tangibility_{it} + \beta_5 growth_{it+1} + \beta_6 income\ variance_{it} + \xi_{it}$$

Where i= 1-----N refers to firms and t=1----T to time periods. The error term in the equation is i.i.d and uncorrelated across observations and with the exogenous variables.

Fixed effects regressions are run on the sample. The results of the pooled cross-sectional regressions and the fixed effects regressions are reported in tables VI[22]. By using firm fixed effects regressions, any cross-sectional variation that is invariant over time is highlighted. In the analysis that follows, I use winsorized ratios for the explanatory variables (1% and 99%) to eliminate the effects of any extreme values on the regressions. In what follows I give a very brief account of the results of the regressions run on the sample of non-listed firms.

[22] The Hausman test rejects the hypothesis that the random effect estimator is consistent, because individual fixed effects are correlated with the explicative variables in the regression equation.

Table VI. Regression Results for the Factors Correlated with Total Leverage.

Estimates are presented for ordinary least squares applied to the pooled sample and various fixed effects estimates, where dummies for listing have been introduced. The t-statistics have been corrected for eventual clustering of errors. Size is defined as the logarithm of total assets, profitability is measured as the lagged ratio of operating income to assets, non-debt tax shields as the ratio of depreciation to assets, tangibility is defined as fixed assets/total assets, growth as the logarithm of the percentage change from the current period to the next period, and income variance as the standard deviation of the percentage change in operating income between the current and the past period. Total debt is defined as the sum of bonds and all amounts owed to credit institutions. The sample employed includes all non-listed firms with total assets of more than SEK 100,000. The figures in italics under the OLS regression t-values are the beta weights of the explanatory variables, or the coefficients of the standardized variables.

	Total Debt OLS	***Total Debt Fixed Effects***	***Total Long-Term Debt OLS***	***Total Long-Term Debt Fixed Effects***	***Proportion Short-Term Debt OLS***	***Proportion Short-Term Debt Fixed Effects***
Profitability	-.07 (-20.43) *-.05*	.02 (7.00)	-.07 (-21.00) *-.05*	.02 (8.28)	.03 (8.87) *.03*	-.02 (-7.02)
Size	.009 (25.14) *.06*	.03 (18.93)	.009 (24.45) *.06*	.03 (16.11)	.002 (4.85) *.06*	-.005 (-2.32)
Non-debt tax shields	-.40 (-58.29) *-.14*	-.11 (-9.72)	-.48 (-68.17) *-.17*	-.13 (-11.62)	.29 (38.49) *.12*	.08 (5.28)
Tangibility	.39 (195.01) *.49*	.34 (74.38)	.37 (187.94) *.48*	.34 (73.31)	-.03 (-17.92) *-.07*	-.09 (-14.35)
Growth	-.22 (-24.22) *.06*	-.05 (-7.88)	-.24 (-26.13) *-.07*	-.05 (-8.68)	.19 (18.82) *.06*	.07 (8.08)
Income variance	-.0005 (-.18.81) *-.05*	-----	-.0005 (-18.67) *-.046*	-------	.0001 (4.08) *.01*	-------
Constant	.13 (23.07)	-.24 (10.27)	.12 (21.92)	-.20 (-8.41)	.03 (4.69)	.20 (5.92)
R2 within		.08		.08		.008
R2 between		.23		.23		.002
R2 overall/R2	.27	.23	.26	.22	.01	.002
Observations	164,259	164,259	164,002	164,002	163,919	163,919

The tables also report the beta weights, which are the regression coefficients for standardized data. This is the average amount the dependent increases when the independent increases one standard deviation and the other variables are held constant. The results on the regressions on the proportion of short-term financing have very low R^2's which calls into question the explanatory power of these regressions. In what follows I include the results of these regressions in the discussion.

I find that total and long-term debt as well as the proportion of short-term financing of non-listed firms is positively related to size and this effect is econometrically significant at the 5% level. That is, across non-listed firms, larger firms have more total and long-term debt and a higher proportion of short-term debt in their capital structure. The result on the proportion of short-term financing is not as predicted. However, as firms grow over time they reduce the proportion of financing that is short-term (once again the economic effect of this variable is very small).

I find evidence of the pecking order theory and find that the levels of total and long-term debt are negatively related to profitability and this effect is econometrically significant at the 5% level. In the cross-section, non-listed firms with higher profitability also have a higher proportion of short-term financing. All these results on profitability are as predicted. The pecking order theory has been confirmed in many other studies in the past especially for long-term debt. Evidence of leverage falling with increases in profitability has been found, for example in Kester (1986), Friend & Lang (1988), Gonedes et.al (1988) and Titman & Wessels (1988). Thus my results for non-listed firms are in accordance to previous studies. I do find that non-listed firms increase the levels of total and long-term debt with increases in profitability. As a firm's profitability increases, the level of its short-term financing falls. These results are significant and not as predicted given the "free cash flow" problem, which points out to the fact that this may not be very important for such firms.

Non-debt tax shields are negatively related to the total debt and long-term debt of non-listed firms. These results are both statistically significant and economically material. I find that non-listed firms decrease total and long-term debt with increases in non-debt tax shields with the result being statistically and economically significant. The proportion of short-term financing is increasing in non-debt tax shields (significantly). As non-debt tax shields increase, non-listed firms increase the proportion of financing that is short-term. The economic and statistical significance of the results of non-debt tax shields for non-listed firms indicates that these are important influences in the capital structure decisions of such firms.

Tangibility is positively and significantly related to total debt and long-term debt. This is in accordance to theoretical predictions and previous empirical results[23]. As pointed out in Rajan & Zingales (1995), close banking relationships should decrease the importance of tangibility (although they did not find this to be the case in their study). Given that most of the firms in the sample are quite small, it would be plausible to assume that they have close banking relationships and that this would decrease the importance of tangibility. This is not the case. Tangibility is negatively and statistically significantly related to the proportion of short-term financing. This would validate theory, as one would expect that increases in tangibility would cause firms to switch from short-term to long term debt. Non-listed firms reduce the proportion of short-term financing (the economic effect is quite small) in response to increases in tangibility.

All the results for the relationship between growth opportunities and leverage are statistically significant. I find that across firms, non-listed firms with more growth options have lower levels of both long-term and total debt, with the effect being economically material as well as statistically significant. The proportion of short-term financing for non-listed firms with higher growth options is also higher. This would allow firms with higher growth opportunities flexibility in project choice as well as avoidance of the underinvestment problem. The fixed effects regressions tell us that non-listed firms reduce total and long-term debt levels as their growth opportunities increase, with the results being statistically significant. As non-listed firms growth options increase over time, so does their proportion of short-term financing. The effect of income variability on total and long-term leverage is negative and statistically significant.

In summary, all the theoretical predictions on the relationship between debt levels and the independent variables are evidenced in this study of non-listed firms and generally confirm the results of a number of studies on listed firms. I find that growth, non-debt tax shields and tangibility have the most influence on the capital structure decisions of non-listed firms. I now turn to a comparison of the capital structure of listed vs. non-listed firms.

VI. A Comparison of Non-Listed and Listed Firm Capital Structure

As mentioned earlier, to carry out a more detailed comparison of listed and non-listed firm capital structure as well as check the importance of the factors commonly considered to affect capital structure choice, I have to refine my sample. In order to make the sample of listed and non-listed firms more alike, I try to "match" the median size (given by the total assets) of the listed and non-listed

[23] For example Bradley et. al (1984), Friend & Hasbrouck (1988), Friend & Lang (1988), Gonedes et. al. (1988), and Titman & Wessels (1988).

firms in the previous sample. This sample contains only the larger non-listed firms, so that the median assets of all non-listed firms are comparable to the median assets of the listed firms. This leaves me with a much smaller sample. I have a total of 3,035 firm year observations on a total of between 187 and 214 listed firms and 775 to 833 non-listed firms. Although the panel is still dominated by non-listed firms, listed firms now comprise roughly 20% of the total number of firms in the panel. A breakdown on the number of observations per year for listed and non-listed firms is given in table VII and the distribution of listed and non-listed firms into the size deciles is given in table VIII.

Table VII. Number of Firms in the Econometric Sample per Year in the "Matched" Sample of Listed and Non-Listed Firms

Year	*Total*	*Listed firms*	*Non-listed Firms*
1997	959	184	775
1998	1,029	207	822
1999	1,047	214	833
Total no. of observations.	3,035	605	2,430

Table VIII. Size Distribution of Listed and Non-listed Firms in the "Matched" sample

Average and median (in parentheses) total assets and number of firms represented in the size deciles. Total assets of both listed and unlisted firms in the econometric sample in 1998 are used in forming size deciles

	Average Total Assets	*Non-listed Firms*	*Listed Firms*
Smallest	138,512,805	23	80
	(123,772,500)		
2	285,047,188	99	4
	(285,068,000)		
3	343,999,836	100	3
	(340,908,500)		
4	428,535,653	97	6
	(435,372,000)		
5	544,273,918	94	9
	(543,217,500)		
6	745,082,924	90	13
	(733,165,000)		
7	1,081,696,039	88	15
	(1,058,394,500)		
8	1,847,892,320	87	16
	(1,802,924,000)		
9	3,703,556,010	86	17
	(3,496,169,500)		
Largest	25,746,110,409	58	44
	(12,526,000,000)		
		822	207

Table IX and X present the leverage measures and descriptive statistics for listed and non-listed firms. As can be seen, non-listed firms are much more heavily indebted than listed firms and the difference stems from the difference is long-term debt, since the level of short-term debt to assets is the same for both categories of firms. Listed firms have significantly higher levels of short-term financing in their capital structures (the t-statistic for the difference is -2.61). Non-listed firms are much more heavily collateralized than listed firms (the table reports the level of collateral scaled by total assets, but non-listed firms level of collateralization scaled by total debt is also higher than for listed firms). The student's T-test and the Mann-Whitney tests of differences presented in table XI confirm that listed and non-listed firm total and long-term debt is different as is their debt composition.

Table IX. Leverage Measure of the Firms in the Matched Sample

All the definitions of the variables are as in Table III. Here the sample contains 3,035 firm year observations on a matched sample of listed and non-listed firms.

	All Firms	***Listed***	***Non-listed***
Total debt	.32 (.25)	.21 (.15)	.35 (.28)
Total long-term debt	.28 (.20)	.17 (.12)	.31 (.23)
Total short-term debt	.03 (.003)	.03 (.003)	.03 (.003)
Proportion short-term financing	.18 (.01)	.23 (.03)	.17 (.02)
Collateral*	.37 (.25)	.28 (.18)	.40 (.26)
Fixed financial assets	.01 (0)	.02 (0)	.01 (0)
Total trade credit	.08 (.06)	.10 (.08)	.08 (.05)

Considering the descriptive statistics, it is clear that non-listed firms are more profitable than listed firms, have much higher levels of asset tangibility, interest coverage and income variance. The current assets of listed firms are higher than those of non-listed firms. Listed firms have higher sales growth than non-listed firms and remain much larger (on average) than non-listed firms (although the difference in size is not as extreme as in the earlier sample). The larger size, higher current assets and lower income variance point out to listed firms being able to carry higher debt levels than non-listed firms, whereas the greater asset tangibility and interest coverage of non-listed firms point out to non-listed firms' ability to carry higher debt. Inasmuch as high growth firms generally have lower asset tangibility and given the higher sales growth of listed firms, the latter would seem to have higher growth options (not just over one year). This would indicate that they should carry less debt given their concern with the debt overhang problem and given the lenders' concern with the asset substitution problem and this is exactly what is reflected in the table. On the other hand, the lower debt of listed firms might just confirm the conjecture of Rajan & Zingales (1995) that larger firms have lower information asymmetry associated with them and thus can opt to issue more equity.

Table X. Firm Attributes of the Firms in the Matched Sample

The sample includes only non-financial firms. The ratios are calculated by summing the numerator across all reporting firms in the category and dividing by the denominator summed across the same firms and are as defined in table IV. The values reported pertain to the mean and median values (in parentheses) of the categories and are for the year 1998.

	All Firms	***Listed***	***Non-listed***
Profitability	.05 (.06)	.02 (.06)	.06 (.05)
Non-debt tax shields	.04 (.04)	.05 (.04)	.04 (.03)
Tangibility	.47 (.40)	.30 (.21)	.51 (.46)
Sales growth	.005 (.002)	.01 (.005)	.004 (.001)
Current assets	.42 8.44)	.54 (.56)	.40 (.38)
Interest coverage	32.07 (3.09)	7.09 (5.75)	37.67 (2.84)
Income variance	17.75 (.35)	3.31 (.62)	21.80 (.32)
Total assets	3,110,856,470 (582,056,000)	5,638,938,620 (593,824,000)	2,474,222,644 (576,225,000)
No. of employees	1,209 (247)	2,850 (274)	789 (242)
Turnover	2,193,402,687 (535,984,000)	4,680,813,308 (607,124,000)	1,566,247,999 (525,341,000)

Table XI. Univariate Tests of Differences between Various Leverage Measures of Listed and Non-listed Firms in the Matched Sample

Mean debt ratios and the results of the student's t-test and the Mann-Whitney test of differences between listed and non-listed firms' different measures of leverage are presented in the table below. All leverage measures are as defined in table III.

	Non-listed Firms	***Listed Firms***	***Student's t-test***	***Mann-Whitney (z)***
Observations	2,965	591		
Total debt	.35	.21	14.29	9.50
Observations	2,958	593		
Total long-term debt	.31	.17	14.34	9.16
Observations	2,956	601		
Total short-term debt	.03	.03	0.48	-0.05
Observations	2,956	590		
Proportion short-term financing	.17	.23	2.61	3.89

I repeat the regressions in the last section (and follow the same methodology) on the matched sample of listed and non-listed firms). The difference is that I now add dummies for listing and interact them with the explanatory variables. I expect to find differences in the effects of these variables on the capital structure of listed versus non-listed firms as discussed earlier, with most of the differences being in the order of the magnitude of the effect of these variables and the effect they have on the debt composition of listed versus non-listed firms. The results are presented in table XII-XIV. The following is a short description of the results. In the tables as before, I report the beta weights of the main explanatory variables in the OLS regressions. These are the regression coefficients for standardized beta, which allows me to compare the importance of some of the explanatory variables. Beta is the average amount the dependent increases when the independent increases one standard deviation and the other dependents are held constant.

A. Firm size

Although I do not find any significant results for the effect of size on total debt in the OLS regressions, contrary to theoretical expectations, I find that firm size is negatively related to the long-term debt of both listed and non-listed firms in the cross-section. Thus across firms, larger firms have less long-term debt than smaller firms with no significant difference between listed and non-listed firms. Although these results are the opposite of what most empirical research has found, evidence of a negative relationship between size and debt is not unique. Rajan & Zingales (1995) found debt to be negatively related to size in Germany. They found this result puzzling given the institutional set up in Germany, which is very creditor friendly, implying that larger firms (i.e. safer firms) there should exhibit a more positive relationship between size and leverage than in other countries. They did not find this to be the case and could not explain this result. I find that there is a difference in how listed and non-listed firms react to growth in firm size over time. As non-listed firms grow larger, they increase the level of total and long-term debt in their capital structure; while there is no significant relationship for listed firms.

As far as debt composition is concerned, in the cross-section, larger firms have a higher proportion of short-term financing, with no significant difference between listed and non-listed firms. This is also contrary to all theoretical predictions, since smaller firms are not expected to have lower debt levels but to have a greater proportion of their financing being short-term or convertible debt (Titman & Wessels 1988).

Table XII. Regression Results for the Factors Correlated with Total Leverage for the "Matched" Sample of Listed and Non-Listed Firms.

The analysis of table VI is repeated here with the difference that dummies for listing have been added to both the OLS and fixed effects regressions. The table also reports the results of the regressions run on the sub-samples of listed or non-listed firms in the matched sample. The dependent variable in this table is total debt. All variables are defined as in table VI.

Total Debt	***OLS***	***Fixed Effects***	***OLS-Listing Status***	***OLS-Non-Listed Firms***	***OLS-Listed Firms***	***Fixed Effects-Listing Status***	***Fixed Effects-Non-Listed Firms***	***Fixed Effects-Listed Firms***
Profitability	-.04	.07	-.03	-.03	-.08	.10	.10	-.02
	(-1.13)	(3.06)	(-.55)	(-.67)	(-1.64)	(3.76)	(3.66)	(-.65)
	-.015		*-.011*	*-.01*	*-.05*			
Size	-.009	.04	-.009	-.009	-.009	.09	.09	-.0007
	(-1.51)	(4.15)	(-1.69)	(-1.12)	(-1.81)	(5.75)	(5.62)	(-.05)
	-.035		*-.04*	*-.03*	*-.10*			
Non-debt tax shields	-.17	.27	-.21	-.21	.13	.35	.35	.03
	(-1.83)	(2.44)	(-2.78)	(-1.94)	(.95)	(2.76)	(2.70)	(.10)
	-.04		*-.05*	*-.05*	*.04*			
Tangibility	.48	.24	.48	.48	.42	.21	.21	.33
	(22.60)	(.5.96)	(28.24)	(19.48)	(8.79)	(4.60)	(4.88)	(3.73)
	.57		*.57*	*.55*	*.58*			
Growth	-.10	-.06	-.09	-.09	-.18	-.04	-.04	-.09
	(-1.41)	(-1.15)	(-.75)	(-1.02)	(-1.77)	(-.75)	(-.75)	(-.98)
	-.02		*-.02*	*-.015*	*-.04*			
Income variance	-.0002	-----	-.0001	-.0001	-.0006	-----	-----	------
	(-1.00)		(-.87)	(-.65)	(-2.12)			
	-.02		*-.02*	*-.02*	*-.11*			
Profitability*listed			-.05			-.12		
			(-.63)			(-2.49)		
			-01					
Size*listed			-.0003			-.09		
			(-.06)			(-4.14)		
			-.01					
Non-debt tax shields*listed			.34			-.32		
			(2.70)			(-1.20)		
			.07					
Tangibility*listed			-.06			.12		
			(-1.44)			(1.13)		
			-.03					
Growth*listed			-.09			-.05		
			(-.49)			(-.43)		
			-.01					
Income variance*listed			-.0005					
			(-1.63)					
			-.03					
Listed			-.04					
			(-.27)					
Constant	.28	-.76	.32	.32	.28	-1.32	-1.68	.13
	(3.05)	(-3.35)	(3.12)	(2.08)	(2.99)	(-4.90)	(-5.03)	(.50)
R2 within		.05				.06	.06	.05
R2 between		.20				.06	.08	.38
R2 overall/R2	.34	.18	.71	.31	.35	.06	.07	.33
Observations	2,965	2,965	2,965	2,374	591	2,965	2,374	591

Table XIII. Regression Results for the Factors Correlated with Total Long-term Leverage for the "Matched" Sample of Listed and Non-Listed Firms.

This table reports the results of replicating the regression in table XII with the difference that the dependent variable now is long-term debt. All explanatory variables are as defined in table VI. Total long-term debt is defined as the sum of corporate bonds (very few) and long-term debt owed to credit institutions scaled by total assets.

Total LT Debt	*OLS*	*Fixed Effects*	*OLS-Listing Status*	*OLS-Non-Listed Firms*	*OLS-Listed Firms*	*Fixed Effects-Listing Status*	*Fixed Effects-Non-Listed Firms*	*Fixed Effects-Listed Firms*
Profitability	-.05	.06	-.05	-.05	-.07	.08	.08	-.04
	(-1.73)	(2.63)	(-1.07)	(-1.31)	(-1.74)	(3.27)	(3.17)	(-.87)
	-.02		*-.02*	*-.02*	*-.05*			
Size	-.02	.05	-.02	-.02	-.01	.11	.11	-.001
	(-4.32)	(4.96)	(-4.67)	(-3.21)	(-3.15)	(6.74)	(6.52)	(-.08)
	-.08		*-.10*	*-.08*	*-.16*			
Non-debt tax shields	-.15	.35	-.17	-.17	.08	.43	.43	.06
	(-1.69)	(3.17)	(-2.40)	(-1.70)	(.62)	(3.47)	(3.36)	(.32)
	-.04		*-.04*	*-.04*	*.03*			
Tangibility	.52	.26	.51	.51	.44	.24	.24	.21
	(25.50)	(6.31)	(31.83)	(22.29)	(9.03)	(5.49)	(5.31)	(2.54)
	.61		*.61*	*.59*	*.62*			
Growth	-.11	-.04	-.12	-.12	-.10	-.04	-.04	-.02
	(-1.52)	(-.83)	(-1.04)	(-1.38)	(-1.07)	(-.80)	(-.78)	(-.29)
	-.02		*-.02*	*-.02*	*-.02*			
Income variance	-.0002	-------	-.0001	-.0001	-.0004	----	-------	-----
	(-.99)		(-.90)	(-.68)	(-1.61)			
	-.02		*-.02*	*-.02*	*-.08*			
Profitability*listed			-.02			-.12		
			(-.30)			(-2.37)		
			-.006					
Size*listed			.01			-.11		
			(1.22)			(-4.87)		
			.19					
Non-debt tax shields*listed			.25			-.37		
			(2.12)			(-1.36)		
			.05					
Tangibility*listed			-.07			-.03		
			(-2.04)			(-.31)		
			-.05					
Growth*listed			.02			.02		
			(.12)			(.15)		
			.002					
Income variance*listed			-.0003			------		
			(-1.12)					
			-.02					
Listed			-.17					
			(-1.49)					
Constant	.43	-.99	.51	.51	.34	-1.62	-2.06	.13
	(5.32)	(-4.38)	(5.60)	(3.88)	(3.85)	(-6.05)	(-6.13)	(.47)
R2 within		.05				.07	.08	.02
R2 between		.17				.06	.07	.04
R2 overall/R2	.39	.16	.69	.36	.36	.06	.06	.03
observations	2,958	2,958	2,958	2,367	591	2,958	2,367	591

Table XIV. Regression Results for the Factors Correlated with the Proportion of Short-term Financing for the "Matched" Sample of Listed and Non-Listed Firms.

This table repeats the regression analysis of table XII, with the difference that the dependent variable now is the proportion of short-term financing, which is defined as the ratio of short-term debt to total debt. All explanatory variables are defined in the same manner as in table VI.

Proportion Short-term Debt	***OLS***	***Fixed Effects***	***OLS-Listing Status***	***OLS-Non-Listed Firms***	***OLS-Listed Firms***	***Fixed Effects-Listing Status***	***Fixed Effects-Non-Listed Firms***	***Fixed Effects-Listed Firms***
Profitability	.12 (2.40) *.04*	-.03 (-.92)	.14 (2.10) *.05*	.14 (2.29) *.05*	.03 (.34) *.01*	-.02 (-.35)	-.02 (-.36)	-.08 (-.99)
Size	.04 (6.93) *.17*	-.04 (-2.13)	.04 (6.26) *.15*	.04 (4.60) *.12*	.04 (3.58) *.24*	-.06 (-1.90)	-.06 (-1.94)	-.03 (-.93)
Non-debt tax shields	.16 (1.43) *.03*	-.28 (-1.43)	.17 (1.81) *.03*	.17 (1.35) *.04*	.24 (.83) *.05*	-.30 (-1.36)	-.30 (-1.39)	-.19 (-.42)
Tangibility	-.32 (-13.80) *-.33*	-.25 (-3.49)	-.36 (-18.08) -.36	-.36 (-13.09) *-.36*	-.29 (-4.49) *-.23*	-.28 (-3.50)	-.28 (-.3.57)	-.12 (-.64)
Growth	.11 (1.02) *.02*	-.11 (-1.26)	.19 (1.26) *.03*	.19 (1.50) *.03*	-.22 (.96) *-.03*	-.03 (-.40)	-.03 (-.41)	-.33 (-1.66)
Income variance	.0002 (.63) *.02*	-------	.0001 (.68) *.02*	.0001 (.52) *.02*	-.0004 (-.68) *-.04*	------	-------	-------
Profitability*listed			-.11 (-.86) *-.03*			-.06 (-.71)		
Size*listed			.0005 (.06) *.01*			.03 (.66)		
Non-debt tax shields*listed			.07 (.32) *.01*			.11 (.23)		
Tangibility*listed			.07 (1.47) *.04*			.16 (.85)		
Growth*listed			-.41 (-1.22) *-.04*			-.30 (-1.39)		
Income variance*listed			-.0005 (-1.10) *-.03*			-----		
Listed			-.07 (-.39)					
Constant	-.50 (-4.26)	1.22 (3.09)	-.37 (-3.18)	-.37 (-2.34)	-.44 (-2.29)	1.38 (2.90)	1.51 (2.67)	.86 (1.41)
R2 within		.01				.02	.02	.01
R2 between		.02				.002	.06	.02
R2 overall/R2	.13	.02	.42	.16	.08	.003	.05	.01
observations	2,956	2,956	2,956	2,366	590	2,956	2,366	590

B. Profitability

I do not find any statistically significant results on the effect of profitability on the debt of listed or non-listed firms. The pooled fixed effects regression results point out to non-listed firms increasing total and long-term debt levels over time as their profitability increases. Listed firms on the other hand reduce debt with increases in profitability over time. This result is contrary to what I expected, since non-listed firm debt is probably more expensive and more restrictive than that of listed firms, indicating that such firms would prefer to reduce debt levels whenever they can. As far as the relationship between profitability and the proportion of short-term financing in concerned, I find that across firms, both listed and non-listed firms with higher profitability have a higher proportion of short-term financing and this result is statistically significant and as predicted for non-listed firms (I had made no prediction on the effect of profitability on the debt composition of listed firms). Although this effect is less for listed firms, the difference from non-listed firms is not econometrically significant at the 5% level. Changes in profitability (in the fixed effects regressions) do not affect the proportion of short-term financing of listed or non-listed firms significantly.

