



Internal capital markets and capital structure:
Bank versus internal debt

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Abstract

Recent empirical evidence has shown that internal capital markets within multinational corporations are used to reduce overall financing costs by optimizing the mix of internal and external debt of affiliates in different countries. We show that this cost saving use of internal capital markets is not limited to multinationals, but that domestic business groups actively optimize the internal/external debt mix across their subsidiaries as well. We use both subsidiary and group level financial statement data to model the bank and internal debt concentration of Belgian private business group affiliates and show that a pecking order of internal debt over bank debt at subsidiary level leads to a substantially lower bank debt concentration for group affiliates as compared to stand-alone companies. However, as the group's overall debt level mounts, groups increasingly locate bank borrowing in subsidiaries with low costs of external financing (i.e. large subsidiaries with important collateralable assets) to limit moral hazard and dissipative costs.

JEL - Classification Codes: G32, G21

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1. Introduction

During the last decade, a growing number of theoretical and empirical studies have compared financing via internal capital markets of conglomerates, business groups or multinational corporations, with external market finance. Contrary to the case of the conglomerates described in the theoretical literature, where external financing is often assumed to be raised by headquarters and passed through to divisions (e.g. Gertner et al., 1994; Stein, 1997), in practice member firms of business groups and multinationals are often separate legal entities which may also directly access the external capital markets. Within these types of organizations, the external/internal financing decision is likely to be a complex group wide trade-off between benefits and costs of internal and external financing. Empirical evidence of this phenomenon is found by Desai et al. (2004), who show that foreign affiliates of US multinational corporations use parent debt as a substitute for external debt, especially in countries where access to external financing is limited or expensive. They argue that the possibility of raising debt where it is cheapest and the potential for tax arbitrage offers multinational corporations an important advantage over their local competitors. However, many large domestic firms are also tied together through ownership to form a domestic group. Especially in Continental Europe, South East Asia and several emerging market regions (e.g. India) this group organizational form is important. For instance, almost one third of the top 100,000 non-financial companies in the Euro-zone have domestic group ties.¹ The vast majority of these groups does not have a stock exchange quoted component.

This paper is the first to analyze in detail, if and how, internal capital markets within domestic business groups are used to minimize the costs of attracting external financing. It

¹ 32.4% of the 100,000 largest companies in terms of total revenue based on Bureau Van Dijk EP's AMADEUS database (version September 2006), using a full control (>50.01%) criterion.

offers the opportunity to evaluate whether or not - likewise international groups - domestic groups can offer their subsidiaries important financing advantages as well. To ensure clean testing we examine the capital structure of large domestic subsidiaries of Belgian private business groups.² Firstly, this implies all companies we consider operate under the same tax regime and within the same institutional framework. Secondly, confounding effects are further reduced because of the limits on financing alternatives imposed by the private nature of the groups: external financing will almost always be bank debt.³ Finally, only larger subsidiaries have an obligation to report detailed information on internal financing. Limiting ourselves to this type of affiliate has the additional advantage that effects from typical financing problems of small firms are avoided within the sample.⁴ Within this setting, we contribute to the literature by developing testable hypotheses about the costs and benefits of bank and internal debt⁵ within global group optimization, and about the nature of the choice between both sources of funding. Using a sample of 553 subsidiaries which are part of 253 different business groups, we model the determinants of the bank and internal debt concentration (i.e. the importance of bank and internal debt as a fraction of total liabilities). Novel to the literature on debt type concentration, we use information from multiple financial statements (at company level and at consolidated group level), which allows us to

² Belgium is a typical civil law country where external capital markets are relatively underdeveloped compared to the Anglo Saxon world (cf. La Porta et al., 1998), and where most firms finance through internal resources, internal capital markets and private debt (mostly bank debt). Equity market capitalization at the end of September 2002 was 49.1% of GDP for Belgium, compared to 98.5% for the United States and a European Union average of 65.7%. The value of outstanding corporate debt securities equaled 9.8% of GDP (US: 22.9%, EU: 9.5%).

³ The evidence on the use of different types of debt in European companies typically focuses on the use of bank debt versus trade credit (e.g. Mateut and Mizen, 2002; Nilsen, 2002; Lopéz Itturiaga, 2005; de Andrés Alonso et al., 2005; Huyghebaert and Van de Gucht, 2007). This literature shows that the choice between trade credit financing and bank debt is mainly an issue for small and young firms. Our sample contains mature and larger sized companies for which the financing motive of trade credit should be of less concern.

⁴ In our Continental European setting, non-quoted is not synonymous with small. Many of the business groups in our sample are among the largest competitors in their industry on a national or European level (average consolidated sales of 250.3 million euros). In fact, even virtually all of the individual group affiliates we consider would meet the size requirements for stock exchange quotation in Europe (e.g. Euronext only requires minimal free float of 2.5 million euros, Deutsche Börse of 1.5 million euros).

⁵ It should be noted that, in theory, private group subsidiaries could also fill extra financing needs by internal equity. In practice however this does not seem to occur. Because internal debt is much more flexible and cheaper (both in terms of fees and taxation treatment) than equity, less than 1% of the subsidiaries in our sample have issued stock during our six year sample period.

investigate the importance of affiliate versus group characteristics. Moreover, we use a sample of comparable stand-alone firms as a benchmark to pinpoint the impact of group membership on bank debt concentration.

Our focus is different from that of most of the empirical literature on business groups' internal capital markets, which mainly concerns explaining the general leverage level of group firms. As a by-product, this literature does offer some inferences on the use of external debt by subsidiaries. Manos et al. (2001) demonstrate that group issues matter in determining the leverage levels of quoted Indian firms. Bianco and Nicodano (2006) show that in Italian business groups, subsidiaries use less external debt as compared to the group holding company. Verschueren and Deloof (2006) find similar results for large Belgian firms and conclude that internal debt is a substitute for external debt. Direct empirical evidence on the drivers of the different components of debt taken on by subsidiaries is scarce. An exception to this is the case of Japanese keiretsu (e.g. Hoshi et al., 1990; Hoshi et al., 1993; Gul, 1999). However, due to the presence of group banks the keiretsu capital structure problem is unique (e.g. bank debt and internal debt can often not be distinguished).

The empirical aim of our study is also different from that of most of the general capital structure literature, which either concerns the choice between public debt and equity (Marsh, 1982; Easterwood and Kadapakkam, 1991; Shyam-Sunder and Myers, 1999, among many others – see Myers, 2001 for a survey), or public debt vs. private debt vs. equity (e.g. Houston and James, 1996, Johnson 1997, 1998; Hooks, 2003; Denis and Mihov, 2003). For companies without access to public debt or equity, the key financing decision concerns the creation of an optimal mix of different private debt types. As argued above, for private business group affiliates in a bank-based financial system, the most important dimension of the debt source decision is likely to be the choice between bank and internal debt.

Previewing our main results, we find that cost savings from centralising financing within groups are an important driver of internal debt use by subsidiaries. Moreover, as the depth of the internal capital market increases, bank debt at subsidiary level is replaced by internal debt. This preference for internal financing increases with the size and age of the group, but decreases with group leverage. Contrary to the relative use of internal debt, which is mainly driven by the characteristics of the internal capital market, individual subsidiary characteristics play a more important role in explaining bank debt concentration. We find that internal debt has a strong negative impact on bank borrowing by subsidiaries, while, in reverse, bank borrowing does not shape internal debt concentration. The data therefore indicate that groups use a pecking order in favour of internal financing. Also, as compared to stand-alone firms, where cash flow shortages often have to be filled with bank debt, in subsidiaries this role is largely taken over by internal debt. Nevertheless, we find evidence indicating that, if needed, groups can facilitate access to bank borrowing by their subsidiaries by adding internal debt, as in practice the latter is subordinated to bank debt. Furthermore our results suggest that as groups use more leverage, moral hazard and dissipative costs from centralizing external borrowing increase. Groups tend to solve this problem by placing bank debt within subsidiaries and hence offer banks seniority rights on the assets of these affiliates. Overall, the evidence consistently supports the notion that the optimisation of group-wide financing costs is an important driving factor of domestic group subsidiaries' financing choices.