C. Non-debt tax shields

The relationship between listed and non-listed firm total and long-term debt levels and the amount of non-debt tax shields they possess is different. Whereas, in the cross-section, non-listed firm measures of total and long-term debt are negatively related to non-debt tax shields, the opposite is true for listed firms. Only the results for non-listed firms in the pooled regression and the difference between listed and non-listed firms are significant and the relation between listed firm non-debt tax shields and debt is the opposite of what I predicted. Although the relationship of non-listed firms is as predicted by theory, the result obtained for listed firms has been evidenced before in Bradley, Jarrell & Kim (1984). In that paper, the authors concluded that their measure of non-debt tax shields based on depreciation and investment tax credits could be capturing the effect of tangibility and would thus explain their results. This is not the case here, since I find that non-listed firm debt is negatively related to non-debt tax shields in the pooled regression. I have not found any explanation for the difference between listed and non-listed firms' relationship between debt and non-debt tax shields. The fixed effects regressions indicate that increases in non-debt tax shields are positively related to the total and long-term debt levels of both listed and non-listed firms. In the pooled regression, there is no significant difference between listed and non-listed firms. There is no significant relationship between the levels of non-debt tax shields and the proportion of short-term debt for listed or non-listed firms.

D. Tangibility

This is the one variable that has the most economic impact on the total and long-term debt levels of both listed and non-listed firms and for which almost all the results are statistically significant. As expected, tangibility is positively and significantly related to the debt levels of all firms. Across firms, firms with more tangible assets have more long-term and total debt. The effect is significantly higher for non-listed firms' long term debt and the difference between listed and non-listed firms is significant and this is as predicted in the theory section. Also in accordance with theory, tangibility has a negative relationship with the proportion of financing that is short-term and this effect is higher for non-listed firms, however the difference between listed and non-listed firms is not significant. Over time, as a firm's asset tangibility increases, so does the level of its total and long-term debt while the proportion of short-term financing falls.

As mentioned before tangibility eases the availability of debt and improves the terms at which debt is available. In addition, given the imperfection of my proxy for growth, it might also reflect firms' growth opportunities. If one is to accept the contention that firms with low growth opportunities also generally have higher levels of tangible assets, then tangibility here could also been reflecting the inverse effect of growth on leverage levels. This would then mean that growth opportunities are very negatively related to total and long-term debt and positively related to the proportion of short-term financing. This would be in line with all the theoretical predictions and previous empirical results.

E. Growth

Unfortunately, all the results for growth are statistically insignificant. This is considered to be a reflection of a poor proxy for the growth opportunity set of non-listed firms. Growth opportunities are negatively (but insignificantly) related to the total and long-term debt of both listed and non-listed firms. Increases in growth opportunities are also negatively related to the total and long-term debt of all firms; however, once again the results are insignificant. Growth opportunities are positively (but insignificantly) related to the proportion of short-term financing of non-listed firms but negatively to the same of listed firms. Relative to non-listed firms, listed firms with higher growth opportunities have a lower proportion short-term debt.

F. Income variability

I find income variability to be negatively related to all debt measures. The results (with the exception of the effect of income variability on the total debt of listed firms in the separate regressions) are all econometrically insignificant. None of the results of the relation between income variance and the proportion of short-term debt are significant. Thus I do not discuss these results in any more detail.

VII. Summary & Discussion

I have investigated the capital structure of non-listed firms and compared it to that of listed firms, having made a number of predictions in the theoretical section. The following is a very brief summary of the results.

In general, looking at the full sample of non-listed firms, I find evidence for all the predicted influences of the determinants of capital structure on non-listed firm capital structure choice. However, all factors considered do not have substantial influence on the debt of non-listed firms. This is especially true for income variance and profitability. The two most important factors, judging by the beta weights are tangibility and non-debt tax shields making them the primary determinants of firm capital structure for non-listed firms.

Comparing the debt levels and descriptive statistics of listed and non-listed firms reveals the following. Non-listed firms are much smaller and have higher income variance than listed firms. Given the size distribution of the non-listed firms, it is likely that the agency costs related to the separation of ownership and control are much lower for them than for listed firms. Listed firms have higher growth. They also have fewer tangible assets, lower interest coverage, lower income variance and are less profitable than non-listed firms. Their debt levels are much lower than those of non-listed firms, with the difference stemming from the level of long-term debt. Listed firms also have a much higher proportion of short-term financing. Thus the capital structures of listed and non-listed firms do differ for the whole sample, with the latter being much more highly leveraged.

I use a smaller sample of matched firms to compare the relationship of listed and non-listed firm debt levels to the independent variables defined earlier. All the differences in the debt levels and descriptive statistics between listed and non-listed firms remain in the new sample, with the exception that listed firms have higher levels of current assets than non-listed firms in this new sample. There are some differences in the capital structure choices of listed and non-listed firms in the new sample which emerge from the multivariate regression analysis. Some differences are in the relation between the explanatory variable and the debt levels. Others pertain to the magnitude of the effect of the explanatory variables.

Contrary to my prediction, size is negatively related to the long-term debt of both listed and non-listed firms. Although contrary to most empirical findings, my results are not unique and have been evidenced before for listed firms. What is interesting is that for most non-listed firms (in the previous sample), size was positively related to long-term debt levels. I find that size is positively related to the proportion of short-term financing (this was true for non-listed firms in the larger sample as well). This is also contrary to what I predicted. I do not get any statistically significant results for profitability although the coefficients have the right sign. The effect of non-debt tax shields on the total and long-term debt of non-listed firms is negative while the opposite is true for listed firms. Once again, tangibility has the most influence on the debt levels of firms. The results for tangibility are as predicted, with tangibility being more important for non-listed firms. Finally, the results for income variance for the matched sample of listed and non-listed firms are not significant.

Given the above, one can draw a number of conclusions. For the larger firms in the sample, both listed and non-listed, larger size has a negative influence on leverage levels. This might validate the contention of Rajan & Zingales (1995) that larger firms have less information asymmetry attached to them and thus can and do issue equity at favorable terms. In the theory section, their contention was taken to relate only to the public markets, but it is possible that it is also true for firms wishing to raise equity in the private markets. In addition, I had contended that non-listed firms suffer less from the agency costs due to the separation of ownership and management. While this might be true of the whole sample, it is possible that the differences compared to listed firms are less for the larger non-listed firms. In any case, there is no evidence of debt being used in listed firms as a means to reduce the "free cash flow" available to managers. Alternatively, it is possible that there are other measures in place to deal with these agency problems such as effective governance or legal requirements and that capital structure need not be the most efficient way to deal with these problems. In addition, it might reflect the fact that the market for corporate control in Sweden is not sufficiently active to make the use of debt in this fashion efficient.

Finally, it is possible that the most important influence on the capital structures of both listed and non-listed firms, namely tangibility could also be reflecting the inverse influence of growth prospects on capital structure. The proxy for growth opportunities employed in the study has a number of weaknesses, since one year's realized growth is used to proxy a firms' growth opportunities. This, as is obvious need not be the same as the investment opportunity set facing a firm (which is the relevant measure to take into account when considering the effects of the asset substitution or the debt overhang problem). The proxy for growth most commonly used in empirical studies is market to book value. However, given that I am considering non-listed firms, I cannot employ this proxy. If one is willing to

make the assumption that firms with a large amount of tangible assets are the more mature firms (with fewer growth opportunities), this would also support the claim of Barclay & Smith (1996) that the primary driver of firms' capital structure is its investment opportunity set, and make growth important (in the regression analysis) even for the total and long-term debt levels for listed firms in my sample.

VIII. Conclusion

Using a unique sample of mainly non-listed firms in Sweden during the 1997-1999 period, I have considered the capital structure of non-listed firms (which have not been the subject of much research) in the light of capital structure theory and compared it to the capital structure of listed firms. By analyzing a large number of non-listed firms in Sweden, which comprise an important part of the economy, I have gathered evidence on the capital structure choice of the average firm in the economy. In contrast, most previous studies often employ samples of listed firms (which are generally much larger than non-listed firms), which probably reflects the aggregate capital structure choices in the economy but cannot be said to reflect choices made by the average firm in the economy. To my knowledge there is no other study on empirical capital structure which employs such an extensive sample of firms in a single country. By employing time series cross-sectional as well as fixed effects methodology, I am able to identify not only cross-sectional differences in capital structure choices, but also how firms change their capital structure in response to changes in the explanatory variables. Different agency costs have different implications for the composition of debt in the capital structure (long-term versus short-term debt). I therefore not only consider the total and long-term leverage of listed and non-listed firms but also the composition of debt by looking at the proportion of financing that is short-term in both categories of firms.

The capital structure of listed and non-listed firms is expected to differ based on a number of reasons. The importance of the various agency costs and information asymmetry costs are different for listed and non-listed firms. Non-listed firms (which are smaller than listed firms) are generally likely to be owner managed, which makes the importance of the agency costs related to the separation of ownership and management much less important for them than for listed firms. On the other hand, smaller firms are generally associated with higher information asymmetry. In this paper, I have questioned how this assumption applies to most of the non-listed firms studied here, which are likely to be simpler organizational forms with focused operations and close relationships to the banks. Listed and non-listed firms also have differing probabilities of costly bankruptcy since the latter have higher income variability. The growth options of non-listed firms and listed firms also differ, once again affecting the agency costs of debt. More basically, non-listed firms do not have the option of approaching public equity markets, and depend mainly on bank debt. This implies that in cases where listed

firms might reduce the level of total and long term debt in their capital structure, non-listed firms switch from long-term to short-term financing.

I find that the relationship between the factors considered to affect capital structure decision is as predicted for the whole sample of non-listed firms. I find tangibility and non-debt tax shields to be the primary determinants of capital structure choice for these firms. In my "matched" sample of listed and non-listed firms, I find a number of differences between listed and non-listed firms. Listed firms have higher growth options, less tangible assets, much lower levels of long-term debt and a much higher proportion of short-term financing. The higher growth of listed firms explains the differences between the debt levels and debt composition of listed and non-listed firms. The results of the regressions suggest that asset tangibility is the most important determinant of the capital structure, with tangibility being more important for non-listed firms. Non-debt tax shields are negatively related to the debt levels of non-listed firms but positively to the debt levels of listed firms (in the pooled regressions). The difference between listed and non-listed firms is significant. I cannot find an explanation of this phenomenon. Increases in non-debt tax shields have a positive and significant effect on the debt levels of non-listed firms. Another surprising result for this sample is that size is negatively related to the long-term debt levels of listed and non-listed firms. The result of non-listed firms thus changes when I include only the largest firms in the sample. Although in contrast to most empirical studies, this result on size is not unique. The coefficients on growth opportunities exhibit the correct sign for total and long-term debt, however the results are insignificant. My discussion on the proxy employed for growth opportunities, given that one cannot use the market to book ratio as a proxy, calls for better proxies of the growth opportunities facing non-listed firms.

Although there are some differences between the determinants of capital structure for listed and non-listed firms, tangibility has the most influence on the capital structure choices of the two categories of firms. If one is willing to make the assumption that firms with more tangible assets are the more mature firms with lower growth prospects, this would support the claim by Barclay & Smith (1996) that one of the primary determinants of the debt and debt composition of both listed and non-listed firms are the growth options faced by the firms.

This paper has taken a broad look at the capital structure of firms based on listing status. It would be interesting in the future to consider a small sample of non-listed firms and compare their debt covenants to those of listed firms. Such research is left to the future.

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The Capital Structure of Groups and Group-Affiliated Firms

Abstract

This paper compares the capital structure of groups and group-affiliated firms to that of stand-alone firms by utilizing a sample of Swedish firms for the years 1997-1999. The characteristics that are peculiar to groups and group-affiliated firms, especially their access to internal capital markets, imply different agency and information costs relative to stand-alone firms. In addition, groups have tools to reduce taxes not available to stand-alone firms. Since agency and information costs as well as firms' ability to utilize the debt tax shields affect the choice of capital structure, it follows that one should observe differences in the way groups (and group-affiliated firms) choose their capital structure relative to stand-alone firms. This paper therefore empirically addresses three questions. Is the leverage of groups (as a whole) different from that of stand-alone firms? Is the determination of the leverage of group-affiliated firms different from that of stand-alone firms? And finally, what is the effect of intra-group borrowing on group-affiliated firms' level of external debt? The contention is that the group form of organization significantly affects the capital structure choices of firms. Due to the presence of countervailing forces it is not possible ex ante to predict the sign of the difference in leverage levels between groups and stand-alone firms. In addition, I expect to find differences in the way the leverage of group-affiliated firms (which is also influenced by group-wide factors) is determined compared to stand-alone firms. In particular, I expect a number of firm level factors to be less important in determining the leverage of group-affiliated firms. Finally, it is expected that the existence of high levels of intra-group debt leads to lower levels of external debt, either because the internal markets substitute for external debt or because high levels of intra-group debt imply lower transparency and higher complexity, making it difficult for debt providers to judge the motives of the borrowing firms. I find evidence of all of the above in the analysis.

Keywords: capital structure, groups, leverage, internal capital markets, agency costs, transparency, complexity, intra-group debt.

I. Introduction

This paper sets out to empirically investigate the capital structure (in particular the leverage) of corporate groups and group-affiliated firms and compare it to that of stand-alone firms. It also analyzes the impact of the internal capital market (that group-affiliated firms have access to) on the external (non-group) debt of such firms. More specifically it analyzes the impact of intra-group debt on the external debt levels of group-affiliated firms.

Corporate groups, which are prevalent in emerging markets and common in Continental Europe[1], are generally characterized by close business relations between member firms, cross-ownership stakes and the limited liability of firms within the group. As Kraakman et al. (2004) point out; some kinds of groups are obvious. These include holding company structures (for ex. U.S style public companies with wholly owned subsidiaries), family and state-owned companies with multiple subsidiaries (common in Continental Europe), and dominant shareholder structures in which the tight link between companies is through cross-shareholdings and where the largest companies appear to lead. Harder to identify are coalition structures where several companies control a set of firms linked by cross-holdings (typical in France, Italy and the Netherlands) and managerial structures in which group level control is exercised without a controlling shareholder coalition. The last has been said to occur in Japan (Kraakman et. al (2004)). Although the German groups, Konzern, have different characteristics, the most prevalent form is that of a parent firm exercising substantial control in subsidiaries. Since the group form of organization is very common in a large number of countries, it provides interesting opportunities for study. The definition of the term corporate group as employed in this paper is that of formal groups, i.e. firms linked together by subsidiary/ parent firm relationship[2] and is thus similar to the German Konzern and the US holding company structure.

Organizational form may affect financing patterns and value creation (Coase (1960) & Williamson (1985)). The structure of groups gives rise to a number of characteristics which distinguish such firms from stand-alone firms (here taken to be firms which are not linked to other firms through parent/subsidiary relationships). These include, inter alia, availability of tools for reducing the total

[1]Chang, Khanna and Palepu (1999), Claessens et.al. (2002) and Guillen (2000) have documented the prevalence of business groups in emerging economies. The consensus seems to be that in such economies these groups fulfill an important function in the face of information problems and other market imperfections. The instance of substantial group structures in European countries has been documented by Barcha and Becht (2001).

[2] The definition of group used in the present paper is a legal form of organization (koncern). It is important to note that I am not studying pyramids (although there might be a few in the data, most of the firms in the sample have very high cash flow rights by the parent firm). Business groups are defined as limited liability firms that are connected to each other through ownership by the parent firms. According to Swedish accounting practices, a business group consists of a parent firm and one or more subsidiaries. The parent firm is the firm, which directly or indirectly owns more than half of the voting shares in the subsidiary.

tax burden of the group, access to internal capital markets which make income smoothing and the ability of group members to service their debt obligations easier, lower transparency and higher complexity. Since taxes, bankruptcy costs (both direct and indirect), agency costs and information asymmetry are important determinants of capital structure decisions it follows that the capital structure of groups (and group-affiliated firms) should differ from that of stand-alone firms. The above also implies differences in the importance of firm level factors that are commonly considered in empirical capital structure studies between groups and stand-alone firms.

This paper empirically examines the effect of the group form of organization on capital structure. To this end, the utilization of external (non-group) debt by groups is compared to that of stand-alone firms using data on Swedish firms for the years 1997-1999. I examine any systematic differences in the importance of firm level factors between groups (and group-affiliated firms) and stand-alone firms. In addition, I separately investigate the effect of intra-group debt on external debt levels of group-affiliated firms by checking for differences in debt (both in level and response to the factors affecting it) based on whether group-affiliated firms have intra-group debt or not.

There is relatively little empirical research on the capital structure of groups and group-affiliated firms and it is therefore of interest to gain further empirical evidence on the subject. Most of the research on groups deals with the effect of the group form of organization on value (for ex. Rajan, Servaes and Zingales (2000) and Claessens, Fan and Lang (2002)). The papers most related to this study are those of Manos, Murinde and Green[3] (2007) and Verschueren and Deloof (2006). The first paper studies the capital structure of listed group-affiliated firms in an emerging market perspective, in particular in India, and compares it to that of stand-alone firms, taking into account some group-wide influences including group size, group profitability and group debt levels. The second is a study of the effect of intra-group debt levels and intra-group guarantees on the external debt of Belgian group-affiliated firms, where group-wide factors have not been accounted for due to the difficulty in establishing the structure of groups in Belgium. My paper endeavors to supplement the findings in the above studies. To this end it studies not only group-affiliated firms but also groups as a whole and considers both listed and non-listed firms. In addition my study investigates whether the effects of intra-group debt on external debt found in Belgian study are found in the Swedish sample[4] i.e. whether the findings in the stated study have broader application or whether they are a peculiarity of Belgian firms.

[3] Their paper specifies a generic model for the capital structure decisions of group-affiliated and stand-alone firms. They then carry out an empirical investigation comparing the capital structure of the two categories of firms.

[4] The authors in the paper state that they do not know if their results are due to the Belgian tax code or apply more generally due to information asymmetry problems in financial markets. It is therefore useful to compare the results I obtain with those found in their study.

The findings of this paper lend empirical evidence to the view that organizational form affects the financing structure of firms. I find that the capital structure of groups as a whole is indeed different from that of stand-alone firms; that the determination of group affiliated firm capital structure is significantly influenced by group-wide factors and that intra-group debt transactions have a negative effect on the external debt levels of groups. My results on the negative influence of group-wide size and profitability confirm the results in Manos, Murinde and Green (2007)[5]. They also confirm the results of Verschueren and Deloof (2006).

On the whole the group form of organization has a positive effect on leverage levels although this effect is lower the more complex a group is (where complexity has been proxied by the size of the group) and the lower the transparency within the group is (where the incidence and scale of intra-group debt transactions are used as a proxy for lower transparency). A number of explanations for the finding of the positive relationship between the group form of organization and leverage levels are possible. The size effect could explain this phenomenon since groups are much larger than stand-alone firms in general. However, the positive affect of the group form on debt levels remains after controlling for size. Group asset structure (with more tangible assets) and higher levels of collateralization (possibly to mitigate the complexity and lack of transparency problems) may also explain their higher leverage. The higher leverage of groups might also indicate that although the creditors of groups are generally more vulnerable to expropriation[6] (Kraakman et al. (2004)) than those of stand-alone firms, there are effective legal and governance measures in place to mitigate this problem. Lastly, it is possible that groups may have a comparative advantage in being able to reduce the fixed costs of raising debt (thereby bypassing any deadweight loss of raising debt[7]). This paper does not explicitly investigate the latter two possibilities.

The results on the influence of group-wide variables in determining the capital structure of group-affiliated firms points to the fact that the leverage decisions of such firms are based on very different considerations than are the leverage decisions of stand-alone firms. I find that group-wide profitability and group size have strong negative effects on the debt of group-affiliated firms as does an increase in the level of debt of the other firms in the group. This would indicate that considering group-affiliated firms' leverage decisions in isolation gives only a partial explanation of their choices. The results on the negative relation between external debt of groups and the incidence-and-scale of intra-group debt indicate

[5] These authors also found that group-wide debt levels exert a negative influence on the leverage of group-affiliated firms. I find this to be true in a sample which only includes firms which utilize some form of debt but not for the whole sample, which includes firms both with and without leverage. However, increases in group-wide debt have a significantly negative effect on the debt of all group-affiliated firms in my study.

[6] It is worth noting that there is considerable debate on this issue, with others claiming that it is the minority holders who are most vulnerable to expropriation.

[7] Matsusaka & Nanda (2002)

that group debt is used as a substitute to external debt and/or it exacerbates the problems related to group complexity and lack of transparency.

The rest of the paper is as follow: Section II relates the reasons for the expected differences in the capital structure of groups and stand-alone firms to the literature and outlines the hypotheses. It also explains why the response of group-affiliated firm debt to firm level factors should differ from that of stand-alone firms and how intra-group debt is expected to affect external debt levels. Section III carries out a comparison of the capital structure of groups compared to that of stand-alone firms. Section IV compares the effect of firm level factors on group-affiliated firms' debt vs. their effect on stand-alone firms' debt. It also gauges the effect of group-wide factors on the leverage of group-affiliated firms. Section V studies the effect of intra-group debt on external (non-group) debt levels. Section VI concludes.

II. Theory and Hypotheses

1. The Debt of Groups and Group-affiliated Firms vs. Stand-Alone Firms

In this section I highlight reasons why formal groups' capital structure should differ from that of stand-alone firms and relate this reasoning to the theory of capital structure, groups and internal capital markets. Some of the theories cited do not explicitly consider the effect of the group form of organization on capital structure. In these cases, I have extended the logic of the arguments in the theory and related them to capital structure.

i) Difference in the Leverage of Groups vs. Stand-Alone Firms

There are a number of characteristics which distinguish corporate groups from stand-alone firms. Groups are generally larger, more visible, more diversified and complex than stand-alone firms. The larger size and visibility implies that such firms are generally followed more closely by the investment community. The parent firm in a group generally has very high incentives to monitor the firms in the group and acquire information. Groups are generally less transparent to outside investors who find it more difficult to analyze corporate groups compared to stand-alone firms.

Groups have access to internal capital markets. This allows them to shuffle funds[8] between group members and smooth income (Matsusaka & Nanda (2002)).

[8] The degree to which this is possible depends in large part on the ownership levels of the parent firm in the subsidiaries. The parent firms in my sample have a very high degree of ownership in the subsidiaries.

The reshuffling of funds within members of a group makes it easier for members of the group to meet their maturing debt obligations. This reshuffling of funds can be efficient; whereby funds are redirected from cash rich firms with low investment opportunities to firms which are cash strapped but have a large number of promising investment opportunities (Stein (1997)). On the other hand, funds may be reshuffled to weaker units (units which in reality need to be downsized or closed down) from stronger units in a "socialistic fashion" (Scharfstein & Stein (1997)). Although the functioning of the internal capital markets can be efficient or inefficient, in most cases very active capital markets make groups more difficult to analyze for outside investors due to increased complexity and lower transparency of such groups and since outside investors are not sure of the true reasons behind the movement of funds (Dewenter, Novaes and Pettway (2001)). Funds in a group can be reshuffled in a number of ways, for example, through intra-group debt transactions, intra-group pricing, intra-group subsidies, etc. The ability to move funds around in the group, also provides groups with tax planning tools not available to stand-alone firms (for example, intra-group subsidies in Sweden are almost exclusively used as a tax reducing tool). Given the differences between groups and stand-alone firms there are a number of reasons for expecting the leverage in groups to differ from that of stand-alone firms.

As mentioned above, groups have access to tax planning tools not available to stand-alone firms. This would imply that the advantage of the debt tax shield (as well as the non-debt tax shield provided by depreciation) is less for groups compared to stand-alone firms. Since the static trade off theory implies that firms balance the advantages of the debt tax shields versus the risk of costly bankruptcy, the extra tools groups have to reduce taxes would imply that groups might not want to take on as high levels of debt as stand-alone firms.

The larger size of and higher degree of diversification within groups implies lower expected bankruptcy and financial distress costs. This would indicate that they carry higher leverage than stand-alone firms. This is based on the arguments of Titman & Wessles (1988), who consider firm size (since larger firms are more diversified) to be an inverse proxy of the probability of default. Diversity reduces cash flow volatility making it more likely that the group can meet its maturing debt obligations. This implies that given costly bankruptcy, compared to the average stand-alone firm, groups can take on more debt in their capital structures.

By virtue of their (generally) larger size, groups are also highly visible. Visibility implies that the investment community follows them closely. This would make them highly aware of reputational concerns (Diamond 1989). Concern for their reputation should curb opportunistic behavior by the group. Given this, credit should be available to groups (and group-affiliated firms) quite easily and possibly at better terms than is available to stand-alone firms. This would imply that groups carry higher levels of debt than stand-alone firms.

The existence of moral hazard and other agency costs in combination with information asymmetry implies that the internal capital market provides a cheaper substitute to external finance. Having access to internal capital markets would then reduce the groups' need for external finance. Groups may therefore have less debt in the capital structures than stand-alone firms.

As mentioned above, the parent firm in a group has the ability to reshuffle funds in a group. Funds in a group may be channeled to various member firms, not on the basis of their performance or investment opportunities, but in a "socialistic" fashion. Scharfstein & Stein's (1997) model explains how the conglomerate form of organization can exacerbate investment inefficiencies such as overinvestment and inefficient cross subsidization that arise from managerial agency problems. They point out that cross-subsidies tend to be "socialistic" in nature, i.e. strong divisions subsidize weaker ones. Managers of the different divisions engage in rent seeking activity to have funds allocated to their divisions instead of spending time on productive activities. If headquarters believes it is personally less costly to distort investment it will do so in favor of divisions whose managers require larger bribes, thereby conserving cash payments. Evidence of inefficient cross-subsidization has been documented in Chang and Hong (2000) although there is evidence to the contrary. Rajan, Servaes and Zingales (2000) also show that multidivisional firms could be value reducing where headquarters uses inefficient cross-subsidization. Matsusaka and Nanda's model (2002) highlights the cost of internal allocation, which is the exacerbation of the over-investment problem (however, their model deals with trade-off of the advantage of internal resource allocation in multi-business firms, which is the ability to avoid the deadweight transaction costs of raising external debt more often than single business firms, with the agency problem of over-investment). Given these scenarios, where the managers would be inclined to over-invest it is plausible that groups will carry less debt than stand-alone firms. This is due to the fact that in such situations, groups would try to utilize the retained earnings in the group since they do not want their actions scrutinized by external providers of financing. Banks are also aware of this moral hazard and can be expected to be wary of the overinvestment tendencies that certain groups may be subject to and may not be willing to lend them funds at favorable terms or only under highly restrictive covenants.

The presence of strong controlling shareholders who are not the managers in the parent company (and are more interested in reducing over-investment than in expropriating creditors and minority shareholders) might imply that they require the group to take on high debt levels in order to curb the over-investment tendencies of their managers. By reducing the free cash flow available to the managers, the controlling shareholders can thus reduce the scope for managerial overspending (based on the logic of Jensen (1986)).

Groups might carry lower levels of debt if the systems of governance and creditor protection are weak. The group form of organization might adversely affect the creditors in two ways as argued by Kraakman et al. (2004). They state that group structure reduces transparency since it blurs the divisions between the assets of group members and by (often wrongly) suggesting that the entire group stands behind each member's debt. In addition, the structure of the group allows the controlling parties to set up the terms of intra-group transactions and thus assign (and reassign) value within the group. According to the authors, sometimes such transactions are designed solely in order to extract value from creditors or minority shareholders of a group member. They state that it is, however, creditors who are more often injured by such transactions. As an example they state that the entire group might gain a production, distribution or tax advantage by shifting assets from one member to another, even if this shift makes the transferor's debt far riskier and thus injures its creditors (absent explicit guarantees from other group members).

The ability of the parent firm in the group to reshuffle funds between member firms can also be done in an efficient manner. Efficient internal capital markets can create value for the firm. Stein's (1997) model shows how internal capital markets may create value given that the headquarters (which is the counterpart of the parent firm in a group) can channel funds to divisions with the best investment prospects or "winner pick" [9]. They can thereby create value without easing credit constraints. Based on the logic of the above argument and the implications of the pecking order theory which shows how firms prefer internal financing to external financing (Gordon Donaldson (1961), Myers & Majluf (1984)), it follows that for the same number of investment opportunities, groups with efficient internal capital markets (being more profitable by virtue of "winner" picking) would employ less debt than stand-alone firms. As such their debt levels should be lower than those of stand-alone firms.

The larger group size in conjunction with a large number of intra-group transactions (i.e. the workings of internal capital markets) can also have negative effects on the leverage levels carried by groups. This is due to the higher complexity and lower transparency within groups in general.

Large groups are generally more complex. The complexity of a group might dominate the advantages of larger size (in reducing the probability of costly bankruptcy and financial distress), reputational concerns and diversification. As group complexity increases, the ability of outsiders to detect opportunistic behavior declines. Dewenter, Novaes and Pettway (2001) study IPO initial returns to evaluate the trade-off between visibility and complexity. They find that the complexity issue dominates visibility. It is plausible then that the complexity of a

[9] Perotti and Gelfer (2001) also show that headquarters can allocate scarce financial resources to the best projects.

group would cause it to have lower debt levels since lenders have more difficulty in judging the underlying reasons for why a group or a group-affiliated firm wishes to borrow[10]. Although the level of information production and monitoring may be higher within groups, it is not always the case that this information is easily available to outside investors. In this case the large size of the group (which is very complex) could have a negative effect on its debt level. One simple way of judging the complexity of groups is by the size of the groups. Since groups tend to be larger than stand-alone firms in general, it then follows that they might generally also be more complex, which would result in their having lower debt levels.

Groups with very active internal capital markets (having a large number of intra-group transactions including intra-group debt transactions) reduce transparency. In this case as well, it is very difficult for lenders to decipher the true reasons for the borrowing as well as know where the funds that they lend to a group member will eventually end up in the group. This can also have a negative effect on the leverage levels of groups.

As is clear from the above discussion, there are convincing arguments both for why groups should have more or less debt than stand-alone firms. A summary of these is given in table I. As such no prediction is made about the effect of the group form of organization on debt levels.

[10] In the study cited, it is stated that two of the authors worked as credit officers (in Asia and Latin America) for New York money center banks during the 1980's. They state that they spent substantially more time analyzing the credit worthiness of group firms than independent (stand-alone) firms. In addition, Khanna & Palepu (1999) proxy greater transparency in their study of Indian group affiliated firms by a lower incidence of intra-group financial transactions (where these transactions are defined as investments in group firms, intra-group receivables and loans received from firms within the group).

Table I. Reasons Why Groups Would Carry More or Less Debt than Stand-alone Firms

Factors which might cause groups to carry more or less debt than stand-alone firms	*Effect of the factor on groups*	*Effect on groups' external (non-group) leverage*
Additional tax planning tools available to groups	Lowers need for the debt tax shield	–
Larger size and diversification of groups	Lower expected bankruptcy and financial distress costs	+
Higher visibility of groups	Higher reputational concern and lower incentive to act opportunistically towards creditors	+
Groups access to internal capital markets	In the face of agency and asymmetric information costs, internal markets can function as a cheap substitute to external finance	–
Ability of parent firm to reshuffle funds between firms in the group in the presence of inefficient ("socialistic") internal capital markets	Exacerbates the overinvestment tendencies of management	–
Given overinvestment tendencies of managers, parent firms' ability to reshuffle funds, higher complexity and lower transparency of groups, controlling shareholders might want to restrict the free cash flow available to managers	Use of debt as a disciplining device by controlling shareholders	+
Weak governance and creditor protection	Creditors fears of being expropriated	–
Ability of parent firm to reshuffle funds between firms in the group in the presence of efficient internal capital markets	Group might be able to fund more projects due to higher profitability achieved by "winner picking"	–
Complexity of groups (given, inter alia, by size of group)	More difficult for credit providers to analyze groups	–
Lower transparency (affected, inter alia by the number of intra-group transactions)	Difficult for credit providers to judge motives behind borrowing	–

ii) The Influence of the Determinants of Capital Structure in Groups vs. Stand-alone Firms

The previous sub-section discussed the reasons for expecting the leverage decisions of groups to differ from those of stand-alone firms. I now turn to consider the effect of the factors discussed in the previous section on the leverage decisions of groups vs. stand-alone firms. Empirical capital structure literature has employed a relatively short list of proxies that are used to test for the effects of these factors, i.e. for the effect of taxes, bankruptcy and financial distress costs as well as the costs related to agency problems and information asymmetry on the leverage decisions of firms. The effects of some of these firm level factors (proxies)

are expected to differ between groups and stand alone firms due to some of the characteristics peculiar to groups[11]. The following discussion pertains to how groups and stand-alone firms are expected to show different sensitivities to the factors considered which include firm size, profitability, non-debt tax shields, asset tangibility, growth prospects and income variance.

As mentioned earlier, leverage is generally expected to increase in firm size (Titman & Wessels (1988) & Diamond (1989[12]). Evidence of this has been found in Rajan & Zingales (1995)[13], Titman & Wessels (1988) and Barclay & Smith (1995). I expect this to be true for most of the stand-alone firms, however, as the arguments in the foregoing sub-section suggest, the countervailing forces of visibility (as well as size and reputation) and complexity (and the lack of transparency) do not allow me to make any clear prediction of the effect of size on group leverage.

There are competing arguments on the effects of profitability on capital structure decisions; Ross (1977), Jensen (1986) and Stulz (1990) all suggest different reasons for why debt should increase in profitability, while Myers & Majluf (1984) suggest the opposite. The majority of previous empirical studies have evidenced a negative relationship between profitability and firm leverage confirming the pecking order of financing choices[14] predicted by the model by Myers & Majluf (1984). These include Rajan & Zingales (1995), Kester (1986), Friend & Lang (1988) and Titman & Wessles (1988). Given the prevalence of empirical evidence concerning the negative relation of profitability to debt, I expect to find this to be true for all firms in the sample. It is less straight-forward to predict differences in the magnitude of this effect on groups vs. stand alone firm leverage. Groups with efficient internal capital markets (being more profitable) would have the ability and incentive to take down slack whereas groups with inefficient internal capital markets interested in overinvestment would want to invest the slack inefficiently. I do not study internal capital market efficiency and can not make any distinction between groups based on efficiency. In addition, as the previous sub-section illustrates, there are a number of other countervailing forces at work, which do not allow me to make any prediction on the difference in the relative importance of this variable on group vs. stand-alone firm debt.

Non-debt tax shields are expected to reduce the importance of the debt tax shield (De Angelo & Masulis (1980) and Bradley, Jarrel & Kim (1984)) which makes the expected relationship between leverage and non-debt tax shields negative. I expect to find this to be the case for stand-alone firms. Non-debt tax shields (more particularly my proxy of non-debt shields in the form of

[11] In the regressions, for the sample as a whole I get the results predicted by theory and validated by most empirical results. Differences in the magnitude of the effect of some factors emerge in the divided sample.
[12] This is because larger firms tend to be older firms and are thus concerned about their reputations.
[13] They did not find this to be true in Germany, but for the other G7 countries they studied.
[14] Gordon Donaldson (1961)

depreciation) are expected to have very little impact on the leverage of groups since they have alternative means of reducing the total level of taxes for the group.

Tangibility is expected to be positively related to debt levels (Scott (1977), Harris & Raviv (1990), and Myers and Majluf (1984). This has been empirically verified in Bradley et al. (1984), Friend & Hasbrouck (1988), Friend & Lang (1988), Gonedes et al. (1988), and Titman & Wessels (1988). The existence of the same countervailing forces which did not allow me to make a prediction on the effect of size on group leverage, do not allow me to make any predictions concerning the relative importance of tangibility for groups. vs. stand-alone firms.

Growth options are expected to be negatively related to debt (Myers (1977), Jensen & Meckling (1976) and Stulz (1990)). Firms with high growth options prefer the more flexible forms of financing, opting either for short-term debt or equity finance (Titman & Wessels (1988) and Barclay & Smith (1995)). This in order to avoid two agency costs related to debt namely the underinvestment problem (Myers (1977)) and the asset substitution problem (Jensen & Meckling (1976)). Since groups have access to internal capital markets, they are likely to be less at the mercy of lenders than stand-alone firms and might be able to finance growth opportunities using internal capital markets. This leads me to expect that stand-alone firms' debt levels are more sensitive to growth options.

Lastly, income variance is expected to be negatively related to debt (Bradley, Jarrell and Kim (1984) and Castanias and DeAngelo (1981). Empirical evidence of this is found in Bradley, Jarrell and Kim (1984). This is due to the positive relation between income variability and the probability of bankruptcy. Since funds can be moved around within the group and member firms can coinsure the debt of the firms in the group, they might have lower income variance by virtue of being more diversified than stand-alone firms. However, there is no reason to expect any difference in the relationship of income variance to debt levels of groups (as a whole) or stand-alone firms. This applies both to the sign of the relationship (negative) and the magnitude.

iii) The Effect of Firm Level Factors on the Debt of Group-affiliated Firms vs. Stand-alone Firms and the Effect of Group-wide Variables on the Debt of Group-affiliated Firms

In this section I shift the focus of the analysis from the level of groups as a whole to the level of group-affiliated firms and compare such firms to stand-alone firms. The reason for doing so is to try to establish whether 1) group-affiliated firms' leverage is determined in the same way as stand-alone firms' leverage and 2) to investigate the effect, if any, that group-wide factors have on the leverage decisions of group-affiliated firms. If the empirical analysis later shows that group-

wide variables exert an appreciable influence on the leverage decisions of group-affiliated firms, this would imply that comparing the leverage decisions of group-affiliated firms to that of stand-alone firms without taking account of group-wide factors only gives a partial explanation of their capital structure choices.

I therefore investigate the relationship of firm level factors to the leverage of group-affiliated vs. stand-alone firms. I also separately consider the effect (if any) of group-wide variables on the leverage of group-affiliated firms. The expectation is that group-affiliated firms' leverage is less sensitive to the firm level factors (with the exception of size and tangibility for which I make no predictions) considered here than is the leverage of stand-alone firms. At the same time, it is expected that the same explanatory factors considered on a group-wide basis should significantly affect the debt of group-affiliated firms.

No prediction is made about the effect of size on the debt levels of group-affiliated firms due to the countervailing forces mentioned in the last sub-section. I expect to find that the impact of profitability on leverage levels is lower for group-affiliated firms compared to stand-alone firms. This is due to the fact that groups can utilize internal capital markets and move slack from cash rich firms in the group to those firms with high growth opportunities but less cash implying that the debt of the group-affiliated cash rich firms might not react at all to increases in profitability.

Based on the reasoning of the previous section, I expect the negative relationship between non-debt tax shields and debt and growth and debt to be weaker for group-affiliated firms. I expect to find that income volatility is not as important to group-affiliated firms as it is to stand-alone firms due to the mutual coinsurance of firms within a group, whereby funds can be moved between group-affiliated firms so that they can meet their debt obligations. I make no predictions concerning any difference in the relative importance of tangibility to the debt of groups vs. that of stand-alone firms due to the same reasons stated in the previous section.

As far as the group-wide factors are concerned I expect that these effect the leverage decisions of group-affiliated firms, however, it is not always straightforward to establish the sign of the effect due to the same countervailing arguments discussed in earlier sections. The only predictions which I am able to make on the factors considered earlier concern non-debt tax shields (as represented by depreciation expense) and growth. Given the group's access to other tax planning tools, group-wide non-debt tax shields are not expected to have an incremental affect on the debt of group-affiliated firms. Group-affiliated firm debt is expected to be affected by the group-wide growth opportunities. This effect is expected to be negative but might not be significant if the group is able to fund a large part of its growth opportunities using the internal capital market. I add an

additional variable in this analysis, which is the debt of all other firms which belong to the group. It is expected that the incidence of very high levels of debt in the group should have a negative impact on the debt level of a member firm, given member firms' role in coinsurance and income smoothing.

I thus do not predict the effect of group-wide profitability, size, tangibility or income volatility on the leverage of group-affiliated firms. On the one hand, group-wide profitability affects the amount of funds available for reshuffling within the group, and thus can be expected to have an incremental negative effect on the debt of group-affiliated firms if they were to use slack to reduce debt in keeping with the pecking order theory. On the other hand, inefficient groups might have incentives to over-invest and thereby not reduce debt. The arguments earlier concerning size, tangibility and income volatility also make it difficult to predict the sign of the effect of these variables on a group-wide level. The effect of group-wide income volatility is difficult to establish since the effect of being able to reshuffle funds to meet maturing debt obligations might dominate the negative effect of income volatility in general.

2. The Effect of Intra-group Debt on Group Affiliated Firm Debt Levels

This section tries to investigate the impact of one part of the internal capital market, more particularly of intra-group debt on the external debt levels of group-affiliated firms. The questions asked here are 1) whether the level of external debt is different between group-affiliated firms with and without intra-group debt and 2) whether the level of total debt (external debt plus intra-group debt) is higher for firms with intra-group debt. Most of the arguments here refer to the discussions above and present reasons for why the existence and level of intra-group debt could affect the amount of external debt in the capital structure of group-affiliated firms.

Internal capital markets with highly utilized intra-group borrowing could function as a substitute to external debt and result in a group-affiliated firm carrying less external debt in its capital structure. In addition, the existence of a large number of intra-group transactions including a large number of intra-group debt transactions would exacerbate the transparency and complexity issues mentioned earlier. Thus we may see that firms with intra-group debt have lower levels of external debt not because the internal capital market substitutes for external debt, but because it is very hard for external debt providers to analyze such firms, resulting in them not extending large amounts of debt to such firms.

If however, firms in the group guarantee each other's debt, this might mitigate the problems for firms with large numbers (or amount) of intra-group debt transactions in gaining external finance. In addition, pledging collateral would also

make it easier for such firms to obtain credit. I do not, however, compare the collateral levels of firms with and without intra-group debt. This is due to the reasoning that given the very high cash flow rights and influence of the parent firms in their subsidiaries in my sample, they could make the subsidiaries without intra-group debt pledge assets for other firms with such intra-group debt. Since no straightforward conclusion can be drawn by the comparison of the collateral levels of these two groups of firms, I do not address this issue.

High cash flow rights provide the parent firms with incentives to monitor other firms in the group closely. This combined with the ability of the parent firm to reshuffle resources is likely to result in a willingness by the parent firm to provide intra-group debt (either from reshuffling from other member firms or from its own funds) to firms in need of such debt. Given the information advantage parent firms have compared to outside investors, it is plausible that the amount of intra-group debt extended to group members is higher than the amount of debt that would be available to such firms (taking in consideration any other external debt they had) by outside creditors. Thus it is likely that group-affiliated firms with intra-group debt have lower levels of external debt (based on the arguments in the previous paragraphs) but higher levels of total debt (intra-group plus external debt) compared to group affiliated firms without intra-group debt. Based on the above, the hypothesis is that firms with intra-group debt will have higher total debt ratios than firms without such debt but lower levels of external debt ratios.

III. The Capital Structure of Corporate Groups vs. Stand-Alone Firms

1. Data, Variables and Descriptive Statistics

I employ a sample from the dataset provided by Market Manager Partners in the rest of the paper. The data provides financial statements (consolidated and unconsolidated) as well as information on the group structure for all firms registered in Sweden. I use data for the years 1997-1999.

In this section I employ only the consolidated statements of groups and financial statements for stand alone firms and compare the capital structures of groups to that of stand-alone firms. To be included in this sample, the groups and the stand-alone firms are required to have total assets of at least SEK 100,000. All financial firms are excluded from the data as well as observations on negative equity or obviously incorrect observations (such as negative assets, turnover etc.). This leaves me with a total of 396,933 firm year observations (355,807 on stand-alone firms and 41,126 on groups). The observations pertain to a total of 184,511 different stand-alone firms and groups (164,222 stand-alone firms and 20,289 groups). The panel is very unbalanced. However, I replicated this study with a less

unbalanced and smaller panel (to be included in the sample firms were required to have at least SEK 1 million in assets and included firms with and without bank debt) and the results were qualitatively similar.

I define debt as the sum of corporate bonds (very few) and amounts owed to all credit institutes, scaled by total assets. Long-term and short-term debt are defined analogously. Thus the definition of debt employed is mainly that of bank debt. The literature on capital structure employs this definition of debt as well as others, including a much broader measure of the ratio of total liabilities to total assets. As mentioned in Rajan & Zingales (1995), the latter measure includes items like account payables, trade credit, pension liabilities, deferred taxes, provisions and other liabilities[15]. I have thus chosen to employ the much narrower definition of debt in the analysis here. I employ a group dummy which is set to one if the firm is a group and to zero if the firm is a stand-alone firm. The definitions of the other explanatory variables employed in the regressions are as follows: Profitability is measured as the lagged ratio of net operating income to total assets. This is accordance to Titman & Wessels (1988), who measure the effect on leverage at the present time by profitability during an earlier period. Doing so sheds light on whether profitability has more than a short-term effect on observed leverage ratios. Size is measured as the log of total assets. Non-debt tax shields are measured as the ratio of depreciation to total assets. Tangibility is the ratio of fixed assets to total assets, while growth is measured as the percentage change in the log of sales from the current to the next period. This implies that realized values of growth are used to proxy expected growth when the capital structure decision was made. The growth proxy leaves much to be desired since previous growth might be a poor measure of a firm's growth prospect. Since my sample includes non-listed firms, I cannot use the common market to book ratio proxy of growth and am thus obliged to use the above. Income variability is measured as the standard deviation of the percentage change in operating income between the current and past period.

The descriptive statistics of the sample are given in Table II. Groups distinguish themselves by being much larger, having higher tangibility as well as higher interest coverage and by pledging more collateral. The higher levels of collateralization (scaled by total assets) could be a reflection of the influence of complexity and transparency issues. They also exhibit markedly lower income variance than stand-alone firms which is likely to be a reflection of the income smoothing and coinsurance effects of the internal capital markets that groups have access to. They are also more profitable and have lower levels of current assets than stand-alone firms.

[15] In comparing their results to earlier studies, Rajan & Zingales (1995) point out the fact that the measure of leverage used significantly affects the conclusions drawn on the leverage of firms. For example, many studies using OECD data have concluded that French, German and Japanese firms are much more highly leveraged than U.S. or U.K firms. The measure for leverage that can be reported for all G7 countries from this data is the ratio of non-equity liabilities to assets. Using different measure of leverage to measure the debt to assets of firms, Rajan & Zingales (1995) note that the U.K. and Germany have the lowest leverage among the G7 countries.

As far as the debt levels of groups are concerned, groups have much higher debt levels (the total debt to assets of groups is 20% compared to 13% of stand-alone firms). The main difference in debt stems from the level of long-term debt, with the long-term debt levels of groups being much higher. To check whether the two categories of firms are different, I employ the student's t-test and the Mann-Whitney test of differences on the different measures of debt of groups vs. stand-alone firms. The results are reported in table III. The results indicate that all the debt measures of stand-alone firms and groups do indeed differ. The low debt levels indicate that a number of firms in my panel might not be utilizing debt (as defined here) at all. I check for this by using a sample that only includes firms with positive debt levels. This is indeed the case as can been seen in tables IIA and IIIA; debt levels go up to the more normal levels[16] in the new sample. What is interesting is that the difference in the debt levels of groups and stand-alone firms no longer remains (also evidenced by the two tests of differences carried out). This indicates that a large number of stand-alone firms are all equity financed. Although the rest of the analysis considers the original sample, I do refer to any differences between the results (in the 2 samples) of the effect of being a group on leverage levels in what follows.

Table II. Descriptive Statistics

Descriptive statistics for the sample of groups vs. stand-alone firms. All values are for the years 1997-1999. Profitability is defined as lagged operating income/total assets. Non-debt tax shields are defined as depreciation/total assets, tangibility as fixed assets/total assets, current assets as current assets/total assets. Growth is defined as the percentage change in the log of sales from t to t+1. Income variance is the standard deviation of the percentage change in operating income. Total debt is defined as all debt owed to credit institutes and bonds outstanding. The sample includes a total of 396,933 firm year observations of which 355,807 pertain to stand-alone firms and 41,126 to groups. The table reports mean (median) values.

	Stand-alone firms	***Groups***
Profitability	.07 (.06)	.09 (.08)
Current assets	.68 (.78)	.62 (.67)
Interest coverage (sqrt)	115.67 (5.44)	139.86 (4.83)
Total debt	.13 (0)	.20 (.08)
Total LT debt	.12 (0)	.19 (.06)
Total ST debt	.009 (0)	.014 (0)
Collateral	.32 (.06)	.45 (.34)
Total assets	5,538,380	195,922,825
	(951,179)	(8,017,500)
Turnover*	5,877,466	143,500,000
	(1,403,000)	(10,500,000)
Tangibility	.24 (.13)	.29 (.19)
Growth	.004 (.003)	.004 (.003)
Non-debt tax shields	.06 (.03)	.05 (.03)
Income variance	39.44 (1.17)	6.71 (.76)
No. of employees	4 (2)	89 (8)

[16] Given the definition of debt employed, see last footnote.

Table III. Test of Differences in Debt Levels of Stand-Alone Firms vs. Groups

Total and median debt ratios, the Student's t-test and the Mann-Whitney test of differences between group and stand-alone firms. Mean (median) values reported.