The remainder of the paper is organized as follows. Section 2 develops a general perspective on the advantages and disadvantages of bank and internal debt. Section 3 develops hypotheses about the link with firm level and group level variables. The sample

and univariate statistics are discussed in Section 4. Section 5 contains the empirical analysis. Finally, Section 6 summarizes the main conclusions.

2. Internal capital markets and the costs and benefits of bank and internal debt

The literature on internal capital markets often takes the view that the process of attracting and assigning financial resources throughout the group is driven by group-wide cost optimisation (e.g. Gertner et al., 1994; Stein, 1997; Schiantarelli and Sembenelli, 2000; Bianco and Nicodano, 2006). This is in line with Coase's theorem which implies that rational agents (in this case bank, parent and subsidiary) negotiate towards an equilibrium where dissipative costs (i.e. moral hazard, bankruptcy costs, etc.) are minimised.

The use of the internal capital market could potentially lead to important cost savings. For concentrating financing activity at the top allows for transfers of cash throughout the group to reduce financing costs and increase flexibility.⁶ Simultaneously bank monitoring costs shrink, the number of debt contracts to be (re)negotiated decreases, and opportunities for the bank to extract rents are reduced. Next to group-wide costs savings, internal debt may entail important advantages at the level of an individual subsidiary as well. First, it is owner-provided, i.e. the provider of debt has control rights over the way the money is spent. Gertner et al. (1994) and Stein (1997) argue that this leads to a more efficient allocation of resources and reduced monitoring costs. Second, because of its owner-provided nature, internal debt is very flexible and can easily be renegotiated at low or zero costs. Third, it entails little moral hazard problems and avoids conflicts of interest between the parent and the subsidiary's debt holders. Specifically, due to the limited liability

⁶ E.g. in most large business groups treasury and overall financial planning is dominated by pooling systems to save on costs. Instead of the top level firm, groups may use a financial subsidiary to centralize financial operations.

of group firms, Bianco and Nicodano (2006) point out that external borrowing by a subsidiary may entice the parent to reduce the wealth of the former at the expense of external debt holders (i.e. tunnelling; cf. Buyschaert et al., 2004).

Preceding discussion suggests that, as use of the internal capital market leads to so many advantages, groups would strictly prefer their subsidiaries to resort to internal debt above bank borrowing.⁷ Nevertheless, Verschueren and Deloof (2006), Manos et al. (2001) and Bianco and Nicodano (2006), among others, document that use of bank debt by subsidiaries remains substantial. One reason why groups may prefer some of their subsidiaries to use bank debt is reduction of costs of financial distress. By placing external bank debt at subsidiary level, the group reduces bankruptcy costs because the limited liability of such a subsidiary decreases the risk of propagation of financial problems throughout the group. Secondly, lending to a firm higher up in the group's structure has the disadvantage that, because of the independent legal status of the subsidiaries, the bank at best ends up as a quasi shareholder of the subsidiary in case of group-wide financial problems. By contrast, direct contracting with a subsidiary typically results in a much more senior position. Especially if the subsidiary has important assets that may be used as collateral for bank debt (as is usually the case in practice), a collateralized loan at subsidiary

⁷ It should be noted that taxation rules may also explain why it could be attractive to use internal debt (see Verschueren and Deloof, 2006), even though multinational taxation arbitrage as described by Desai et al. (2004) is not relevant for our sample. The tax-deductibility of interest payments may help in reducing group wide taxation if loss generating affiliates (that do not pay taxes on their extra interest income) grant internal loans to profitable member companies (that can tax deduct paid interests). If this type of taxation game would be important, we should observe that affiliates pass through intra-group resources to other subsidiaries to a significant extent. Robustness checks of our empirical analysis shows that such pass through activity is very limited (see footnote 21). In addition, we do not find that subsidiaries with higher return on assets use more internal debt. In fact, as alternative and very flexible tools to shift costs within the group are available (e.g. mutual cost sharing agreements between affiliates), it is not surprising that groups make little use of internal debt to shift taxable profit from one subsidiary to another. Finally, given the fact that in Belgium dividends are taxed at 25% and intra-corporation dividends are not completely tax exempt (most intra-group dividends are 95% tax exempt under the so-called DBI double taxation regime), business groups may have an incentive to redistribute internally generated cash surpluses in the form of interest, rather than dividends. However as the tax treatment of internal debt is the same as that of external debt, such a tax advantage would enhance the overall use of financial debt, rather than determine the choice between bank and internal debt.