	Stand-alone	*Group*	*Student's t (p-values)*	*Mann-Whitney Z (>z)*
Observations	355,752	41,117		
Total debt	.13	.20	-63.31 (0.00)	-81.49 (0.00)
Observations	355,752	41,117		
Total LT debt	.12	.19	-65.53 (0.00)	-80.62 (0.00)
Observations	355,407	41,006		
Total ST –debt	.009	.014	-22.38 (0.00)	-73.06 (0.00)

Table IIA. Descriptive Statistics

Descriptive statistics for the sample of Groups vs. stand-alone firms which includes only firms with positive debt levels. All values are for the years 1997-1999. All variables are defined as in Table I. The sample includes a total of 164,719 firm year observations of which 139,585 pertain to stand-alone firms and 25,134 to groups. The table reports mean (median) values.

	Stand-alone firms	*Groups*
Profitability	.06 (.06)	.08 (.07)
Current assets	.57 (.61)	.55 (.57)
Interest coverage (sqrt)	9.67 (3.24)	12.77 (3.58)
Total debt	.325 (.28)	.328 (.28)
Total LT debt	.30 (.25)	.30 (.26)
Total ST debt	.02 (0)	.02 (0)
Collateral	.59 (.49)	.61 (.55)
Total assets	7,814,659 (1,478,000)	288,947,732 (10,950,000)
Turnover*	6,792,590 (2,155,000)	204,900,000 (13,990,500)
Tangibility	.37 (.30)	.37 (.33)
Growth	.005 (.003)	.005 (.003)
Non-debt tax shields	.07 (.04)	.055 (.04)
Income variance	7.65 (1.03)	6.63 (.70)
No. of employees	5 (2)	127 (11)

Table IIIA. Test of Differences in Debt Levels of Stand-Alone Firms vs. Groups

Total and median debt ratios, the Student's t-test and the Mann-Whitney test of differences between group and stand-alone firms for the sample which only contains firms with positive debt levels. Mean (median) values reported.

	Stand-alone	*Group*	*Student's t (p-values)*	*Mann-Whitney Z (>z)*
Observations	139,530	25,125		
Total debt			-1.86 (0.06)	-.33 (0.7430)
Observations	139,530	25,125		
Total LT debt			-1.97 (0.04)	-.65 (0.5171)
Observations	139,585	25,134		
Total ST –debt			.51 (0.61)	-27.18 (0.0000)

2. Results on the Determinants of Group vs. Stand-alone Firm Capital Structure

To test the relation of the explanatory variables normally employed in capital structure studies to the leverage measures of groups and stand-alone firms, I carry out the following pooled cross section and fixed effects regressions:

$$Leverage_{it} = \alpha + \alpha_2\, group + \beta_1\, profitabilty_{it-1} + \beta_2\, size_{it} + \beta_3\, non-debt\ tax\ shields_{it} + \beta_4\, tangibility_{it} + \beta_5\, growth_{it+1} + \beta 6\, income variance_{it} + \varepsilon_{it}$$

Where i= 1-----N refers to firms and t=1----T to time periods. The error term in the equation is i.i.d and uncorrelated across observations and with the exogenous variables.

The results of the above regressions are presented in table IV and table V. I use winzorized ratios at the 1% and 99% levels of all the explanatory variables to avoid biasing the results due to extreme values. I also use a group dummy in the regressions to gauge the affect of being a group on the debt levels of the firms. In additional regressions I add interaction terms on the explanatory variable as well as the group dummy to check more precisely the differences (if any) in the response of groups and stand-alone firms to the firm level variables. I thus employ the following regression:

$$Leverage_{it} = \alpha + \alpha_2\, group + \beta_1\, profitability_{it-1} + \beta_2\, size_{it} + \beta_3\, non-debt\ tax\ shields_{it} + \beta_4\, tangibility_{it} + \beta_5\, growth_{it+1} + \beta_6\, income\ variance_{it} + \beta_7\, profitability_{it-1} * group + \beta_8\, size_{it} * group + \beta_9\, non-debt\ tax\ shields_{it} * group + \beta_{10}\, tangibility_{it} * group + \beta_{11}\, growth_{it+1} * group + \beta_{12}\, income\ variance_{it} + \varepsilon_{it}$$

The interaction terms measure the change in the results due to being a group. More specifically they measure the change in the slope of the firm level characteristic if the firm is a group. Thus if being a group affects the sensitivity of debt levels to the firm factors considered, then the coefficients for these factors (β_7 to β_{12}) should be significantly different from zero. The group dummy is included to measure the change in the constant when the firm studied is a group. It is set to one if the firm is a group and zero otherwise. In addition, I carry out fixed effects regressions to highlight any cross-sectional variation that is invariant over time, such as belonging to a group or not.

Table IV. Regression Results for the Factors Correlated with Total Leverage for Groups and Stand-Alone Firms

Estimates are presented for ordinary least squares applied to the pooled sample and various fixed effects estimates, where dummies for group firms have been introduced. The t-statistics have been corrected for eventual clustering of errors. Size is defined as the logarithm of total assets, profitability is measured as the lagged ratio of operating income to assets, non-debt tax shields as the ratio of depreciation to assets, tangibility is defined as fixed assets/total assets, growth as the logarithm of the percentage change from the current period to the next period, and income variance as the standard deviation of the percentage change in operating income between the current and the past period.

	Total debt OLS (1)	***Total debt OLS with interaction terms (2)***	***Total debt- Fixed effects with interaction terms (3)***
Profitability	-.004	-.004	.006
	(-4.29)	(-4.41)	(8.53)
Size	.03	.03	.04
	(77.56)	(75.02)	(63.42)
Non-debt tax shield	-.30	-.32	-.08
	(-44.40)	(-43.88)	(-13.27)
Tangibility	.41	.40	.24
	(170.73)	(154.45)	(107.12)
Growth	-.008	-.01	-.01
	(-2.86)	(-3.29)	(-4.92)
Income variance	.00002	.00001	-----
	(1.43)	(1.20)	
Profitability* group		-.003	-.002
		(-.82)	(-3.34)
Size*group		-.01	-.003
		(-10.42)	(-1.26)
Non-debt tax shield*group		.22	.02
		(12.04)	(.75)
Tangibility*group		.11	.09
		(15.77)	(11.42)
Growth*group		.01	-.01
		(1.46)	(-1.60)
Income variance*group		.00005	-----
		(1.29)	
Group	-.0001	.12	
	(-.63)	(7.43)	
Constant	-.34	-.35	-.48
	(-67.98)	(-65.36)	(-54.46)
Within			.09
Between			.29
R2/overall	.30	.30	.28
Observations	396,869	396,869	396,869

Table V. Regression Results for the Factors Correlated with Long-term Debt for Groups and Stand-Alone Firms

Estimates are presented for the same regression as in table III where the dependent variable is long-term debt instead of total debt. All variables are defined as in the previous table.

	Total LT- debt OLS (4)	***Total LT debt with interaction terms (5)***	***Total LT debt- Fixed effects with interaction terms (6)***
Profitability	-.004	-.004	.006
	(-4.05)	(-4.18)	(9.23)
Size	.03	.03	.04
	(75.51)	(73.39)	(57.10)
Non-debt tax shield	-.33	-.35	-.09
	(-50.77)	(-49.82)	(-15.11)
Tangibility	.39	.38	.23
	(165.96)	(149.67)	(104.47)
Growth	-.02	-.02	-.01
	(-4.29)	(-4.78)	(6.15)
Income variance	.00001	.00001	----
	(.71)	(.38)	
Profitability*group		-.003	-.003
		(-1.17)	(-4.89)
Size *group		-.01	-.003
		(-11.40)	(-1.47)
Non-debt tax shield*group		.22	.02
		(12.43)	(1.04)
Tangibility*group		.12	.10
		(17.18)	(13.01)
Growth*group		.01	-.005
		(1.72)	(-1.01)
Income variance*group		.0001	-----
		(1.75)	
Group	-.001	.13	
	(-.58)	(8.28)	
Constant	-.32	-.33	-.43
	(-65.83)	(-63.57)	(-49.45)
Within			.08
Between			.28
R2/overall	.29	.30	.28
Observations	396,869	396,869	396,869

As is clear from the first regression, all the explanatory variables have the expected sign[17], when significant. The effect of the group variable on leverage is significant only in the OLS regressions which include interaction terms. In these regressions, the effect of the group variable on the leverage is positive[18]. The largest

[17] As mentioned earlier no prediction was made about the effect of size on groups, however, since the sample is mainly stand-alone firms, it should reflect the relationship between debt and size for the average stand-alone firm.

[18] In the sample which includes only firms with positive debt levels, the results are essentially the same except that in the regressions without the interaction terms, the effect of being a group on total debt is negative. This effect, however, changes to positive when the interaction terms are included.

differences in the slopes of the explanatory variables, based on whether a firm is a group or not (also in separate regressions with standardized variables) are for the non-debt tax shield and tangibility variables. The effect of non-debt tax shields on leverage in the cross-section is as hypothesized. It is negative and is lower for groups, which is not surprising given the discussion in the theory section. With increases in non-debt tax shields over time both groups and stand-alone firms decrease the levels of debt as reflected in the fixed effects regressions, with no significant difference between the behavior of groups and stand-alone firms. I find that tangibility is much more important for groups compared to stand-alone firms both in the cross-section and in the fixed effects regressions (no prediction about the relative importance of tangibility to group leverage vs. that of stand-alone firms had been made). The above indicates that once we have accounted for the differences in non-debt tax shields and tangibility (mainly), the effect of the group form of organization on debt levels is positive.

Considering the other explanatory variables, I find that the relationship of size to leverage is positive but less for groups in the cross-section, influenced perhaps by the transparency and complexity issues discussed earlier. I had not made any predictions on the effect of size on the leverage of groups, given the countervailing forces discussed earlier. Over time as the size of firms increase so does the level of their total and long-term debt, with no significant difference between groups and stand-alone firms.

I had not made any predictions concerning the magnitude of the expected negative effect of profitability on the debt levels of groups vs. stand-alone firms and do not find any significant difference in this magnitude in the cross-section. There is, however, a difference in the way stand-alone firms' and groups' total and long-term debt reacts to increases in profitability over time as evidenced by the fixed effects regressions. As firm profitability increases, all firms increase the levels of total and long-term debt, but this effect is much less for groups. Growth is negatively related to leverage and contrary to my prediction I do not find that this variable to have a weaker effect on the leverage of groups. I do not find any statistically significant results for the relationship of income variance to either the total or long-term debt of stand-alone firms, nor do I find any difference in the relationship of groups' debt levels to income variance compared to stand-alone firms.

In conclusion, the analysis clearly shows that the group form of organization has a positive effect on debt levels (after taking differences in the slopes of the explanatory variables between group and stand-alone firms into account). Given several reasons to expect the opposite, a number of explanations of this phenomenon might be possible. Although the size effect could be an explanation, the positive effect of the group form of organization remains after controlling for size. As Matsusaka and Nanda (2002) state, assuming the transaction cost of raising external funds is greater than the cost of internal funds, internal resource allocation

gives the firms a real option to avoid external capital markets (including external borrowing) and the associated deadweight transaction costs in more states of the world. They compare single business firms to firms with multiple lines of business. However, their intuition can be extended to groups since they are, in the cross-section, more likely to have multiple lines of business than stand-alone firms[19]. It is plausible that groups as an aggregate, by virtue of their internal capital markets, approach external capital markets less often and when they do raise higher levels of capital for their different divisions, thereby reducing transaction costs. This would imply that groups are able to reduce the fixed costs associated with borrowing. It is possible that due to their larger size and access to internal capital markets they, on the aggregate may be able to negotiate less restrictive debt covenants, inducing them to take on more debt than stand-alone firms. None of these possibilities have been investigated in this paper and are beyond the scope of this paper. Groups being associated with higher debt levels could also mean that there are effective legal and governance mechanisms in place which deter groups from acting opportunistically and provide creditors with sufficient protection against the same. Then the reasons discussed previously (in the theory section) for groups to carry more debt need not be counteracted completely by the negative influences of agency problems and moral hazard.

The results of the relatively less but still positive influence of the size variable on group debt suggest that, while the complexity and transparency issues still exert a negative influence on debt levels, the severity of these problems do not dominate the countervailing forces discussed in the theory section. One reason might be the fact that these problems are mitigated by the groups' more extensive use of secured debt (as indicated by the collateralization levels of groups and the results of the influence of the tangibility variables). Unfortunately, I do not have detailed data for guarantees, since this would also be a mitigating factor.

I find that there are differences in the effects of some firm level factors on the debt of groups vs. stand-alone firms. Besides the size and tangibility results referred to above, non-debt tax shields are much less important to groups than to stand-alone firms. I do not find any differences in the relationship between group and stand-alone leverage to profitability and growth.

[19] Matsusaka & Nanda's (2002) model deals with the trade off of avoiding costly external financing vs. the overinvestment problem. They show that the value of the option depends on the specific parameters and it is not always the case that the multidivisional firms approach external capital markets less often than single divisional firms.

IV. The Capital Structure of Group-Affiliated vs. Stand-Alone Firms and the Effect of Group-Wide Variables on the Debt of Group-Affiliated Firms

1. Data and Descriptive Statistics

The purpose of this section is to highlight the differences in the effects of firm level factors on the debt of group-affiliated and stand-alone firms. I use unconsolidated statements of group-affiliated firms and repeat the regression analysis in the previous section for group-affiliated vs. stand-alone firms. I include all firms affiliated with the groups in the previous sample as well as the stand-alone firms in the previous sample. The definitions of the variables are as in the last section. I replace the group dummy by a group-affiliation dummy. This dummy is set to 1 if the firm is group-affiliated and zero otherwise.

After comparing the capital structure of group-affiliated and stand-alone firms, I test for the effect of group-wide variables on the capital structure of group-affiliated firms. To this end I run a regression on group-affiliated firms only which include group-wide variables (defined below) and check for any incremental affect of these variables on the debt of group-affiliated firms. For the sake of brevity, in the last regression I only consider total debt. The model for the last regression is as follows:

$$Leverage_{it} = \alpha + \beta_1\, profitability_{it-1} + \beta_2\, size_{it} + \beta_3\, non-debt\ tax\ shields_{it} + \beta_4\, tangibility_{it} + \beta_5\, growth_{it+1} + \beta_6\, income\ variance_{it} + \beta_7\, group\ profitability_{it-1} + \beta_8\, group\ size_{it} + \beta_9\, group\ non-debt\ tax\ shields_{it} + \beta_{10}\, group\ tangibility_{it} + \beta_{11}\, group\ growth_{it+1} + \beta_{12}\, group\ income\ variance_{it} + \beta_{13}\, group-wide\ external\ debt_{it} + \xi_{it}$$

Initially I run this regression only including the first six factors as well as the variable group-wide external debt. The last variable measures the total debt of all firms in the group with the exception of the group-affiliated firm being considered. I then run the regression with all the other group-wide variables, which measure the factor being considered for all the other firms in the group, with the exception of the firm under consideration. Thus group-wide profitability is the profitability of all the firms in the group, with the exception of the n^{th} firm being considered. Since I am only considering group-affiliated firms in this part, I no longer have a dummy for group affiliation.

In the comparison of group-affiliated firms to stand-alone firms, my sample consists of 449,798 firm year observations for the years 1997-1999 (355,807 on stand-alone firms and 93,991 on group-affiliated firms) on a total of 164,222 stand-

alone firms and 38,975 group-affiliated firms. It is important to note that no effort has been made to make sure that all member firms in all groups analyzed are in the sample. It is more than likely that such is not the case especially for firms that have foreign subsidiaries, thus a direct comparison to the results of the previous section cannot be made.

2. Results on the Determinants of Group-affiliated vs. Stand-alone Firm Capital Structure

Table VI. Regression Results for the Factors Correlated with Total Leverage of Group-affiliated and Stand-Alone Firms

Estimates are presented for regressions similar to those in table III. The sample used here is different and compares group-affiliated firms to stand-alone firms. All variables are as defined in table III. My sample now consists of 449,801 firm year observations, of which 355,807 pertain to stand-alone firms.

Dependent variable	*Total debt- OLS (1)*	*Total debt OLS with interaction terms (2)*	*Total debt- Fixed effects with interaction terms (3)*
Profitability	-.002	-.003	.006
	(-3.20)	(-3.06)	(7.72)
Size	.02	.03	.04
	(77.59)	(74.52)	(60.32)
Non-debt tax shields	-.28	-.32	-.08
	(-49.28)	(-43.80)	(-12.89)
Tangibility	.39	.40	.24
	(170.23)	(154.41)	(103.48)
Growth	-.01	-.01	-.01
	(-3.22)	(-2.90)	(-4.92)
Income variance	.00002	.00001	--------
	(2.30)	(1.29)	
Profitability*group affiliation		-.004	.002
		(-2.04)	(1.70)
Size *group affiliation		-.02	-.01
		(-26.68)	(-11.74)
Non-debt tax shields*group affiliation		.15	.03
		(12.58)	(2.91)
Tangibility*group affiliation		-.004	-.03
		(-.64)	(-5.68)
Growth*group affiliation		-.03	-.002
		(-4.02)	(-.47)
Income variance*group affiliation		.00003	----
		(1.35)	
Group Affiliation	-.01	.23	
	(-11.88)	(24.25)	
Constant	-.28	-.35	-.46
	(-65.27)	(-64.95)	(-58.67)
Within			.08
Between			.20
R2/overall	.28	.29	.19
Observations	439,337	439,337	439,337

The results from repeating the regression analysis of the last section are presented in table VI and table VII. In the OLS regressions without the interaction terms, the effect of group affiliation on the leverage of group-affiliated firms is negative and significant. However, when we take into consideration the change in the slopes of the firm level factors when a firm is group-affiliated, the effect of being group-affiliated is positive and significant, as evidenced in regressions 2 (in table VI) and regression 5 (in table VII). Using another sample, which only includes firms with positive debt levels, I find that the effect of being affiliated with a group is always positive and significant.

Table VII. Regression Results for the Factors Correlated with Long-term Leverage of Group-affiliated and Stand-Alone Firms

Estimates are presented for the regressions carried out comparing stand-alone firms to group-affiliated firms. The dependent variable now is long-term debt. All variables are as defined in table III.

Dependent variable	*Total LT debt-OLS (4)*	*Total LT debt OLS with interaction terms (5)*	*Total LT debt-Fixed effects with interaction terms (6)*
Profitability	-.003	-.003	.006
	(-2.66)	(-2.80)	(8.41)
Size	.02	.03	.04
	(75.85)	(72.93)	(55.33)
Non-debt tax shields	-.31	-.35	-.09
	(-55.24)	(-49.73)	(-14.74)
Tangibility	.37	.38	.23
	(165.05)	(149.64)	(101.22)
Growth	-.01	-.01	-.01
	(-4.30)	(-4.30)	(-6.09)
Income variance	.00001	.000004	------
	(1.51)	(.47)	
Profitability*group affiliation		-.003	.003
		(-1.65)	(1.94)
Size *group affiliation		-.02	-.01
		(-27.28)	(-10.22)
Non-debt tax shields*group affiliation		.17	.03
		(14.97)	(2.83)
Tangibility*group affiliation		.0004	-.03
		(.06)	(-6.02)
Growth*group affiliation		-.02	.002
		(3.06)	(.54)
Income variance*group affiliation		.00004	-------
		(1.81)	
Group Affiliation	-.01	.22	
	(-11.17)	(24.37)	
Constant	-.26	-.33	-.41
	(-63.53)	(-63.20)	(-53.71)
Within			.08
Between			.20
R2/overall	.28	.28	.20
Observations	439,308	439,308	439,308

The main prediction made in the theory section was that the magnitude of the relationship between the firm level factors (with the exception of tangibility and size for which I made no predictions) and the debt levels of group-affiliated firms should be less than that of stand-alone firms. Only the result for non-debt tax shields concurs with my predictions. I find that the (positive) magnitude of the size variable, both in the cross-section and the fixed effects regressions, is lower for group-affiliated firms than it is for stand-alone firms. Group-affiliated firms show much less sensitivity to non-debt tax shields than stand-alone firms and the difference from stand-alone firms is statistically significant in all regressions.

I do not find that group-affiliated firms are less sensitive to profitability as predicted. In the cross-section, the debt of all firms is negatively related to profitability. This effect is higher for group-affiliated firms as far as total debt is concerned while there is no statistically significant difference between stand-alone and group-affiliated firms as far as long-term debt levels are concerned.

I do not find any significant difference in the relationship between tangibility and the debt levels (both total and long-term) of stand-alone firms and group-affiliated firms. Over time, as asset tangibility increases, so does the debt level of all firms, with the effect being lower for group-affiliated firms.

Contrary to my prediction, I find that group-affiliated firms are more sensitive to the effects of growth opportunities compared to stand-alone firms, with this difference between group-affiliated and stand-alone firms being statistically significant in the cross-section. All firms reduce debt levels with increases in growth opportunities but here I do not find any statistical difference between stand-alone and group firms. Finally, I do not find any statistically significant results for income variance and its effect on firm leverage.

In summary, while I had predicted that group-affiliated firms would be less sensitive to firm level factors (making no prediction about size or tangibility), I find mixed results. I find that group-affiliated firms' debt is less sensitive to size and non-debt tax shields, but contrary to my predictions is more sensitive to growth.

As a final step in this analysis I check the effect of group-wide variables (including group-wide debt) on the debt levels of group-affiliated firms. For the sake of brevity, I only consider the total debt measure in the following. I use the group-affiliated firms present in the last sample and supplement with information on group-wide variables. The results of the regression are presented in table VIII.

Table VIII. The Effect of Group-wide Debt and Firm level Factors on the Leverage of Group-affiliated Firms.

Estimates are presented for ordinary least squares applied to the pooled sample and various fixed effects estimates. I add group-wide variables which are defined as the firm level variables in table III, but are summed over all the firms in the group, excluding the firm under consideration. The term group-wide debt includes the total debt of all other firms identified belonging to the group excluding the firms in question. The t-statistics have been corrected for eventual clustering of errors. All firm level variables are as defined in table III. The dependent variable is total debt and is as defined in table III.

Dependent Variable	*Total debt OLS (1)*	*Total debt Fixed effects (2)*	*Total debt OLS (3)*	*Total debt Fixed effects (4)*
Profitability	-.02	.003	-.03	-.003
	(-5.46)	(4.43)	(-5.76)	(-.79)
Size	.01	.03	.003	.03
	(15.56)	(43.50)	(4.99)	(26.84)
Non-debt tax shields	-.19	-.04	-.15	-.06
	(-15.99)	(-4.27)	(-9.97)	(-3.36)
Tangibility	.39	.19	.45	.20
	(59.12)	(47.78)	(63.59)	(32.97)
Growth	-.06	-.02	-.11	-.03
	(-6.49)	(-4.62)	(-5.61)	(-2.77)
Income variance	-.0001	---------	.003	---------
	(-4.43)		(22.97)	
Group profitability			-.02	-.006
			(-4.90)	(-1.54)
Size of group			-.01	-.002
			(-25.36)	(-2.35)
Group non-debt tax			-.06	-.02
shields			(-3.40)	(-1.25)
Group tangibility			.11	.006
			(20.91)	(1.42)
Group growth			-.08	-.02
			(-4.87)	(-1.28)
Group income variance			.003	.-----
			(24.34)	
Group total external	-.0003	-.0001	-.0003	-.0001
debt	(-1.04)	(-2.14)	(-1.05)	(-2.24)
Constant	-.08	-.34	-.03	-.31
	(-8.84)	(-35.18)	(-2.82)	(-18.62)
R^2 Within		.07		.07
R^2 Between		.23		.24
R^2/ R^2 Overall	.28	.21	.30	.22
No. of observations	85,582	85,582	85,582	85,582

The first thing to note is that group-wide debt does not have a statistically significant effect on the debt of firms in the cross-section. I only get statistically significant results for the fixed effects regressions. The results show that as group-wide debt increases over time, it has a negative effect on the debt of the member firms (however, I also ran the same regression using a sample of firms with positive debt levels and found that group-wide debt exercises a substantial and significant negative effect on member firms' debt levels). The other group-wide explanatory factors have an incremental effect on the debt of group-affiliated firms, i.e. over

and above the effect of the firm level factors. Although most of the factors on the group level have the same sign as the firm level coefficients, there is one exception.

As regression 3 in table VIII indicates, the effect of profitability on the debt of group-affiliated firms still negative and significant. Group-wide profitability has an incremental negative and significant effect on the leverage of the group-affiliated firms. I do not get any statistically significant results for the effect of profitability on debt in the fixed effects regression (4).

The only variable where the sign of the variable at the firm level and group-wide level is different is the size variable. The size variable has a significant and positive effect on the debt of the group-affiliated firms on the firm level. The size of the group, however, has a strong negative and significant effect on the debt of the group-affiliated firms. Over time as the size of the firm increases it has a positive effect on the leverage of the firms, but increases in the size of the group have a negative effect on the debt of group-affiliated firms. This is in keeping with the previous discussion on the effects of complexity on group-affiliated firms' debt levels. Non-debt tax shields have a negative effect on the debt of group-affiliated firms. The incremental effect of group-wide non-debt tax shields in also negative and significant. As the fixed effects regression (4) shows increases in non-debt tax shields have a negative effect on the leverage of the group-affiliated firms, but that increases in group-wide non-debt tax shields do not have a statistically significant effect on the total debt of these firms. I find that tangibility has a positive and statistically significant effect on debt at the firm level and this effect is accentuated by the additional positive and statistically significant effect on firm debt of group-wide tangibility. Once again I do not find any statistically significant results for the group-wide tangibility in the fixed effects regression (4). As before at the firm level, increases in tangibility over time are positively related to the debt levels of the group-affiliated firms.

Growth is negatively related to the debt levels of group-affiliated firms both at the firm and the group-wide level. Both these results are statistically significant. An increase in growth opportunities on the firm level results in a reduction of debt. However, this variable does not have any significant relationship to the debt levels over time on the group-wide level. Lastly, I find that the debt of group-affiliated firms is positively associated with income variance on the firm level as well as the group-wide level.

Thus in this section I have found evidence that although group-affiliated firms are less sensitive to the size and non-debt tax shield variables, this not true for all factors such as profitability and growth. In addition, I find that group-wide variables such as group size and profitability exert a material negative influence on the capital structure of group-affiliated firms.

V. Evidence on the Effect of Intra-Group Debt on Member Firm Debt

1. Sample and Descriptive Statistics

The sample employed in this section is the same as was used in the last part of section III, i.e. only group-affiliated firms with assets of at least SEK 100,000 with the same restrictions applied as before. I divide my sample into firms which have intra-group debt vs. firms that do not have intra-group debt and check whether there are any differences in the sample. Table IX gives the descriptive statistics of the sample.

Table IX. Descriptive Statistics for Group-affiliated Firms With and Without Intra-group Debt

Descriptive statistics for the sample of group-affiliated firms. The sample is divided into firms with and without intra-group debt. As before all figures pertain to the years 1997-1999 and mean and (median) values are reported.

	Group-affiliated firms without intra-group debt	*Group-affiliated firms with intra-group debt*
Profitability	.03 (.02)	.05 (.04)
Current assets	.63 (.75)	.57 (.67)
Interest coverage- sqrt	295.26 (4.48)	465.98 (4.18)
Total assets	33,207,450 (1,893,000)	126,897,995 (6,541,000)
Total sales	12,092,589 (1,089,000)	76,787,464 (5,259,065)
Tangibility	.17 (.03)	.23 (.07)
No. of employees	7 (1)	37 (4)
Growth	.004 (.002)	.003 (.002)
Income variance	39.56 (1.01)	43.88 (.86)
Non-debt tax shields	.04 (.01)	.04 (.02)
Total debt	.13 (0)	.39 (.35)
Total external debt	.13 (0)	.12 (0)
Total LT debt	.12 (0)	.19 (.02)
Total external LT debt	.12 (0)	.11 (0)
Total ST-debt	.01 (0)	.19 (.10)
Total external ST debt	.01 (0)	.009 (0)
Collateral pledged	.53 (0)	.34 (.08)

The following can be gleaned from the descriptive statistics. Firms with intra-group debt are generally much larger than firms without such debt. They have more tangible assets, lower growth, higher interest coverage, higher income variance than firms without intra-group debt. Firms without intra-group debt have higher levels of current assets than firms with intra-group debt.

As far as the debt levels are concerned, the following definitions are employed. Debt is as defined earlier. Total debt, total long-term debt and total short-term debt include external debt as well as intra-group debt. External debt includes only non-group debt. I find that firms with intra-group debt have higher

levels to total, total long-term and total short-term debt. The level of external debt is however lower for such firms. Firms with intra-group debt have lower levels of total external debt, total external long-term debt and marginally lower levels of total external short-term debt. I test for differences in leverage across firms with and without intra-group debt, using the Student's t-test and the Mann-Whitney test of differences between sub-samples. I have presented these results in table X. Table XI presents the results of pair-wise correlation of intra-group debt and external debt. The results clearly show that there are significant differences between all the leverage measures of these the two samples of firms. As is evident from the pair wise correlation matrix, both long-and short-term intra-group debt are negatively correlated with almost all measures of external debt levels.

Table X. Test of Differences in Leverage Measures of Firms With and Without Intra-group Debt

Total and median debt ratios, the student's t-test and the Mann-Whitney test of differences between group firms with and without intra-group debt. All figures pertain to the years 1997-1999.

	Without intra-group debt	*With intra-group debt*	*Student's t (p-values)*	*Mann-Whitney Z(>z)*
Observations	41,255	42,301		
Total debt	.13	.39	-144.94 (0.0000)	-171.07 (0.0000)
Observations	41,255	42,327		
Total external debt	.13	.12	6.70 (0.0000)	-5.49 (0.0000)
Observations	41,268	42,347		
Total L-T debt	.12	.19	-44.40 (0.0000)	-58.89 (0.0000)
Observations	41,268	42,365		
Total external LT debt	.12	.11	6.56 (0.0000)	-5.63 (0.0000)
Observations	41,263	42,798		
Total ST debt	.01	.19	-158.07 (0.0000)	-209.66 (0.0000)
Observations	41,263	42,810		
Total external ST debt	.01	.009	2.09 (0.0037)	-9.78 (0.0000)

Table XI. Pair-wise Correlations of Intra-group Debt with Different Debt Measures

The correlations between intra-group total, long-term and short-term debt with different debt measures is presented. Total external debt and total external long-term debt are as defined in table III and table IV. Total external short-term debt is all short-term debt owed to credit institutes scaled by total assets. Total debt includes all external debt plus all intra-group debt scaled by total assets, total long-term debt is all external long-term debt plus all long-term intra-group debt scaled by total assets and total short-term debt is defined as all external short-term debt plus all intra-group short-term debt scaled by total assets.

	Total debt	*Total L-T debt*	*L-T external debt*	*Total S-T debt*	*Total external ST debt*	*Total external debt*
L-T group debt	.06	.08	-.012	-.006	-.002	-.012
S-T group debt	.06	-.008	-.014	.10	.014	-.01
Total intra-group debt	.65	.19	-.18	.73	-.06	-.18

2. Regression Analysis

Having established that firms with and without intra-group debt have differences in their capital structure, I turn now to the effect of intra-group debt on external leverage. To assess the effect of intra-group debt on total and total external debt, I employ the following regression models for total and total external debt. To check whether intra-group debt affects the levels of external debt, I first check whether the presence of intra-group debt affects the debt levels of the group-affiliated firms, and later add the amount of intra-group debt to the regressions equations[20].

$$Leverage_{it} = \alpha + \beta_1\, long-term\ intra_{it} + \beta_2\, short-term\ intra_{it} + \beta_3\, profitability_{it-1} + \beta_4\, size_{it} + \beta_5\, non-debt\ tax\ shields_{it} + \beta_6\, tangibility_{it} + \beta_7\, growth_{it+1} + \beta_8\, income\ variance_{it} + \varepsilon_{it}$$

And,

$$Leverage_{it} = \alpha + \beta_1\, long-term\ intra_{it} + \beta_2\, short-term\ intra_{it} + \beta_3\, amount\ long-term\ intra_{it} + \beta_4\, amount\ short-term\ intra_{it} + \beta_5\, profitability_{it-1} + \beta_6\, size_{it} + \beta_7\, non-debt\ tax\ shields_{it} + \beta_8\, tangibility_{it} + \beta_9\, growth_{it+1} + \beta_{10}\, income\ variance_{it} + \varepsilon_{it}$$

Where long-term intra and short-term intra are dummies to reflect the presence of long-or-short-term intra-group debt. The variables amount long-and-short-term intra take into account the actual amount of intra-group debt in the firm under study. I also carry out fixed effects regression to gauge the effect of the explanatory factors on total and total external debt levels. As before all ratios employed as proxies for the explanatory variables are winzorized at the 1% and 99% level. All explanatory variables except intra-group debt variables are as defined in the previous sections. Intra-group debt is scaled by total assets, as are most of the other variables. I divide the sample into firms which have both short and long-term debt and into firms which have either long-term or short-term debt. Since the results are qualitatively similar for most part, I will discuss the most pertinent features of the latter and mention any differences between the results of the two samples.

The results of the multivariate regression are given in tables XII. The presence of intra-group debt, both long and short-term, has a negative and statistically

[20] The approach used is similar to the one employed by Verschueren and Deloof (2006).

significant effect on external debt levels, while the opposite is true for the total debt levels. All the other control variables follow the expected signs for external debt, with the exception of growth and profitability (however, these results are significant only for the sample with both short and long-term debt in the cross section).

Table XII. The Effect of Intra-Group Debt on Total and Total External Debt.

The table presents results on regressions of total debt and total external debt as defined in table III and table XII. The regressions consider, besides the effects of the factors considered in earlier regressions, the effect of the presence of intra-group long-term debt and intra-group short-term debt on these debt measures. All other explanatory variables are as defined in table III.

Dependent Variable	(1) *Total debt OLS*	(2) *Total debt fixed effects*	(3) *Total debt*	(4) *Total debt fixed effects*	(5) *Total external debt*	(6) *Total external debt fixed effects*	(7) *Total external debt*	(8) *Total external debt fixed effects*
Sample:	LT-debt>0 & ST-debt >0	LT-debt>0 & ST-debt >0	LT-debt or ST debt>0	LT-debt or ST debt>0	LT-debt>0 & ST-debt >0	LT-debt>0 & ST-debt >0	LT-debt or ST debt>0	LT-debt or ST debt>0
Intragroup LT-debt >0	.08 (14.68)	.04 (8.90)	.11 (29.09)	.07 (21.28)	-.18 (-39.06)	-.11 (-24.31)	-.15 (-48.18)	-.08 (-31.10)
Intragroup ST-debt>0	.04 (7.91)	.04 (10.83)	.02 (8.45)	.04 (15.89)	-.12 (-26.16)	-.04 (-10.09)	-.18 (-66.16)	-.07 (-32.33)
Profitability	.02 (3.80)	.01 (5.13)	.01 (4.27)	.01 (6.69)	.01 (2.75)	.01 (5.24)	.002 (1.14)	.01 (6.99)
Size	-.007 (-4.77)	.04 (9.06)	.002 (2.29)	.05 (27.38)	.003 (2.07)	.004 (.97)	.01 (19.60)	.03 (19.44)
Non-debt tax shields	-.11 (-4.78)	-.05 (-1.53)	-.07 (-4.67)	-.06 (-2.94)	-.20 (-10.04)	-.06 (-1.75)	-.16 (-12.79)	-.02 (-1.34)
Tangibility	.34 (49.12)	.11 (7.69)	.33 (61.09)	.10 (11.33)	.36 (50.24)	.22 (16.58)	.36 (62.62)	.19 (26.53)
Growth	.14 (9.98)	-.0005 (-.06)	.17 (18.61)	.02 (2.77)	.06 (5.75)	-.02 (-2.09)	.01 (1.39)	-.01 (-1.76)
Income variance	.00003 (1.52)	----	.00003 (2.52)	----	.00001 (.79)	----	.00001 (.75)	----
Constant	.40 (17.20)	-.23 (-3.31)	.20 (14.35)	-.54 (-17.26)	.28 (13.60)	.22 (3.44)	.02 (2.04)	-.29 (-11.66)
Within R^2		.04		.05		.10		.09
Between R^2		.04		.04		.39		.28
Adjusted R^2/overall	.19	.04	.16	.04	.41	.39	.37	.27
No. Of observations	20,544	20,544	56,086	56,086	20,544	20,544	56,086	56,086

I next check whether the amount of intra-group debt has an incremental effect on non-group debt levels. The results of including the amount of intra-group short-term and long-term debt are reported in table XIII. Again, all the control variables have the expected sign for the control variables, with the exception of

growth and profitability. As before the presence of both short-term and long-term intra-group debt has a negative effect on external debt levels, (however, this time these variables also show a negative relationship to total debt levels). The effects are all statistically significant in the cross-section and almost all the results of the fixed effects regressions are also statistically significant.

Table XIII. The Effect of Intra-Group Debt (including Levels) on Total and Total External Debt.

This table presents the results of performing the regressions in the preceding table, with the difference that two additional explanatory variables, the amount of long-term and short-term intra-group debt have been added. The measure the long-term and short-term intra-group debt scaled by total assets in the group to which a firm belongs. All other variables are as defined in the previous table.

Dependent variable	(1) Total debt	(2) Total debt fixed effects	(3) Total debt	(4) Total debt fixed effects	(5) Total external debt	(6) Total external debt fixed effects	(7) Total external debt	(8) Total external debt fixed effects
Sample	LT-debt>0 ST-debt >0	LT-debt>0 ST-debt >0	LT-debt or ST-debt >0	LT-debt or ST-debt >0	LT-debt>0 ST-debt >0	LT-debt>0 ST-debt >0	LT-debt or ST-debt >0	LT-debt or ST-debt >0
Intragroup LT-debt >0	-.09 (-14.81)	-.03 (-6.49)	-.06 (-14.75)	-.02 (-6.23)	-.19 (-14.81)	-.03 (-6.49)	-.06 (-14.75)	-.02 (-6.23)
Intragroup ST-debt>0	-.08 (-15.45)	-.007 (-1.91)	-.13 (-47.44)	-.04 (-19.92)	-.08 (-15.45)	-.007 (-1.91)	-.13 (-47.44)	-.04 (-19.92)
Intragroup LT debt	.64 (49.31)	.51 (37.74)	.68 (80.16)	.64 (81.39)	-.36 (-27.98)	-.49 (-36.36)	-.32 (-38.20)	-.36 (-45.56)
Intragroup ST-debt	.71 (69.99)	.61 (55.18)	.79 (174.77)	.74 (141.22)	-.29 (-28.60)	-.39 (-34.56)	-.21 (-47.65)	-.26 (-48.99)
Profitability	.01 (3.39)	.01 (6.00)	.005 (2.54)	.01 (7.96)	.01 (3.39)	.01 (6.00)	.005 (2.54)	.01 (7.96)
Size	-.005 (-.38)	.02 (4.67)	.01 (16.35)	.04 (24.96)	-.0005 (-.38)	.02 (4.67)	.01 (16.35)	.04 (24.96)
Non-debt tax shields	-.17 (-9.02)	-.05 (-1.79)	-.14 (-11.88)	-.03 (-2.18)	-.17 (-9.02)	-.05 (-1.79)	-.14 (-11.88)	-.03 (-2.18)
Tangibility	.36 (53.78)	.17 (14.50)	.35 (67.86)	.16 (24.67)	.36 (53.78)	.17 (14.50)	.35 (67.86)	.16 (24.67)
Growth	.09 (7.93)	-.01 (-1.39)	.05 (7.70)	-.002 (-.45)	.09 (7.91)	-.01 (-1.39)	.05 (7.70)	-.002 (-.45)
Income variance	.00002 (1.15)	----	.00001 (1.44)	----	.00002 (1.15)	-----	.00001 (1.44)	----
Constant	.32 (16.20)	.06 (.95)	.07 (6.27)	-.36 (-15.25)	.32 (16.20)	.06 (.95)	.07 (6.27)	-.36 (-15.25)
R^2 Within		.32		.47		.26		.20
R^2 Between		.33		.44		.36		.29
R^2/overall	.42	.31	.52	.42	.46	.37	.42	.29
Number of obs.	20,544	20,544	56,086	56,086	20,544	20,544	56,086	56,086

It is also clear that the amount of short-term and long-term intra-group debt have negative and significant effects on the levels of external debt, over and above those captured by the presence of intra-group debt. As the amount of intra-group debt increases over time, this also has a negative effect on the level of external debt. This could imply one of two things; either having a well functioning internal capital market lowers the need of member firms to obtain external finance or that the presence of a large number of intra-group debt transactions increases the complexity and decreases the transparency of the group, making lenders less inclined to lend to member firms. In either case, the result is the same, i.e. intra-group lending has a negative effect on external debt levels.

The main results of this section imply that the presence of intra-group debt has a negative effect on external debt levels and thus confirm the earlier predictions. It also confirms the contention that firms with intra-group debt have higher levels of total debt than firms without such debt. Given the information and monitoring advantages by the parent firm, this might just imply that the internal capital markets are an efficient substitute to external finance. On the other hand, it might imply that the intra-group transactions just exacerbate the complexity and transparency issues making firms rely more on internal capital markets.

VI. Summary and Conclusion

This paper focused on the capital structure of groups and group-affiliated firms and addressed a few issues. The main objective of the analysis was to assess the effect of the group form of organization on firm leverage. To investigate this issue, I considered the following questions. Is the leverage of groups and group-affiliated firms different from that of stand-alone firms? Are there differences in the way the leverage of group-affiliated firms is determined relative to stand-alone firms? What is the effect of intra-group debt on the external debt levels of group-affiliated firms? In order to carry out an investigation of the above questions I carry out analyses on samples of firms in Sweden during the years 1997-1999.

There are a number of reasons for expecting groups and group-affiliated firm capital structure to differ from that of stand-alone firms. Groups and group-affiliated firms have access to internal capital markets, tax planning tools not available to stand-alone firms giving additional non-debt tax shields (for example group transfers/subsidies), the ability to fund a larger number of projects than stand-alone firms without easing credit constraints and the ability to co-insure the debt of firms within the group. In addition, they are generally larger, more diversified and more concerned about reputational issues than stand-alone firms while at the same time generally being more complex (which makes them harder to analyze) and less transparent. The above implies differences in the importance of the debt tax shield, in expected bankruptcy and financial distress costs as well as

differences in the agency and information asymmetry costs faced by groups vs. stand-alone firms. This in turn would also imply differences in the capital structure of groups vs. stand-alone firms as well as differences in the importance of the factors generally considered to influence capital structure decisions.

I find evidence of differences in the leverage of groups and stand-alone firms. On the whole the effect of being a group on leverage levels is positive. However, as the size of the group increases this effect diminishes as the problems related to group complexity and lack of transparency seem to increase. There are a number of possible explanations for groups carrying higher levels of debt. The level of collateralization in groups is higher compared to stand-alone firms and might mitigate problems due to information asymmetry and the ability of groups to act opportunistically. It is also possible that groups somehow can reduce the dead-weight/fixed costs of raising external finance (including borrowing). Another possible explanation of this phenomenon is that sufficient legal and governance mechanisms are in place to assure creditors and investors that they will not be taken advantage of by groups.

I also find a number of differences in the magnitude of the relationships of firm level factors and the debt levels of groups and stand-alone firms. The complexity and transparency issues discussed above are likely explanations for why tangibility is more important and size is less important for group debt. The lower positive effect of size on group debt implies that although the transparency and complexity issues are not the dominating effects, they still exert influence on the leverage of groups. Group debt is less sensitive to non-debt tax shields (as represented by depreciation expenses), but this is not surprising given that groups have other tools for reducing their total tax bill. I do not find differences in the relationship between group and stand-alone debt to growth, profitability or income variance. Due to a number of countervailing arguments, I did not predict the relationship between group debt and size, profitability or tangibility.

Considering the capital structure of group-affiliated firms, my main prediction was that the capital structure of group-affiliated firms is set by different considerations than is the capital structure of stand-alone firms (being influenced by group-wide variables). I find that group size and profitability exert a strong negative influence on the leverage of group-affiliated firms, while group-wide income variance has a small but positive influence on the debt levels of these firms. I also predicted that the debt levels of such firms should be less sensitive to the explanatory variables than the debt of stand-alone firms (with the exception of size and tangibility for which I made no predictions). Although I do find that the leverage decisions of group-affiliated firms are less sensitive than stand-alone firms to non-debt tax shields and size, they are more sensitive to growth. I do not find any statistically significant differences in the effects of income variance and tangibility variables on the debt level of group-affiliated vs. stand-alone firms.

Lastly, I considered the effect of intra-group debt on group-affiliated firm debt. The hypothesis being that the amount and presence of such debt would have a negative effect on external debt levels but a positive effect on total debt levels (which include external and intra-group debt). I find evidence of both. It is however, not possible to distinguish whether this is because the internal capital market provided by groups is cheaper and more efficient or because the presence of intra-group debt makes external lenders reluctant to lend funds to such firms due to transparency issues and thus forces such firms to rely on internal capital markets.

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The Placement of Debt in Formal Corporate Groups in Sweden

Abstract

The limited liability of group affiliated firms provides the group with an option of partial liquidation which has positive effects on the survival of groups. The option of partial liquidation also has a negative effect on the incentives of the parent firm (and ultimately the controlling shareholders). It exacerbates the asset substitution problem. Lenders being aware of this problem can be expected to require higher interest rates from group affiliated firms. One way, however, for the parent firm to commit to not taking advantage of partial liquidation is by placing more debt at the top of the group. I investigate the placement of debt in formal corporate groups in which the parent firms have very high ownership stakes in their subsidiaries. I argue that such firms have very high incentive to place debt strategically. I find the parent firms in my sample do indeed have higher leverage than their subsidiaries. The difference is not very large, however. Closer inspection reveals that the complexity and transparency of the group are very important influences on how debt is placed within groups. The size of the group and the amount of intra-group debt within the group are substantial negative influences on subsidiary debt. This is taken as indication that lenders in this situation face reduced transparency and cannot be sure where the funds they lend end up within the group.

Keywords: Partial liquidation, groups, transparency, complexity, leverage, asymmetric information, listing status, intra-group debt.

I. Introduction

The focus of this paper is the placement of debt in formal corporate groups in light of the influence of various agency and information asymmetry costs. I compare the leverage ratios of parent firms vs. their limited liability subsidiaries. In addition I attempt to judge the effects of transparency and complexity on the way debt is placed within groups

The group form of organization is generally characterized by equity, management or directorship interlocks. The basis on which groups are classified in this paper is based on the existence of a parent/subsidiary relationship between firms in the group. This is a legal form of organization in Sweden and in a number of countries. This definition has also been employed in Reimund (2002) and probably defines the way most (relatively large) firms are organized globally. What distinguishes them from stand-alone firms is that the latter do not have any subsidiaries or parent structures related to them. Thus, groups as defined in this paper include conglomerates. Most of the subsidiaries in my sample are owned more than 90% by the parent firms and when listed do not trade separately. They have access to internal capital markets, with all the pros and cons associated with the use of such markets. What is most interesting from my point of view when considering the placement of debt within groups is that all the firms in the group are limited liability firms.

Why do firms organize themselves into separate legal limited liability entities, with the parent firm holding most or all of the shares in all their subsidiaries (even when they are no legal requirements for them to do so, for example due to different state or country legislation)? The benefits of reputation, internal capital markets, size, diversification or political clout for obtaining debt or equity financing do not require the formation of a group (defined as above). A large diversified firm, with a number of divisions that are not separate limited liability entities can achieve all of the above. If the parent firm owns a very high stake in all the firms in a group, it does not have any legal restrictions on moving funds from one firm to another (of course where the ownership of the parent is less there might be issues in the way the funds should be channeled in the group). In this way a large firm should have the advantages as well as the disadvantage of internal capital markets. The scope of expropriating minority shareholders which is usually present in groups characterized by widely varying ownership rights of the parent firm (and ultimately the controlling shareholder), however, is severely limited if not absent where the parent firm holds a major stake in the subsidiaries, which again begs the question of why the subsidiaries are separate limited liability entities in these groups.

One answer to this question lies in the advantages limited liability can have on the survival and thus value of the group as a whole. In Sweden the parent firm is not liable for the debt of its subsidiaries including those owned 100% by the parent firm (this differs internationally, in some countries the parent is liable if it holds more than 90% stake in the subsidiary or if it can be proved that the parent is responsible for the collapse of the subsidiary). There have only been a handful of exceptions to this rule in Sweden based on extraordinary circumstances[1]. Given limited liability, organizing divisions within the groups as separate legal entities provides the parent firm with the option of partial liquidation[2]. This has both advantages and disadvantages (Bianco & Nicodano (2006)). In general and for the most part, in the presence of internal capital markets firms within the group can take advantage of mutual co-insurance, whereby funds can be shuffled between firms such that the member firms can meet their debt obligations[3]. However, if there are insufficient funds within the group as a whole, or if the operations within a particular subsidiary have extremely high costs for the group as a whole, the parent can let a firm within the group go under and not be held liable for the subsidiary's debt obligations. The advantage of such partial liquidation is that the survival of the group as a whole is not threatened by the bankruptcy of one of its members. This option of partial liquidation also has implications for how debt is placed within the group. In order to take advantage of partial liquidation, debt should be placed in subsidiaries and not in the parent firm. There are arrangements, however, which can make the option of partial liquidation non-operational. This would be the case in the event that the parent firm guarantees all the debt in its subsidiaries. The structure of debt guarantees in the group also affects the extent to which partial liquidation can be taken advantage of. There are plausible debt guarantee structures within groups such that the failure of one subsidiary could cause a chain reaction and threaten the survival of the group itself.

In addition to the abovementioned advantage of partial liquidation, partial liquidation can also give rise to increased moral hazard and agency costs of debt due to the limited liability of firms which are members of the group. By placing most external debt in (a few of) its subsidiaries and then reshuffling this debt to other firms within the group (when this is feasible), the parent firm (and ultimately the controlling shareholder) has incentive to take on higher risk projects, since if it is not able to meet its debt obligations, partial liquidation allows the parent to let one (or more) subsidiaries go bankrupt without jeopardizing the survival of the group as a whole. In other words, the asset substitution problem, which is an agency cost of debt, becomes more acute with a group structure where the parent firm is not responsible for the debt of its subsidiaries. This, of course, would

[1] The legal term for this phenomenon is "piercing the corporate veil". In a number of cases the court considered the subsidiary to be operating solely for the benefit of the parent firm, without having enough capital or assets to carry out its business as an independent entity.
[2] Bianco & Nicodano (2006)
[3] Matsusaka & Nanda (2002)

require that the risk taking and risky investment opportunities of firms within the groups are not known to outside investors, i.e. the presence of information asymmetries with regard to the investment opportunity set and project choice of group firms, which to me seems to be quite an innocuous assumption. Of course, banks and other lenders anticipate this increased moral hazard problem and would thus charge a higher rate of interest when lending to subsidiaries. One way for the parent firms in groups (especially where the parent firm has a very high ownership stake in its subsidiaries, since in such groups reshuffling of funds is all the more easier) to credibly commit to lenders of not taking advantage of this partial liquidation (which stems from the limited liability of its subsidiaries) is to take on more debt itself. It then has an incentive to pursue safer projects, since the financial difficulties and possible bankruptcy of the parent firm would lead to the ceasing of operations of the group as a whole[4].

The arguments above concerning the pros and cons of partial liquidation were developed in a paper by Bianco & Nicodano (2006) who developed a model for pyramids. Their intuition is based on the partial ownership which exists from the parent firm to the subsidiaries in pyramids. In their set-up, the controlling shareholder can take advantage of minority shareholders (by shifting the burden of external debt service to them) through asset substitution. This interesting aspect is not present in groups which do not have highly varying ownership stakes of the parent firm.

I consider the placement of debt within firms which are members of corporate groups in Sweden for the years 1997-1999. I do not consider the cash flow rights of the controlling shareholder due to data limitations. However, given that most of the subsidiaries are owned more than 90% by the parent firm, this should not be a problem and should reflect the ownership stakes of the controlling shareholder. Thus in my sample the expropriation of minority shareholders is not a major concern. Is this necessarily a disadvantage? I think not. There are several reasons why it is of interest to study the type of groups I consider in this paper. First and foremost, although the expropriation of minority shareholders is not important in my sample, the exacerbation of the asset substitution problem due to the option of partial liquidation is still highly relevant. Secondly, the parent firms in my sample, given their high ownership stakes, can shuffle funds around firms in the group with much more ease than if their ownership stakes were low. Some evidence of the scope of internal capital markets based on how groups are defined is presented in the literature review. This makes the opportunities of taking advantage of the option of partial liquidation higher for them than for groups in which the ownership stakes of the parent firms are lower. In addition, the parent firm in this case can not only take riskier projects in the subsidiaries which have higher levels of external debt, but they can also increase the project risk of firms

[4] Bianco & Nicodano (2006)

other than the ones taking on high levels of external debt by requiring the latter firms to lend to the high risk firms within the group. Lastly, it seems that in the absence of tunneling or other ways of shifting funds to the parent firm and the controlling shareholder, the parent firms in my sample have a higher incentive of exploiting the option of partial liquidation. This is due to the fact that their high ownership stakes imply that if their high risk projects pay off, they receive the lions' share of the spoils. Given the above mentioned reasons and the fact that in a number of countries most firms are organized as the type of groups I study, this study should contribute to the literature on debt placement in groups.

Of course, the above incentives and motivations of the parent firm (and ultimately the controlling shareholder) are not unknown to the lenders as pointed out by Bianco & Nicodano (2006). As discussed this implies higher interest rates charged unless the parent firm commits to not taking advantage of the option of partial liquidation by taking on higher debt levels. My study thus compares the debt levels of the parent firms vs. their subsidiaries. Based on the opportunities and incentives of the groups in my sample to take advantage of partial liquidation, I expect to find that the parent firms in my sample should have higher debt levels than their subsidiaries. I also check for the effect of factors such as group complexity, transparency, subsidiary profitability and risk levels on the placement of debt. Groups which are more complex and have less transparency make it difficult for lenders to judge the motives behind the borrowing activity of group-affiliated firms and probably more difficult for them to prove suspected wrong-doing on the part of the parent firm in a court of law. Thus I expect to find that in groups which are more complex and less transparent, more debt should be placed in the parent firm than for less complex and more transparent groups. As mentioned, in the groups in my sample the parent firm can shuffle funds quite easily. This would imply that they do not necessarily need to take higher external debt levels in subsidiaries where they want to increase the risk. Nevertheless, I check whether the risk of the subsidiary (given by its income variance) has any effect on the amount of external debt placed in the subsidiary. I also check for the effect of subsidiary profitability on their levels of external debt. Given the parent firms' incentive to take advantage of the option of partial liquidation, I should find that external debt levels are higher for firms which are less profitable. Finally I test for differences in the placement of debt between listed and non-listed groups. Given the accepted fact that large listed firms are more transparent due to the number of analysts and investors looking into the company accounts, I expect to find that non-listed group parent firms have to take on higher debt levels than their listed counterparts.

I find that the parent firms' do indeed have higher external debt levels compared to their subsidiaries, although the difference is not extreme. Closer inspection reveals that the complexity of the group, proxied by the size of the group has a significant negative influence on the external debt levels of the

subsidiaries. Another important factor includes the amount of intra-group debt within the group. This is taken as reducing transparency and making it difficult for lenders to decipher the motivations of the borrowing firm. Lenders also might expect that the funds they lend will end up in another firm in the group for purposes they have no information about. I find that in a "matched" sample of listed and non-listed groups, the parent firms have about twice the amount of external debt compared to the subsidiaries and that being a subsidiary has a negative relationship to external debt levels. Since this sample is comprised of the largest groups in the sample, this is interpreted as an effect of group complexity. I find that the negative effect on external total debt levels of being a subsidiary is higher for listed group affiliated firms. This seems counter intuitive since listed firms are normally considered to be more transparent than non-listed firms. I do not consider this to be an effect of listing status but a reflection of the effect of size on the placement of debt within groups. This is due to the fact that in the "matched" sample, I only used the largest non-listed firms, which gave me the opposite way debt is placed between parent and subsidiary firms compared to the original sample employed. Since in the "matched" sample of listed and non-listed firms, listed firms remain much larger than the non-listed firms, I have concluded that the higher negative effect of being a subsidiary of a listed group depends on the larger size of the listed groups. Finally, considering a sample of groups in which the parent firms do not have operations of their own, I find that subsidiaries have higher external debt levels compared to the parent firms and that being a subsidiary is positively related to external debt levels. This is taken as confirmation of the contention that such groups are less complex than groups with operations of their own. Thus in this case the parent firm does not need to commit to not taking advantage of partial liquidation by taking on higher debt levels. I also find that subsidiary external debt levels are negatively related to their profitability while the parent firms' external debt is positively related to the same. This would point out to the parents placing more external debt in the less profitable firms. Unfortunately I do not get any significant results for the effect of income variance on the way debt is placed within groups. To sum up, I find evidence that parent firms commit to not taking advantage of the option of partial liquidation by taking on higher debt levels. This however, is not the whole story. The way debt is placed in groups is affected materially by the complexity and transparency of the group.

This paper thus takes the insight provided by Bianco & Nicodano (2006) and applies it to groups with high ownership stakes of the parent firms (as opposed to pyramids). In this sense it generalizes their insight to a wider ranger of groups and provides arguments for why the exacerbation of the asset substitution problem is also relevant for them. In addition, it highlights the negative effect that complexity and lack of transparency have on the amount of debt taken on by subsidiaries. To my knowledge this has not been investigated before.

The rest of the paper is organized as follows. Section II defines the concept of groups, the definition of groups employed in this paper as well as some accounting conventions. Section III briefly touches on the literature on groups and internal capital markets and discusses the placement of debt within groups. Section IV describes the data and variables and gives a brief outline of the study. Section V presents the results of the study. Section VI concludes.

II. A Look at Some Definitions of Corporate Groups

There have been a number of studies on the group form of organization. The definition of what comprises a group not only differs by study but also by country in the same study, which complicates the inferences drawn and comparisons made as well as the general application of the lessons derived from the studies. Some studies give detailed accounts of the minimum requirements for group affiliation as well as the details concerning the sample employed in the study while others only provide the latter. Not knowing the details of the sample necessarily begs a number of questions, for example is the concept of internal capital markets applicable to the groups studied (i.e. does the controlling shareholder have enough control and legal mandate to force a firm to borrow or lend within the group, to shuffle funds from cash rich firms with fewer investment opportunities to firms within the group which are cash strained but have a large number of investment opportunities).

According to Manos & Murinde (2007), firms may constitute themselves into business groups and enter a number of formal as well as informal contractual agreements to influence the way these firms are governed and the means by which they raise capital. They also state that control of the group can be achieved by appointing family members and friends to directorship and top management positions or through direct or indirect ownership (pyramid ownership structures). According to Hoshi, Kashyap and Scharfstein (1991) "it is best to think of a group as a network of business and financial relationships of varying degrees and kinds". Clasessens, Fan and Lang (2002) study groups in nine East Asian economies and point out, that when using country specific sources, they find that the definition of what constitutes a group varies by country (some are based on ownership levels while others are based on the controlling family being the largest shareholder).

The definition of group used in the present paper is based on the legal classification of firms into groups (Koncern). This construct is not unique to Sweden but represents how firms are organized in a number of countries for example the U.K and Germany, among others. Business groups are defined to be limited liability firms that are connected to each other through ownership by a parent company. According to Swedish accounting practices, a business group[5]

[5] The Swedish term for the groups studied in this paper is Koncern.

consists of a parent firm and one or more subsidiaries. The parent firm is the firm, which directly or indirectly owns more than half of the voting shares in the subsidiary (the subsidiary is not allowed to own shares in the parent firm). It is the ownership of voting rights which determines whether or not a firm belongs to a group, while the cash flow rights of the parent firm are taken into consideration when setting up consolidated statements, such as the income statement and the balance sheet. A firm is classified as a minority interest firm if the parent firm owns a minimum of 20% and a maximum of 50% of the voting rights. Such firms are generally not considered part of the group. There are exceptions to this rule, however, in cases where it is considered that the parent firm controls the firm in which it has minority interest (thus I have ownership levels in my sample which are lower than 50% yet the firms are considered to be part of the group). This arises if the parent firm has a contract with the other firm which either gives it the right to more than 50% of the votes or to appoint/fire more than half of the board of directors. In addition firms in which the parent firm of a group has a contractual right to determine strategy can also be included in the group structure. Importantly, the parent in the group is not liable for the debt of its subsidiaries.

Contingent on fulfilling certain conditions, Swedish firms within a group have the possibility of reducing their total tax burden through "group subsidies/transfers". By using "group subsidy/transfer", profits can be moved between firms within a group in order to reduce to total tax liability of the group. One of the criteria to be met to use this instrument is that group ownership of the firms should be more than 90% of the capital at the outset of the year under consideration. Although "group subsidy/transfer" is mainly used as a tax reduction device, it could be used as a dividend or as an addition to non-restricted equity.

III. Related Literature on Groups

There are a number of fundamental characteristics that define the group form of organization and these characteristics and their effects have been discussed in the literature. Although all characteristics do not apply to all kinds of groups, the following is a brief overview of the related literature on groups in general. Groups firms are generally characterized by the limited liability of subsidiaries within a group, access to internal capital markets and tools for reducing the total level of taxes of the group. They are also generally more complex and larger than stand-alone firms.

Larger firms are considered to have lower levels of information asymmetry. Although groups are generally very large and very visible (which would curb any opportunistic behavior of the group vs. outside investors due to reputational considerations, Diamond (1989)), as pointed out by Dewenter, Novaes and Pettway (2001), the complexity of the group may make it difficult for outsiders to

judge the motives and strategy of the group. A large number of intra-group transactions should add to this difficulty in judging the motives and strategy of the group. Thus it may be that groups which have a large number of intra-group debt transactions occurring may find it difficult to get as much outside financing as group affiliated firms without intra-group debt transactions[6]. Khanna & Palepu (1999) proxy greater transparency in their study of Indian group affiliated firms by a lower incidence of intra-group financial transactions (where these transactions are defined as investments in group firms, intra-group receivables and loans received from firms within the group). The lack of transparency or increased complexity should not only be of concern to equity providers but also to debt providers, since there is no reason to assume that the firm will act opportunistically towards one class of investors but not the other.

Studies on internal capital markets (both theoretical and empirical) highlight the effects of this market, both positive and negative. By virtue of this market, funds can be transferred within the group using a number of channels, for example intra-group sales prices, intra-group receivables and payables, intra-group lending and borrowing as well as group subsidies. Given that the level of information asymmetry between the parent firm and its subsidiaries is generally lower than that between an independent firm and outside investors (Gertner, Scharfstein and Stein (1994)), the parent firm can move funds from cash rich subsidiaries with low investment opportunities to cash constrained subsidiaries with good investment opportunities at a lower cost than outside finance would imply. Evidence of active resource allocation within conglomerates is to be found in Lamont (1997) and Shin & Stulz (1998)[7]. Internal capital markets also provide the group with the ability to coinsure firms within the group, whereby income is smoothed (Matsusaka & Nanda (2002))[8] and the ability of the group affiliated firms to meet their debt obligations is almost guaranteed by moving funds to firms in need. Other advantages of internal capital markets include a relaxation of credit constraints and the ability of headquarters to winner pick among projects (Stein 1997), thus increasing value and being able to fund more projects without relaxing credit constraints. This of course assumes that such internal capital markets are efficient. There is evidence that these markets may be used inefficiently with "socialistic" cross-subsidization[9] whereby funds are channeled not to the firms which create the highest value but to firms within the group that are weak, as well as evidence of waste (in time which should be spent on productive activities) on rent seeking and political activity (Scharftein & Stein (2000) model divisional rent

[6] In the study cited, it is stated that two of the authors worked as credit officers (in Asia and Latin America) for New York money center banks during the 1980's. They state that they spent substantially more time analyzing the credit worthiness of group firms than independent (stand-alone) firms.

[7] In both these studies the capital expenditure of the segments of the conglomerates are shown to depend on the cash flows of other segments. The allocation of capital is, however, not efficient.

[8] The argument here is that risk management increases firm value due to the smoothing of internal funds which reduce the costs of under-investment.

[9] Evidence of inefficient cross subsidization is found in Rajan, Servaes & Zingales (2000) who find that compared to stand-alone firms, multidivisional firms allocate more resources to weak firms.

seeking activities and the two-tiered agency problem which results in investment distortions and inefficient cross-subsidization).

Since most of the subsidiaries in my sample are owned to a very high degree by the parent firm, they should be able to employ internal capital markets extensively. However, this is not necessarily true of all kinds of groups (as mentioned there are several definitions of the term group as applied in the finance literature). The applicability of some factors rests crucially on the definition of group employed in the studies. For example, whether or not groups can use internal capital markets, for income smoothing, cross-subsidization etc., depends on the structure of the group. Khanna & Palepu (1999) study listed group affiliates in India and Hoshi et al. (1991) study the Japanese Kieretsu and both come to the conclusion that the scope of using internal capital markets in their group structures is limited. As Khanna & Palepu state "Because Indian business groups are a collection of public firms, the group's ability to use "internal capital markets" to fund on-going activities of one group firm from the cash flows of the other group firms is limited. Therefore the most important role of the group's internal capital market is to launch new ventures, in which both the family and the other group affiliates might acquire ownership stakes. In this respect, Indian business groups are closer to the LBO associations than to the diversified public corporations in the U.S.". There is evidence of funds being moved in Indian groups to controlling shareholders at the expense of minority shareholders, but this is in the form of tunneling of resources (Bertrand, Mehta and Mullainathan (2002)). The scope and incentives for using internal capital markets (as in conglomerates) in the Japanese Kieretsu, which center around main banks, are also very limited. As stated in Hoshi et. al (1991), despite the large number of intra-group sales transactions, the arguments about group firms carrying out intra-group transactions at prices which do not reflect market prices or of group firms shuffling income across firms to reduce taxes, smooth income or fund investment where needed in the group are not convincing. They state that "First, the tax-reduction and income smoothing explanations presume a degree of strategic micro-management that is inconsistent with what we know about behavior within the group. There are undoubtedly enough product-market linkages among group firms to enable them to shuffle income. However, these firms are all publicly traded and independently managed. It is hard to believe that firms have an incentive to make themselves look bad to help other firms."

In an asymmetric information framework, Bianco & Nicodano's (2006) model of the additional moral hazard due to the option of partial liquidation has been discussed in the introduction. The authors also carry out an empirical study of the placement of debt in Italian pyramids and find that the parent firms do indeed have substantially higher debt levels than their subsidiaries and that the external debt levels of subsidiaries is negatively related to the ownership levels of the parent firms.

IV. Data, Variables and Outline of the Study

I utilize data provided by Market Manager Partners. Using unconsolidated statements I distinguish between the parent companies and subsidiaries. The data includes accounting information for all firms and agencies (both private and governmental) registered in Sweden. Their main source of information is comprised of the financial statements filed by all firms at the Swedish patent registration office[10]. Information is available on both an unconsolidated as well as on a consolidated basis, with the former being available from 1984 and the latter from 1992. It also includes information on group structure which allows me to distinguish parent from subsidiary firms. All accounting information used in the present study is for the years 1997-1999, while information on the structure of the group is from 1997. The data also includes information on the percentage ownership of a firm within a group by the firm immediately above it in the chain within the group. The ownership information is not complete but quite broad. I use this information as a proxy for ownership effects. (I also used the available information on the group structure to calculate the parent firm's ownership in the different subsidiaries for a smaller sub-sample of firms and since the ownership is mostly 100% it did not effect my results qualitatively, which is why I have chosen to use the immediate parent firm's ownership stake as a proxy of the ownership stake of the parent firm at the top of the group). As is evident by table I, most of the firms in the sample are wholly owned by the parent.

I employ a sample of the data which contains all group affiliated and group related firms (firms in which the group affiliated firms have a minority interest) where the total assets of the parent firm are at least 1.0 million SEK. My sample includes parent firms which have operations of their own as well as parent firms whose main assets are shareholdings in their subsidiaries. The firms classified as minority interest firms have been classified as group affiliated firms in the data base which would imply that the parent firms in the groups have substantial control over these firms. This is confirmed by looking at the ownership stake of the parent firms in these minority-interest firms which is quite high (although not always a controlling cash flow share, see table I). In this way it is highly plausible that the parent firms can exert some influence as to the placement of debt within such firms also. However, the scope for using internal capital markets for income smoothing or cross-subsidization is very limited as far as these firms are concerned. I exclude all financial firms from the sample and the very few dubious accounting posts such as negative assets as well as firms which report negative total equity posts. I also restrict my sample to include only those groups for which I have financial statements for the parent firms and for which I have basic information (such as listing information, company history etc.). I exclude all

[10] A number of foreign firms registered at the patent registration office are included in the sample. However, in the final econometric sample, the number of such firms is quite small, leaving the sample representing predominantly Swedish firms.

groups in which the assets of the parent firm are not given or those in which there is only one subsidiary with missing assets. I include only those subsidiaries which can be considered as operating firms, which I define as firms with financial holdings in the group of less than 50%. This is done in an effort to exclude firms which are not defined as the parent company, but which are no more than firms which have been moved down the chain in the group due to corporate restructuring activities[11]. It is important to note that no effort is made to include every firm within the group due to the fact that a number of groups have foreign subsidiaries for which information is not available in the data files employed.

I have a total of 58,199 firm year observations on a total of 10,478 parent firms and 20,309 different subsidiaries or related firms. A total of 1,358 firms are defined as associated firms. More than 90% of the subsidiaries are fully owned by the firm immediately above it. Details of the ownership levels of the parent firms in the subsidiaries are given in table I.

The analysis of debt placement employs various categories of debt. The variables are defined as follows. The primary dependent variables used are total external debt and total external long-term debt. I also employ total and total long-term debt as dependent variables. Total debt is defined as the sum of total debt owed to institutions, bonds outstanding (very few) and intra-group debt scaled by total assets. Total external debt is as the above with the exclusion of intra-group debt. I also distinguish between total-and-external long-term and short-term debt, where total long-term debt is the sum of long-term debt from all credit institutions, bonds outstanding and intra-group long-term debt scaled by total assets. External long-term debt is defined as above without the inclusion of intra-group long term debt. Total short-term debt is all short-term debt owed to credit institutions plus all short-term intra-group debt scaled by total assets and external short-term debt is composed only of the first term divided by total assets in the last definition. The distinction is made due to the fact that the agency costs of debt differ between long-and-short-term debt (Titman & Wessles (1988) and Barclay & Smith (1995)) with most of the agency costs (for example the asset substitution problem and the under-investment problem) being more applicable to long-term debt. Net intra-group debt is the difference between intra-group lending and borrowing. As a first step in the analysis I carry out a comparison of the placement of the various definitions of debt between the parent and subsidiary firms. I very superficially compare the collateralization, which is defined as the amount of collateral pledged to total assets, of the parent firms vs. the subsidiaries. I have information only of the amount of collateral pledged by a firm but not of the details regarding what the collateral is pledged for. Casual inspection reflects that the amount of guarantees outstanding for the subsidiaries is much higher than in the parent firms. However, I do not have details of the guarantees and do not feel

[11] I am grateful for Svante Andreen, head of corporate finance at the Handelsbanken Capital Markets for bringing my attention to this phenomenon.

that the information is sufficient to justify including this very important post in the analysis. Although I assume that the guarantees are most likely to be for the debt of other firms in the group, I cannot confirm this conjecture with the information at hand.

Table I. Ownership Levels of Subsidiaries

Ownership levels of the firm one level up in the group. Note that the majority of groups are quite flat and do not have several levels. The sample includes all observations used in the econometric sample while the ownership figures pertain to 1997. Panel A gives the mean ownership level in different percentiles of the sample. Panel B gives the average, median, number of observations and the standard deviation of ownership of the immediate parent firm.

Panel A

Percentage of sample with an average ownership level reflected in the two columns	*Group affiliated subsidiaries. Average percentage ownership by parent firms in the group.*	*Minority interest firms. Average percentage ownership by parent firms in the groups.*
1%	51%	20%
5%	91%	20%
10%	100%	24%
25%	100%	30%
50%	100%	40%
75%	100%	50%
90%	100%	50%
95%	100%	50%
100%	100%	50%

The minimum ownership level in a group firm is 36% for firms classified as group firms as opposed to firms in which another firm holds a minority interest (as mentioned it is possible for a firm to be classified as part of the group if the parent firm exercises real authority in the mentioned subsidiary).

Panel B

	Median	*Mean*	*Standard deviation*	*Minimum*	*Maximum*	*Number of observations*
Minority interest firm	40%	39.03%	11.08	9%	50%	2,359
Group affiliated firm	100%	98.13%	7.93	36%	100%	34,764

Although it would be interesting to consider the effect of the percentage ownership of the parent firm in the subsidiaries on debt levels in the pooled OLS regression, I do not carry out such an investigation initially. The reason for this is that since the sample is mostly comprised by fully owned subsidiaries, there is not enough variation in the sample to obtain significant results. Later I do check for the effect of being a subsidiary or related firm (a minority interest firm) and percentage ownership of the parent firm in the subsidiaries on debt levels in pooled OLS regressions, where the dependent variables are total debt, total external debt, total long-term debt and total long-term external debt by employing a dummy for the firms being subsidiaries. As control variables, I use the independent variables commonly used in the study of capital structure; profitability, size, non-debt tax shields, growth opportunities and income variance. The basic models to be tested are as follows:

$$Leverage_{it} = \alpha + \beta_1\, size_{it} + \beta_2\, profitability_{it-1} + \beta_3\, non\text{-}debt\ tax\ shields_{it} + \beta_4\, tangibility_{it} + \beta_5\, growth_{it+1} + \beta_6\, income\ variance_{it} + \xi_{it}$$

and,

$$Leverage_{it} = \alpha + \beta_1\, size_{it} + \beta_2\, profitability_{it-1} + \beta_3\, non\text{-}debt\ tax\ shields_{it} + \beta_4\, tangibility_{it} + \beta_5\, growth_{it+1} + \beta_6\, income variance_{it} + \beta_7\, percentage\ ownership_{it} + \beta_8\, subsidiary_{it} + \xi_{it}$$

I use winsorized ratios for the explanatory variables (1% and 99%) to eliminate the effects of any extreme values on the regressions. The Breusch-Pagan-Godfrey test on the sample rejected the assumption of homoscedastic disturbances, for which reason t-values based on white corrected errors are reported in all the regressions. Corrections for clustering have also been specified in the regressions to take account of any group specific effect.

The definition of the control variables is as follows. Profitability is measured by the lagged ratio of net operating income to total assets. The logarithm of total assets in time t is used as a proxy of firm size to judge the effect of size on leverage. I use depreciation divided by total assets at time t as a measure of non-debt tax shields at time t. Realized values of growth are used to proxy expected growth when the capital structure decision was made. They are measured as the percentage change in the log of sales from the current to the next period.

Although the theoretical predictions about the effect of profitability[12] and size[13] on leverage are ambiguous, most empirical studies have found size to be positively related to the levels of debt[14] (in particular total and long-term debt) and negatively related to profitability[15]. Depreciation and other non-debt tax shields reduce the relative benefit of the debt tax shield[16] (subject to profit exhaustion) and therefore should exhibit a negative relationship to debt levels. Firms with a large number of investment or growth opportunities are more subject to the asset substitution problem[17] and therefore should have lower levels of debt compared to firms with lower growth opportunities.

In order to understand other important influences on debt placement, I consider complexity, and transparency issues as well as the effect of subsidiary profit and risk on debt placement as follows. The simplest way, employed here, to proxy group complexity is to gauge the effect of the size of the group on the placement of debt, since the larger a group is, the more complex it should be to analyze. To gauge the effect of transparency I use two proxies. The first one is the size of the intra-group transactions in the whole group. These include all intra-group borrowing and lending activities as well as all intra-group receivables. This is labeled total intra-group transactions in the regressions. The second proxy used is the amount of intra-group debt activity in the group as a whole. This is labeled as total intra-group debt. Ideally, I would have preferred to use the number of intra-group transactions as well since a high number of intra-group transactions would definitely make it more difficult to understand the motivations behind the transactions and reduce the transparency within the group. These factors are added to the OLS regressions previously carried out.

In order to investigate whether the parent firms' choose to put more external debt in riskier or less profitable subsidiaries, I add income variance (as a proxy for risk) to the regressions and interact profitability and income variance with the dummy for being a subsidiary. Income variance is defined as the standard deviation of the percentage change in operating income from the previous year to the present year. This is expected to be negatively related to the leverage measures

[12] Ross' (1977) signaling model in the face of information asymmetry implies that profitable firms can take on higher debt to signal quality. Jensen (1986) and Stulz(1990) show that in the presence of active markets of corporate control, profitable firms may take on higher debt levels to reduce the free cash flow available to managers due to the presence of agency costs of separation of ownership and control. Myers & Majluf (1984) derive a pecking order of financing choices and show that firms prefer to finance first internally, then by debt and lastly by equity. An implication of their model is that firms with slack should reduce debt levels.

[13] Larger firms, by virtue of generally being more diversified have a lower probability of costly bankruptcy enabling them to carry higher debt levels (Titman & Wessels (1988)) and are generally also older firms concerned with maintaining their hard earned reputation which curbs their opportunistic behavior (Diamond 1989). On the other hand, the information asymmetry associated with larger firms is believed to be lower, making equity financing a more attractive option for them compared to smaller firms (Rajan & Zingales 1995).

[14] (Rajan & Zingales (1995), Banerjee et al 2004).

[15] Kester (1986), Friend & Lang (1988), Gonedes et.al (1988) and Titman & Wessels (1988).

[16] De Angelo & Masulis (1980)

[17] Jensen & Meckling (1976).

employed for the parent firm. If the parent firms do indeed place more external debt in riskier subsidiaries, then I should find that income variance is positively related to external debt levels of the subsidiaries.

Another way I check for the effect of complexity is by looking at groups where the parent firm's assets are mainly holdings in their subsidiaries and compare the results obtained in this sample with the results obtained earlier. Parent firms that have operations of their own make the group more complex. Such groups do not only have intra-group financial transactions occurring but also a number of operational transactions which involve transfer pricing, intra-group receivables, and payables. This also makes it more difficult for lenders to prove in court that the parent firm acted opportunistically at their expense. For the sake of brevity, I change the regressions in this and the next part to include only two control variables, namely profitability and size.

Finally, since it is a well known truism that large listed firms have less information asymmetry associated with them and are thus more transparent, I compare the listed group debt placement to non-listed group debt placement. Initially I compare the descriptive statistics on the whole sample distinguishing listed and non-listed group firms. However, since the panel is extremely unbalanced I do not use the original sample for a detailed comparison. I use a much smaller sub-sample by attempting to match the median size of the listed and non-listed groups (the total assets of the group as a whole). This reduces my sample drastically. The contention is that listed firms, by virtue of being more transparent, should suffer less from the consequences of the moral hazard problem related to partial liquidation. This would lead them to have relatively less debt than the parent firms of non-listed groups compared to their subsidiaries.

V. Placement of Debt within Business Groups

A. Results: Placement of Debt

The descriptive statistics of the sample (which include parent firms with operations of their own) are reported in table II. As reflected in the table, considering the whole sample, the parent firms are much larger, have a much higher proportion of financial assets and have less collateral pledged than the subsidiaries (which is likely to reflect the fact that subsidiaries have a lot more fixed assets). The parent firms' have the same level total debt as the subsidiaries. What is also apparent from the table is that the parent firms' total external debt and total long-term external debt to assets is higher than of the subsidiaries despite their having less tangible and current assets. Although the latter factors point out to the ability of the subsidiaries to take on higher levels of debt, the larger size, higher interest coverage and lower income variance of the parent firms point out to their being able to carry higher debt levels. The differences in total external

debt, total long-term debt, total external long-term debt, total short-term and total external short-term debt, total intra-group debt and total short-term intra-group debt and receivables are significant according to the Students't-test at the 5% level and the Mann-Whitney tests of differences (tables have been excluded in the interest of brevity).

Since I have scaled all measures including the intra-group debt by the firms' total assets and given the difference in size of the parent firms and the subsidiaries, it is not possible to make an exact statement about the flow of funds. Also, inasmuch as all the firms in the group are not present in the sample, an exact statement of the flow of funds is not possible. The subsidiaries do, however, have higher levels of intra-group debt than the parent firms. The posts long-term intra-group receivables include only long-term intra-group lending. Netting out the long-term intra-group debt with these receivables, it seems that the subsidiaries are lending long-term funds to the parents. The parents in turn seem to be lending these funds out short-term to the subsidiaries, given the levels of short-term intra-group receivables. However, this last term includes not only short-term intra-group lending but also transactional posts. Therefore, one cannot make an exact statement of the magnitude of this lending, but since subsidiaries have higher levels of total intra-group debt than the parents, and lend long-term to the parents, it follows that the parent firms must be lending more in short-term intra-group debt to the subsidiaries. However, as mentioned before, without ascertaining that all the firms in the group are present in the sample, it does not seem feasible to make any definitive statements about the flow of intra-group debt with the groups. The subsidiaries in the sample are channeling funds to the parent companies using intra-group subsidies/transfers.

All the differences between the levels of intra-group debt, intra-group receivable and intra-group transfers etc. are significant between the parent and subsidiaries based on t-tests at the 5% level and the Mann-Whitney test (once again I exclude these tables in the interest of brevity). Thus in accordance to the theoretical arguments presented earlier, given the incentives and motivations of the parent firms in my sample, I find that the parent firms have higher external leverage measures than the subsidiaries. The descriptive statistics presented in table II also distinguish between listed and non-listed groups. I find that the way debt is placed in listed vs. non-listed groups is very different. The following is a brief summary of the differences.

Table II. Firm Characteristics and Leverage Statistics of All Non-Financial Group Affiliated Firms

Descriptive statistics for group affiliated firms distinguishing between parent and subsidiary firms as well as listed and non-listed group parent and subsidiary firms employed in the econometric sample. I have 58,199 firm year observations on group affiliated firms over the period 1997-1999. Of these 10,478 are on parent firms and 20,309 on subsidiaries. The table reports mean and median (in parentheses) values. The variables are defined as follows: Total assets, turnover and number of employees report the values of these posts on the balance sheets. Current assets and fixed financial assets are the posts on the balance sheet scaled by total assets. Profitability is measured as the lagged ratio of operating income to assets; interest coverage as the square root profit adjusted for depreciation and financial costs divided by financial costs, tangibility as fixed assets/total assets; growth as the logarithm of the percentage change from the current period to the next period. Income variance is defined as the standard deviation of the percentage change in operating income between the current and the past period, while non-debt tax shields are defined as the ratio of depreciation to assets. All leverage measures, receivables, collateral and intra-group transfers are scaled by total assets. Total debt is defined as the sum of all sums owed to credit institutions, bonds outstanding (very few) and intra-group debt scaled by total assets. Total external debt is the value of the previous post without the inclusion of intra-group debt. Intra-group debt is scaled by total assets. Total and external long-and-short-term debt are defined analogously.

	All Parent Firms	***All Subsidiaries***	***Parent Companies Non-listed)***	***Parent Companies (Listed)***	***Subsidiaries (Non-listed)***	***Subsidiaries (Listed)***
Profitability	.04 (.02)	.05 (.04)	.04 (.02)	-.04 (-.01)	.06 (.04)	-.04 (.002)
Current assets	.41 (.38)	.66 (.81)	.41 (.38)	.40 (.38)	.67 (.81)	.62 (.78)
Fixed financial assets	.34 (.17)	.01 (0)	.34 (.16)	.38 (.34)	.01 (0)	.02 (0)
Interest coverage	232.23 (3.68)	189.95 (4.37)	236.12 (3.68)	-86.23 (3.39)	195.14 (4.30)	105.24 (6.08)
Total assets	122,834,673 (4,858,000)	53,977,264 (3,476,000)	50,148,835 (4,692,734)	3,735,590,005 (252,455,000)	33,176,170 (3,253,000)	233,547,625 (9,322,000)
Tangibility	.17 (.03)	.22 (.07)	.17 (.03)	.07 (.01)	.23 (.07)	.16 (.03)
Turnover	41,826,426 (1,326,000)	47,483,585 (3,388,000)	28,987,808 (1,280,500)	679,699,705 (10,837,000)	25,669,338 (3,298,137)	236,566,547 (5,571,000)
Sales growth	.003 (.002)	.004 (.002)	.003 (.002)	.004 (.005)	.004 (.002)	.005 (.003)
Income variance	10.63 (.86)	46.49 (.82)	10.63 (.86)	10.50 (1.36)	16.00 (.83)	338.29 (.81)
Non-debt tax shields	.03 (.01)	.05 (.02)	.03 (.01)	.01 (.003)	.05 (.02)	.05 (.01)
No. of employees	19 (1)	22 (3)	12 (1)	350 (12)	15 (3)	85 (7)
Total debt	.26 (.15)	.26 (.14)	.26 (.15)	.21 (.16)	.26 (.14)	.25 (.12)
Total external debt	.15 (0)	.13 (0)	.15 (0)	.11 (.02)	.14 (0)	.05 (0)
Total intra-group debt	.11 (.002)	.13 (0)	.11 (.002)	.10 (.03)	.12 (0)	.20 (.04)
Total long-term debt	.18 (.004)	.16 (0)	.18 (.003)	.13 (.03)	.16 (0)	.09 (0)
External LT-debt	.14 (0)	.12 (0)	.14 (0)	.09 (.001)	.13 (0)	.04 (0)
Intra –group LT-debt	.04 (0)	.04 (0)	.04 (0)	.03 (0)	.04 (0)	.05 (0)
Intra-group LT receivables	.03 (0)	.06 (0)	.03 (0)	.07 (0)	.05 (0)	.16 (0)
Total ST-debt	.08 (0)	.10 (0)	.08 (0)	.08 (.03)	.10 (0)	.15 (.01)
External ST-debt	.01 (0)	.01 (0)	.01 (0)	.02 (0)	.01 (0)	.007 (0)
Intra-group ST-debt	.07 (0)	.09 (0)	.07 (0)	.06 (.01)	.09 (0)	.15 (.003)
Intra-group ST receivables	.09 (0)	.15 (0)	.09 (0)	.17 (.09)	.14 (0)	.24 (.04)
Collateral	.34 (.12)	.39 (.06)	.34 (.13)	.18 (.02)	.41 (.11)	.20 (0)
Intra-group transfers	.03 (0)	-.04 (0)	.03 (0)	.01 (0)	-.046 (0)	-.03 (0)

In general, firms which belong to non-listed groups are more profitable, have a higher level of current assets, higher interest coverage, tangibility and non-debt tax shields (here the difference only applies to the parent firms) than firms which belong to listed groups. Firms belonging to listed groups are much larger and have a higher proportion of financial assets than firms which belong to non-listed groups. The total and long-term external debt levels of listed firms are also much lower than for non-listed firms. Considering the debt levels of the parents and subsidiaries in more detail, we can distinguish some interesting differences between listed and non-listed groups. The external leverage of the parent firms of non-listed firms is still slightly higher than that of the non-listed subsidiaries. The difference between the external debt levels of the listed parent firms compared to listed subsidiaries is much higher. Although the total debt of the listed parent firms is lower than their subsidiaries, their level of total external debt is more than twice that of their subsidiaries and this difference is statistically significant at the 5% level. The main difference arises from the levels of long-term external debt with the parent firm carrying much higher levels of external long-term debt. Thus for the sample as a whole, the parent firms of listed groups have to carry much higher levels of debt than the parents of non-listed groups. However, since the sample is mainly non-listed firms, at this point no definite statement can be made about the influence of listing status, if there is any, on the placement of debt within groups.

I now carry out the multivariate analysis on the previously named control variables as well as the additional dummy for whether a firm is a subsidiary and a variable capturing the percentage ownership by the firm directly above in the group. Although I later carry out a comparison of listed and non-listed groups using a matched sample of firms, I do distinguish between listed and non-listed subsidiaries at this point. This is done due to the interesting and extreme difference in the levels of parent and subsidiary debt of listed and non-listed groups. The results are reported in table III.

Table III. Regression Analysis of Debt Levels

Estimates are presented for ordinary least squares applied to the pooled sample for external total and total debt where a dummy have been introduced for whether a firm is a subsidiary. I include percentage ownership of the immediate parent firm as explanatory variables in half of the regressions. Size is defined as the logarithm of total assets, profitability is measured as the lagged ratio of operating income to assets, non-debt tax shields as the ratio of depreciation to assets, tangibility is defined as fixed assets/total assets, growth as the percentage change in the log of sales from the current period to the next period, and income variance as the standard deviation of the percentage change in operating income between the current and the past period. I use a dummy equal to one if a firm is a subsidiary.

Dependent Variable	***Total Debt***	***Total Debt***	***Total External Debt***	***Total External Debt***	***Total LT Debt***	***Total LT Debt***	***Total LT External Debt***	***Total LT External Debt***
Profitability	-.02	-.02	-.01	-.01	-.01	-.01	-.01	-.01
	(-5.51)	(-5.44)	(-3.57)	(-3.58)	(-2.90)	(-3.67)	(-3.56)	(-3.19)
Size	.03	.03	.01	.01	.02	.02	.01	.01
	(22.55)	(24.18)	(8.07)	(7.38)	(15.26)	(14.53)	(7.48)	(7.11)
Non-debt tax shields	-.09	-.09	-.17	-.22	-.18	-.19	-.19	-.24
	(-3.86)	(-2.46)	(-7.98)	(-8.02)	(-7.98)	(-6.88)	(-9.33)	(-9.25)
Tangibility	.41	.42	.42	.40	.44	.45	.41	.38
	(56.31)	(46.94)	(49.44)	(37.07)	(57.29)	(45.86)	(48.77)	(36.92)
Growth	.02	-.03	-.03	-.05	.004	-.02	-.03	-.04
	(1.48)	(-2.48)	(-3.35)	(-4.33)	(.44)	(-1.80)	(-3.36)	(-3.92)
Income variance	-.00003	-.00003	-.00002	-.00002	-.000005	.000006	-.00002	-.00001
	(-1.21)	(-.92)	(-1.11)	(-.58)	(-.29)	(.23)	(-1.08)	(-.46)
Subsidiary	-.001	.06	**-.03**	.001	**-.03**	.02	**-.03**	-.002
	(-.26)	(1.44)	**(-10.36)**	(.02)	**(-9.53)**	(.63)	**(-10.19)**	(-.06)
Percent ownership		.001		**-.0004**		.0001		**-.0003**
		(12.18)		**(-3.57)**		(1.02)		**(-3.40)**
Constant	-.20	-.44	-.06	-.06	-.12	-.21	-.05	-.05
	(-10.54)	(-9.55)	(-3.00)	(-1.33)	(-7.55)	(-4.80)	(-2.55)	(-1.13)
R^2 Overall	.22	.29	.29	.29	.28	.33	.28	.29
No. of observations	57,659	36,890	56,655	36,889	57,718	36,913	57,709	36,912

As can be seen, most of the control variables exhibit the relationships predicted by theory and most of the results on the control variables are significant. What is clear from the regressions concerning debt placement is the following. Being a subsidiary has a negative relationship to total external debt, long-term external debt and total long-term debt. When I add percentage ownership of subsidiary firms, the sample changes (since I do not have ownership figures for all the firms in the sample and the number of firms is about half of what it was previously). This variable is positively related to the levels of total debt and negatively related to the levels of external debt, thus higher ownership implies more intra-group debt and lower levels of external debt. This indicates, that even in this sample with mostly fully owned subsidiaries, variation in percentage ownership implies that the motivation of the parent firm to place debt in subsidiaries where ownership is lower is present. Although the results for percentage ownership on external debt levels are statistically significant, it is important to note that the effect is quite small judging by the size of the

coefficients. Adding this variable makes the effects of being a subsidiary on external debt levels insignificant.

Thus the above demonstrates that the parent firms' ownership rights affect the way debt is placed in the subsidiaries. It also indicates that being a subsidiary has a negative effect on external total debt levels (as mentioned there is not a lot of variation in ownership levels in the sample). The same relationship also holds true for the level of external long-term debt. It is important to note that the magnitude of the effect of ownership share is quite low (looking at the value of the coefficients), while the magnitude of the effect of being a subsidiary is markedly higher.

B: What lies behind these results? Gauging the effects of complexity, transparency, subsidiary profitability and subsidiary income variance:

Thus far I have established that the leverage of the parent and subsidiary firms differs. In accordance to theoretical arguments, the parent firms do have higher external debt levels than their subsidiaries due to the moral hazard problem associated with limited liability. It is imperative to investigate the data further in order to uncover other factors explaining the results. As mentioned in the introduction, several factors can affect the placement of debt and I aimed to look into some of these factors. The factors to be considered are those which affect the lenders ability to judge the motivations behind group affiliated firm transactions as well as factors which make it more difficult for lenders to verify in a court of law that the parent firm has acted opportunistically. I also consider a couple of factors based on the motivations of the parent firms. Do the parent firms place more external debt in their less profitable subsidiaries since it is less painful for the group to let such firms go under? I also consider whether the parent firm places more debt in their risky subsidiaries.

As mentioned earlier I check for complexity, transparency and other factors by using a number of proxies for these factors. For this reason I add group size, amount of intra-group transactions, amount of intra-group debt and the profitability and variance of the subsidiaries into the regressions on the sample employed earlier. I now concentrate only on external debt levels. The results are presented in table IV, V and VI. Tables IV and V reports the regression results for total external and total long-term external debt while VI reports the Beta weights of the variables employed in regression V to gauge the relative importance of the different explanatory variables. The Beta weights are the regression coefficients (b) for standardized data. Beta reflects the average amount (in standard deviations) the dependent increases when the independent increases one standard deviation and the other independents are held constant.

Regressions 1, 2 and 3 in tables IV and V gauge the effect of being a subsidiary on debt levels as well as the effect of the complexity and transparency variables mentioned earlier on the debt of the groups. The results for the total and long-term external debt levels are almost identical. The effect of being a subsidiary on external debt levels is as before negative and almost always significant. The effect of group complexity, proxied by the size of the group is negative on the debt levels of groups and group affiliated firms, as also evidenced by the fifth and the first three regressions in both tables. Of the two proxies on transparency, only the level of intra-group debt in a group is found to have a negative and significant effect on the debt levels of groups. The amount of total intra-group transactions by itself does not provide any significant results. Breaking this term into intra-group debt and intra-group receivables indicates that the level of intra-group receivables have a positive effect on external debt levels in the group in regression 3.

I check whether the relationship between the external debt levels of the parent firms to profitability and income variance is different than that of the subsidiaries as well as the effect of being a subsidiary on debt levels in regression 4 in tables IV and V. Regression 5 includes the above as well as interaction between being a subsidiary and the complexity and transparency variables used in the first three regressions.

As far as the profitability of the group-affiliated firms are concerned, it is clear that while the parent firms' debt in positively related to profitability, the opposite is true for the subsidiaries. Although the results for the subsidiaries are in line with the predictions of the pecking order theory, the question arises as to why the parent firm and their subsidiaries behave so differently. It would indicate that the parent firms prefer to place more external debt in subsidiaries that are less profitable. I do not get any statistically significant results for the effect of income variance on the debt of the parent firms or their subsidiaries.

Table IV. Regression Analysis of Total External Debt Including Underlying Factors

Estimates are presented for ordinary least squares applied to the pooled sample as in table III, here only for total external debt. The definition of control variables and dummies is as the previous table. This table considers additional factors to proxy complexity, transparency, subsidiary profit and subsidiary risk. Group size is defined as the log of total assets for the whole group. Intra-group transactions are defined as the sum of intra-group receivables and debt of the whole group scaled by the total assets of the group. Intra-group debt is defined as the total intra-group debt of the group scaled by the total assets of the group. Income variance is defined as the standard deviation of income from the past to the present period.

Dependent Variable	***Total External Debt (1)***	***Total External Debt (2)***	***Total External Debt (3)***	***Total External Debt (4)***	***Total External Debt (5)***
Profitability	-.001	-.001	-.001	.02	.02
	(-.51)	(-.22)	(-.30)	(4.91)	(5.06)
Size	.01	.01	.01	.01	.01
	(9.82)	(11.54)	(13.22)	(8.06)	(13.24)
Non-debt tax shields	-.16	-.16	-.16	-.16	-.16
	(-7.39)	(-7.07)	(-7.49)	(-7.99)	(-7.44)
Tangibility	.42	.42	.42	.42	.42
	(48.19)	(47.93)	(48.04)	(49.42)	(48.50)
Growth	-.02	-.02	-.02	-.02	-.02
	(-2.92)	(-1.73)	(-1.76)	(-3.29)	(-1.63)
Income variance	-.00003	-.00003	-.00003	-.00003	-.00003
	(-1.24)	(-1.11)	(-1.46)	(-1.35)	(-1.28)
Subsidiary	-.03	-.03	-.03	-.03	-.03
	(-9.95)	(-8.41)	(-8.20)	(-4.83)	(-.08)
Group size	-.00005	-.00005	-.00005		.00005
	(-2.73)	(-2.11)	(-4.24)		(.76)
Total intra-group transactions.	.0008 (.75)				
Total intra-group receivables			.003 (3.38)		-.005 (-2.06)
Total Intra-group debt.		-.18 (-22.17)	-.19 (-22.73)		-.12 (-12.06)
Subsidiary* group size					-.0001 (-2.97)
Subsidiary* total intra-group transactions					
Subsidiary* total intra-group receivables					.007 (3.48)
Subsidiary* total intra-group debt					-.10 (-7.15)
Subsidiary* profitability				-.03 (-6.70)	-.03 (-6.32)
Subsidiary* income variance				.00002 (.48)	.00002 (.23)
Constant	-.08	-.08	-.09	-.07	-.11
	(-4.31)	(-4.66)	(-5.32)	(-3.28)	(-6.43)
R^2 Overall	.29	.30	.30	.29	.31
No. of observations	57,675	57,675	57,675	57,675	57,675

Table V. Regression Analysis of Total Long-Term External Debt Including Underlying Factors

I repeat the analysis in the previous table with the only difference that now my dependent variable is total long-term external debt.

Dependent Variable	***Total LT External Debt (1)***	***Total LT External Debt (2)***	***Total LT External Debt (3)***	***Total LT External Debt (4)***	***Total LT External Debt (5)***
Profitability	-.001	-.001	-.001	.01	.01
	(-.45)	(-.21)	(-.29)	(4.42)	(4.49)
Size	.01	.01	.01	.01	.01
	(9.61)	(10.72)	(12.72)	(7.49)	(12.37)
Non-debt tax shields	-.18	-.18	-.18	-.19	-.19
	(-8.66)	(-8.38)	(-8.81)	(-9.34)	(-8.77)
Tangibility	.40	.40	.40	.41	.41
	(47.58)	(47.29)	(47.36)	(48.74)	(47.71)
Growth	-.02	-.02	-.02	-.03	-.03
	(-2.96)	(-1.78)	(-1.81)	(-3.32)	(-1.71)
Income variance	-.00002	-.00002	-.00003	-.00004	-.00004
	(-1.25)	(-1.08)	(-1.40)	(-1.66)	(-1.68)
Subsidiary	-.03	-.02	-.02	-.03	-.004
	(-9.68)	(-8.12)	(-7.96)	(-5.16)	(-.72)
Group size	-.00004	-.00004	-.00007		.000008
	(-2.60)	(-2.14)	(-4.19)		(.27)
Total intra-group transactions.	.0006 (.57)				
Total intra-group receivables			.002 (3.21)		-.004 (-1.84)
Total Intra-group debt.		-.17 (-22.23)	-.18 (-22.60)		-.12 (-11.88)
Subsidiary* group size					-.0001 (-2.18)
Subsidiary* total intra-group transactions					
Subsidiary* total intra-group receivables					.007 (2.99)
Subsidiary* total intra-group debt					-.09 (-6.86)
Subsidiary* profitability				-.02 (-6.08)	-.02 (-5.65)
Subsidiary* income variance				.00003 (.89)	.00002 (.74)
Constant	-.06	-.07	-.07	-.05	-.09
	(-3.72)	(-4.08)	(-4.67)	(-2.75)	(-5.62)
R^2 Overall	.29	.30	.30	.28	.31
No. of observations	56,719	56,719	56,719	56,719	56,719

Table VI. Beta Weights

I report the Beta coefficients for regression 5 in the previous two tables to indicate the importance of the variables considered earlier.

Dependent Variable	***Total External Debt***	***Total LT External Debt***
Profitability	.02*	.02*
Size	.10*	.10*
Non-debt tax shields	-.06*	-.07*
Tangibility	.50*	.50*
Growth	-.007	-.01
Income variance	-.01	-.02
Subsidiary	-.001	-.008
Group size	.04	.01
Total intra-group transactions (here intra-receivables).	**-.16***	**-.15***
Total Intra-group debt.	**-.08***	**-.08***
Subsidiary* group size	**-.17***	**-.14***
Subsidiary* total intra-group transactions- (intra-group receivables.)	**.27***	**.25***
Subsidiary* total intra-group debt	**-.06***	**-.06***
Subsidiary* profitability	-.03*	-.03*
Subsidiary* income variance	.003	.01
No. of observations	57,675	56,719

* indicates that the coefficients of the original regression were significant at the 5% level.

Considering the results of regression V, the following is clear. It is still true that group size is negatively related to the debt of group affiliated firms. However, the effect is on the debt levels of subsidiaries which are negatively related to group size. Thus belonging to a large group has a negative effect on the debt of subsidiaries. The negative effect on subsidiary debt of belonging to larger groups is highly material as evidenced in table VI, where the beta coefficients are reported. This shows that group size, which proxies for complexity has a very important influence on the way debt is placed in groups. The results on the lower debt of larger groups could be explained by the fact that large groups might have larger internal capital markets which function as substitutes to external debt. On the other hand, belonging to a large group gives the subsidiaries the benefits of the reputation of the group, which might overshadow the negative effect of complexity on subsidiary leverage. This does not seem to be the case here, since belonging to a larger group has a negative effect on the external debt levels of subsidiaries. Thus it seems that either due to the substitution effect of internal capital markets on external financing or due to problems associated with complexity, larger groups and belonging to larger groups affects debt levels negatively. The results in table VI clearly indicate that the variables proxying complexity and lower transparency have the most influence on the external debt.

Distinguishing between the total amount of intra-group receivables and intra-group debt, I find the following (in table IV and V). The effect of intra-group receivables on the external debt level of parent firms is negative (the results are only significant for total debt) while it is positive for subsidiaries. The difference between the two is significant. The effect of intra-group debt transactions is always negative and significant for the debt of both the parent firms and the subsidiaries, but this effect is much higher for the latter and the difference between the parent firm and subsidiaries is significant. Thus large amounts of intra-group debt transactions have a definite effect on the way debt is placed in subsidiaries. This is taken as reducing transparency and making it difficult for lenders to judge the motives of the borrowing group affiliated firms, explaining the higher negative effect on the debt of subsidiaries given the moral hazard faced by the parent firms.

As mentioned in section II, groups where parent firms have operations of their own might be more difficult to analyze by lenders (especially with regards to the motives behind funds flowing to the parent firm) than groups where the parent firms' main assets are holdings in their subsidiaries. Khanna & Palepu (1999) proxy greater transparency in a group by a lower incidence of intra-group financial transactions. In a group where the parent firm owns both shares in its subsidiaries as well as operating assets one would expect a much larger number of transactions for which the motivation might not be as clear as in a group where the parent mainly holds shares in its subsidiaries. In this situation, it might be harder for the lenders to analyze the group as a whole or to prove that the parent acted in an opportunistic fashion in a court of law compared to a group where the parent mostly holds shares in its subsidiaries. Thus parent firms in groups (which mainly own assets in their subsidiaries) might not have as high debt levels relative to their subsidiaries as firms in the previous sample. To check this conjecture I change my original sample. I now consider groups in which the parent firms' main assets (more than 75% of their assets) are comprised of holdings in their subsidiaries. This changes my sample and I am left with a total of 15,002 firm year observations. I have data on a total of 7,978 different group affiliated firms of which 2,531 are on parent firms and 5,447 are on subsidiaries and related firms. A total of 329 firms are minority interest firms. The descriptive statistics of the sample are provided in table VII.

Table VII. Descriptive Statistics of Firm Characteristics and Leverage Measures of Group Affiliated Firms Where the Parent Firms' Main Assets are Holdings in their Subsidiaries.

For this part of the analysis, I employ all group affiliated firms where the parent firms' main assets comprise of holdings in their subsidiaries. The table reports mean and median (in parentheses) values. I have 5,093 firm year observation on parent firms and 9,909 firm year observations on subsidiaries. The variables are defined as in table II.

	All Parent Firms	***All Subsidiaries***		***All Parent Firms***	***All Subsidiaries***
Profitability	.005 (-.0002)	.04 (.05)	Total debt	.33 (.25)	.24 (.12)
Current assets	.11 (.05)	.64 (.75)	Total external debt	.11 (0)	.14 (0)
Fixed financial assets	.86 (.92)	.02 (0)	Total intra-group debt	.22 (.06)	.10 (0)
Interest coverage	213.66 (1.77)	169.57 (5.15)	Total long-term debt	.18 (0)	.16 (.02)
Total assets	71,685,989 (3,414,000)	47,013,023 (5,799,258)	External LT-debt	.10 (0)	.13 (0)
Tangibility	.02 (0)	.22 (.09)	Intra -group LT-debt	.09 (0)	.03 (0)
Turnover	4,556,522 (0)	45,550,287 (6,433,000)	Intra-group LT receivables	.01 (0)	.08 (0)
Sales growth	-.003 (0)	.003 (.003)	Total ST-debt	.15 (.002)	.08 (0)
Income variance	14.72 (.78)	94.15 (.77)	External ST-debt	.01 (0)	.01 (0)
Non-debt tax shields	.004 (0)	.04 (.02)	Intra-group ST-debt	.13 (0)	.07 (0)
No. of employees	3 (0)	23 (5)	Collateral	.30 (0)	.38 (.17)
			Intra-group transfers	.04 (0)	-.003 (0)
			ST Intra-group receivables	.05 (0)	.14 (0)

A number of interesting differences in debt placement emerge in this sample compared to the previous sample. As can be expected in such a sample, the parent firms (whose assets are mainly comprised of their fixed financial assets) have lower current assets, lower tangibility, and non-debt tax shields than their subsidiaries and related firms. The parent firms in this sample have higher interest coverage, lower income variance, and turnover than their subsidiaries. The total debt and total long-and short-term debt (which include intra-group debt) is higher for the parent firms, while the levels of both total external and total long-term external debt is higher for subsidiaries. The level of external short-term debt is the same for both the parent firms and subsidiaries. All the above would indicate that the subsidiaries are borrowing more externally and lending to the parent firms. It also

seems to confirm the fact that the problems associated with complexity and lack of transparency are less in this new sample and that wrong-doing on the part of the parent firm is easier to prove. Thus, the parent firms in this sample are not using higher debt levels as a commitment to not take advantage of partial liquidation. It is also clear that all the subsidiaries are pledging more collateral than their parent firms which reflects the fact that these firms have tangible assets to pledge while the parent firms do not. Whether such firms have to pledge more assets due to being associated with groups is a question that is not investigated in this study and would require a comparison with stand-alone firms.

Carrying out the multivariate analysis gives the expected results for most of the control variables. The results are reported in table VIII. As mentioned earlier, I change the regressions now to include only two control variables, since I am mainly interested in the effect of being a subsidiary on the placement of debt. The control variables are now profitability and firm size. The effect of being a subsidiary on the levels of total debt and total long-term debt is negative when I only include the term subsidiary. This is as expected since it seems that the subsidiaries lend internally to the parent firms within the group. This changes when I include the variable percentage ownership, where the effect on total debt of being a subsidiary is positive and significant, while the result for being a subsidiary on the total long-term debt becomes insignificant. This might be a function of the smaller sample size in the second and sixth regressions. I do not find any significant effect of percentage ownership on the total and total long-term debt. This might reflect the fact that most of the firms in the sample are fully owned and that there is insufficient variation in ownership levels. The effect of being a subsidiary on the total external and long-term external debt levels is positive, and statistically significant in all the regressions. Percentage ownership is negatively and significantly related to external debt levels although the effect seems to be small, which might once again be a function of the fact that most of the subsidiaries in the sample are fully owned by the parent firm. Thus the parent firm prefers to place debt in subsidiaries where its ownership stake is lower. Ideally to get a better understanding of the influence of ownership levels it would be better to employ a sample with more variation in ownership levels. However, the present analysis seems to indicate that ownership levels have an influence in the way in which debt is placed in subsidiaries. Thus, the above seems to indicate that being a subsidiary has a positive relation to external debt levels, but that percentage ownership has a negative effect. This seems to validate the contention that groups in which it is easier to detect and prove wrong-doing on the part of the parent firm don't have to commit not to taking advantage of partial liquidation by placing more debt in the parent firm.

Table VIII. Regression Analysis of Total and Total External Debt for Group Affiliated Firms Where The Parent Firms' Holdings Main Assets are Holdings in their Subsidiaries.

This table reports the results of running the regression performed in table III on the new sample of firms, where the parent firms' main holdings are ownership of their subsidiaries. I now only include two control variables in the regressions. All variables are defined as before.

Dependent Variable	***Total Debt (1)***	***Total Debt (2)***	***Total Ext. Debt (3)***	***Total Ext. Debt (4)***	***Total LT Debt (5)***	***Total LT Debt (6)***	***Total LT Ext. Debt (7)***	***Total LT Ext. Debt (8)***
Profitability	-.03	-.05	-.03	-.03	-.03	-.03	-.03	-.03
	(-4.90)	(-5.82)	(-3.30)	(-4.41)	(-1.98)	(-4.57)	(-3.20)	(-4.31)
Size	.03	.05	.03	.03	.04	.04	.02	.02
	(13.34)	(20.09)	(13.23)	(12.87)	(16.01)	(17.11)	(12.67)	(12.43)
Subsidiary	-.09	.05	.03	.12	-.03	.05	.03	.11
	(-11.70)	(7.51)	(4.02)	(17.25)	(-4.18)	(.93)	(4.53)	(17.55)
Percent ownership		.0005		-.0006		-.0001		-.0005
		(1.86)		(-2.22)		(-.54)		(-2.14)
Constant	-.19	-.55	-.30	-.41	-.27	-.43	-.26	-.37
	(-4.71)	(-11.99)	(-9.68)	(-9.60)	(-9.48)	(-6.18)	(-9.28)	(-9.46)
R^2	.06	.10	.04	.07	.04	.08	.04	.06
No. of observations	14,850	9,747	14,850	9,750	14,866	9,755	14,868	9,757

As a final check on transparency effects I compare listed groups to non-listed groups. It is a well known fact that large listed firms have lower levels of information asymmetry associated with them. Thus I should be able to find that compared to non-listed groups the parent firms of listed groups have to carry lower levels of debt relative to their subsidiaries. In order to check this conjecture, I have to change the sample once again, since my original sample was comprised mainly (99%) of non-listed group affiliated firms. I match the median assets of the sample of listed parents in my original sample (containing both operating and non-operating parent firms) with the median assets of the parent firms of non-listed groups. Thus I include only the largest non-listed firms in this sample. This leaves me with a total of 9,062 firm year observations. Of these 1,084 pertain to parent firms and 7,978 to subsidiaries. The information is on a total of 512 parent firms and 4,661 subsidiaries. Of these 324 parent firms are for non-listed groups (with an associated 2,380 different subsidiaries) and 188 are on listed parent firms (with 2,281 associated subsidiaries). The sample includes a total of 374 minority interest firms of which 185 are associated with listed groups. The descriptive statistics of the sample are presented in table IX. In what follows I focus only on debt.

Table IX. Descriptive Statistics of Firm Characteristics and Leverage Measures of Non-Listed Vs. Listed Group Affiliated Firms

For this part of the analysis, I employ a matched sample of listed and non-listed group affiliated firms. The table reports mean and median (in parentheses) values. I have 1,084 firm year observation on parent firms and 7,978 firm year observations on subsidiaries. The variables are defined as in table II.

	All Parent Firms	***All Subsidiaries***	***Parent Companies (Non-Listed)***	***Parent Companies (Listed)***	***Subsidiaries (Non-listed)***	***Subsidiaries (Listed)***
Profitability	.002 (.006)	.08 (.001)	.03 (.01)	-.04 (-.01)	.19 (.01)	-.04 (.002)
Current assets	.39 (.36)	.61 (.75)	.39 (.35)	.40 (.38)	.59 (.72)	.62 (.78)
Fixed financial assets	.31 (.21)	.02 (0)	.27 (.13)	.38 (.34)	.02 (0)	.02 (0)
Interest coverage	204.73 (4.17)	284.41 (4.59)	365.46 (4.67)	-86.23 (3.39)	437.84 (3.68)	105.24 (6.08)
Total assets	2,139,796,365 (228,852,000)	199,585,907 (9,996,000)	1,187,960,689 (226,315,000)	3,735,590,005 (252,455,000)	166,943,252 (10,549,466)	233,547,625 (9,322,000)
Tangibility	.16 (.02)	.20 (.04)	.22 (.05)	.07 (.01)	.24 (.06)	.16 (.03)
Turnover	624,860,904 (21,783,500)	159,542,609 (5,726,000)	592,151,457 (31,288,000)	679,699,705 (10,837,000)	85,832,139 (5,892,000)	236,566,547 (5,571,000)
Sales growth	.004 (.003)	.003 (.002)	.004 (.002)	.004 (.005)	.0006 (.002)	.005 (.003)
Income variance	17.61 (.82)	167.46 (.79)	21.52 (.65)	10.50 (1.36)	15.48 (.79)	338.29 (.81)
Non-debt tax shields	.02 (.004)	.09 (.006)	.02 (.006)	.01 (.003)	.12 (.008)	.05 (.004)
No. of employees	240 (10)	66 (4)	176 (9)	350 (12)	47 (2)	85 (7)
Total debt	.27 (.20)	.27 (.14)	.31 (.22)	.21 (.16)	.30 (.17)	.25 (.12)
Total external debt	.17 (.04)	.07 (0)	.21 (.05)	.11 (.02)	.09 (0)	.05 (0)
Total intra-group debt	.10 (.03)	.20 (.03)	.10 (.02)	.10 (.03)	.21 (.02)	.20 (.04)
Total long-term debt	.19 (.06)	.13 (0)	.23 (.10)	.13 (.03)	.17 (0)	.09 (0)
External LT-debt	.15 (.02)	.06 (0)	.19 (.03)	.09 (.001)	.09 (0)	.04 (0)
Intra - group LT-debt	.04 (0)	.11 (0)	.06 (0)	.03 (0)	.16 (0)	.05 (0)
Intra-group LT receivables	.07 (0)	.14 (0)	.07 (0)	.07 (0)	.12 (0)	.16 (0)
Total ST-debt	.08 (.02)	.14 (.004)	.08 (.01)	.08 (.03)	.13 (.001)	.15 (.01)
External ST-debt	.02 (0)	.007 (0)	.02 (0)	.02 (0)	.007 (0)	.007 (0)
Intra-group ST-debt	.06 (.007)	.13 (0)	.06 (.005)	.06 (.01)	.12 (0)	.15 (.003)
Intra-group ST receivables	.12 (.04)	.21 (.01)	.10 (.02)	.17 (.09)	.19 (.001)	.24 (.04)
Collateral	.26 (.07)	.24 (0)	.31 (.14)	.18 (.02)	.27 (0)	.20 (0)
Intra-group transfers	.01 (0)	-.18 (0)	.01 (0)	.01 (0)	-.33 (0)	-.03 (0)

What is most interesting to note here is that the differences between the levels of external debt between listed and non-listed group affiliated parent and

subsidiary firms, evidenced in the full sample without any restrictions, is no longer present. The parent firms of non-listed groups (like their listed counter-parts), have more than twice the amount of total external and external long-term debt in their capital structures. The subsidiaries of both categories have high intra-group debt levels (higher than for non-listed firms in the full sample used earlier). No statement is made about the exact flow of funds, given that the debt measures are scaled by total assets and the assets of the parent and subsidiary firms are not comparable.

I carry out a number of regressions to judge the effect of listing on debt placement. The results of these regressions are reported in tables X. As stated earlier I now only include two control variables in the regressions.

Table X. Regression Analysis on the Debt of Non-Listed Vs. Listed Group Affiliated Firms

This table reports the results of running the regressions on the new sample of firms, distinguishing between listed and non-listed groups. The control variables are defined as in table III. Additional dummies for being listed and a listed subsidiary are added to this regression.

Dependent Variable	*Total Debt (1)*	*Total Debt (2)*	*Total External Debt (3)*	*Total External Debt (4)*	*Total Lt Debt (5)*	*Total Lt Debt (6)*	*Total External LT Debt (7)*	*Total External LT Debt (8)*
Profitability	-.02	-.02	-.003	-.003	-.007	-.007	-.003	-.002
	(-2.60)	(-2.57)	(.004)	(-.52)	(-.91)	(-.97)	(.006)	(-.34)
Size	.05	.05	.01	.01	.03	.03	.01	.01
	(22.47)	(22.55)	(6.80)	(6.73)	(10.49)	(10.31)	(6.42)	(6.44)
Subsidiary	.20	.20	-.07	-.07	.08	.13	-.03	-.03
	(10.39)	(10.36)	(-1.94)	(-3.38)	(4.12)	(4.30)	(-1.64)	(-1.34)
Listed subsidiary	-.05	-.05	-.04	-.04	-.08	-.08	-.04	-.04
	(-3.16)	(-3.27)	(-3.42)	(-3.31)	(-5.00)	(-4.93)	(-3.64)	(-3.52)
Percentage ownership		.002		-.0006		.00002		-.0006
		(8.76)		(-3.02)		(1.27)		(-2.97)
Constant	-.62	-.84	-.08	.15	-.33	-.41	-.07	-.02
	(-14.87)	(-15.62)	(-2.24)	(2.95)	(-6.71)	(-6.18)	(-2.01)	(-.57)
R^2	.15	.18	.06	.06	.05	.11	.06	.05
No. of observations	9,014	7,896	9,008	7,890	7,890	7,890	9,002	7,802

Considering the effect of being a subsidiary on debt levels, it is clear that being a subsidiary has positive effect on the total and total long-term debt in almost all the regressions for both listed and non-listed. This effect is higher for non-listed group affiliated firms and the difference from listed group affiliated firms is significant. The effect on external debt levels is the opposite, i.e. the effect on external debt levels of being a subsidiary is negative. Here the effect is higher for listed groups and the difference between the two categories of firms is significant. The results of non-listed subsidiaries are only significant in regression

number four for total external debt and are not significant for the external long-term debt levels. Percentage ownership has a positive effect on total and total long-term debt levels but a negative effect on external debt levels and this effect is, for the most part, significant.

The last set of regressions establishes that there are differences between the sample of listed and non-listed group affiliated firms considered. In particular it points out to the fact that the debt of subsidiaries compared to the parent firms is less if they are listed. Does this imply that there are fewer problems associated with the lack of transparency in non-listed groups than listed groups? I doubt that such a conclusion could be justified. What the last part of the analysis seems to establish is the effect of group size on the placement of debt. The non-listed firms considered now are the largest firms of the original sample. Doing this completely changed the results of the way debt is placed in non-listed groups compared to the original sample. The higher negative effect of being a subsidiary on the external debt of the listed group affiliated subsidiaries in the sample can be taken to be an effect of the fact that such groups are still much larger than non-listed firms. Thus, without matching the sample of listed vs. non-listed group affiliated firms, one cannot draw any conclusions about the differences in debt placement based on listing. What one can say is that the size of the group has a significant influence on the way debt is placed in groups.

VI. Conclusion

This paper investigated the placement of debt within formal corporate groups. Given the benefits and drawbacks associated with the option of partial liquidation (Bianco & Nicodano 2006) in an asymmetric information framework, the way external debt is placed within groups becomes a strategic choice that the parent firms of groups may exercise. The main advantage of partial liquidation, which is possible when the firms in the group are limited liability firms, is that it is possible for the parent firm to let a subsidiary in financial distress go under without jeopardizing the existence of the group as a whole. Partial liquidation, however, might be used strategically by the parent firm (and ultimately the controlling shareholders) in a way which exacerbates the asset substitution problem. Lenders are aware of this problem and thus charge group firms a higher interest rate unless they are able to commit in some way that they will not take advantage of the option of partial liquidation. One way to commit to lenders that the parent firm will not exploit the option of partial liquidation is to take on more debt in the parent firm, since then the parent firm has an incentive to take safer projects in all firms in the group, as the survival of the group is dependent on the survival of the parent firm. Thus, organizational form can affect the placement of debt in groups.

I therefore investigate the pattern of debt placement within formal corporate groups. I also try to gauge the effects of group complexity and transparency on the way debt is placed within groups. I study formal corporate groups and my sample is dominated by groups in which the parent firms have very high ownership stakes in most of the subsidiaries. This makes it very easy for them to shuffle funds around in the group. It also gives them more incentive to increase the riskiness of their investments by placing debt lower down in the group, since in the absence of tunneling or other shady arrangements, they gain more (due to their higher ownership share) if their bets pay off.

I find evidence that the parent firms do indeed have higher external debt than the subsidiaries. The difference in the debt levels of the parent firms' and the subsidiaries in the whole sample (comprised mostly of smaller non-listed groups) is not very much, however. The OLS regressions confirm the negative relation of external debt levels to being a subsidiary. To look deeper into the explanations of debt placement I consider the effect of complexity, which is proxied by the size of the group, on debt placement. I find that the effect of group size is negative and statistically significant. I then consider how the transparency of the group effects the way debt is placed. I find that the amount of intra-group debt in the group as a whole has a substantial and negative effect on the external debt levels of the subsidiaries. I also check whether the parent firms are likely to place more external debt in subsidiaries which are less profitable and more risky. I find that compared to the parent firms, whose external debt levels are positively related to profitability, the negative effect of profitability on the debt of subsidiaries is significant. The difference between the parent firms and subsidiaries indicates that the parent firms prefer to place more external debt in the less profitable subsidiaries. I do not find any statistically significant results for the effects of income variance on the way debt is placed within groups. Although there is not a lot of variation in the ownership levels, the evidence indicates that parent firms prefer to place more debt in subsidiaries where their ownership stake is lower.

In order to further investigate the effects of transparency I look at group affiliated firms in which the main assets of the parent firms' are holdings in their subsidiaries. The contention is that if the parent firms are shuffling funds to themselves at the expense of debt holders, this is easier to see and prove in this sample of groups than with groups where the parent firms also have operations of their own. I find that in this sample of firms, subsidiaries have higher levels of external debt, which seems to confirm the above conjecture. The multivariate regression indicates that external debt levels are positively related to a firm being a subsidiary.

Lastly, I use a matched sample and compare the debt placement in listed vs. non-listed groups. This is done due to the fact that large listed firms are supposed to be more transparent. In the "matched" sample, which comprises of the largest

non-listed firms, the difference in the way listed and non-listed group affiliated firms place debt that was present in the original sample is no longer evidenced. I do find that being a subsidiary has negative effects on the external total debt of the subsidiaries with the effect being higher for listed firms. This in conjunction with the way debt is placed in the larger non-listed groups is not taken to be an affect of listing but of the size of the groups firms belong to.

A number of conclusions can be drawn from the results obtained. Firstly, the ability and the incentive to take advantage of partial liquidation are present in all groups and lenders are aware of this. However, this is not sufficient to force (or want to force) the parent firm to take on higher debt levels. Complexity and transparency seem to have a decisive influence on debt placement within groups. This would explain why in my sample with the parent firms whose main assets are comprised of subsidiary holdings, the external debt levels of the subsidiaries are higher than the parent firms. Such groups may be comparatively more transparent than groups in which the parent firms also have operations of their own. It is feasible, that in such a set up it is not only easier for the lenders to judge the motives of the parent firm in relation to group external debt transactions, but it might also be easier to prove opportunistic behavior by the parent in court. Complexity, given by firm size would also explain why the level of external debt in the parent firms in the "matched" sample of listed and non-listed firms is about twice the level of external debt in the subsidiaries. This sample is comprised of the largest groups in the sample. Although listed groups are expected to be more transparent than non-listed groups, I do not find evidence of this in the "matched" sample as far as the placement of debt is concerned. This is taken to be a function of the much larger size of the listed groups in the sample compared to the non-listed groups. Lastly, the amount of intra-group debt in the group as a whole exerts a substantial negative influence on the external debt of subsidiaries. This might be seen as a sign by lenders that their funds are likely to be reshuffled within the group for purposes other than those stated by the borrower. This thus makes it more difficult for lenders to decipher the motivations behind external debt transactions.

This paper took a very broad look at debt placement within formal groups. It would be interesting to look at a smaller sample of formal groups and investigate the details of debt guarantees to see how they are used by banks in light of the incentives of the controlling shareholder as well as the placement of debt based on the actual level a firm is at in a group (not just distinguishing between parent and subsidiary firms). It is also of interest to investigate in detail how internal capital markets function in the kinds of groups I consider. I leave such projects to future research.

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