level limits moral hazard problems as it reduces the scope to expropriate the banker by ex post additional borrowing by this subsidiary.⁸

These arguments imply that bank borrowing by a subsidiary may become a useful tool to limit overall moral hazard costs as the group's overall leverage increases. For in that case, placing debt at the level of a subsidiary to limit propagation of bankruptcy costs may become more relevant.⁹ Simultaneously the group's incentive to engage in ex post borrowing at the level of the subsidiary at the expense of debt holders that have granted credit to the parent, increases. Especially for private groups - as studied in this paper - access to additional external equity is limited and group leverage likely makes up for shortage of internally generated funds. As external private debt providers understand this, they may only be prepared to provide extra resources when they can take out a security on the assets of subsidiaries if overall group leverage is already substantial. Moreover, if the parent adds guarantees, those specific conflicts of interest that arise because bank debt of subsidiaries is not owner provided, can be mitigated. However, this solution comes at the expense of an increasing number of debt contracts which have to be renegotiated while it foregoes the cost savings of the use of the internal capital market. Consequently, groups likely only use it when it becomes difficult to avoid. In that latter case minimization of financing costs would imply that bank debt is channeled toward those subsidiaries where the dissipative costs of external borrowing are relatively small. As the debt source concentration literature shows that limiting the dissipative costs of financing is important for stand-alone firms as well, we

⁸ Note that in Belgium, as in many other countries, if a group wants to pledge a member company's assets as collateral for an external loan, this loan has to be contracted by that specific member company because of its separate legal identity.

⁹ In practice the benefits of this policy may be limited though, as the failure of a large subsidiary is likely to have a strong negative impact on group reputation. In fact, Dewaelheyns and Van Hulle (2006) find empirical evidence indicating that Belgian business groups continue to support their troubled operating subsidiaries for as long as they can manage.

would expect these affiliates to show characteristics similar to stand-alone companies that easily obtain bank debt.

3. Group and subsidiary characteristics and affiliate use of bank and internal debt: hypotheses

The logic of the previous Section showed that both group and subsidiary characteristics likely are important determinants of bank and internal debt concentration within affiliates. Below we turn the general perspective of that Section into testable hypotheses.

3.1 Group characteristics and subsidiary bank and internal debt concentration

Group size, age, and profitability – Cost saving opportunities offered by the internal market should increase with this market's scope and depth. Gertner et al. (1994), Stein (1997), Lamont (1997), Chang and Hong (2000) and Claessens et al. (2006), among others, show that group size, age, and overall profitability are important drivers (i.e. ceteris paribus larger, older and more profitable groups likely have more resources available). Hence one would predict that subsidiary level bank debt shrinks in favour of internal financing as group size, age and profitability increase.

Group leverage and group reserves (i.e. accumulated reserves and retained earnings) – If increasing group leverage mainly reflects the information that headquarters passes external financing through to affiliates, group leverage should have a positive impact on internal capital markets and subsidiaries' internal debt use. By contrast, as argued in the previous Section, increasing group leverage may cause groups to opt for more subsidiary level bank debt to reduce moral hazard and dissipative bankruptcy costs. If in addition, group leverage is used to make up for shortage of internally generated funds, a higher level of group leverage likely reflects more limitations on the scope of the internal capital market. As a

result, if preceding two forces are important, group leverage and the relative importance of internal debt in total subsidiary debt should be negatively related, while the converse holds for subsidiary bank borrowing. As an additional check on the interpretation of the empirical findings we also consider group reserves. In particular, if increasing group leverage reflects a shortage of internally generated funds – as we would expect in private groups – group reserves should be negatively related to group leverage and subsidiary bank debt concentration, but positively to internal debt use of group firms.

Finally, as the properties of the internal capital market drive both availability of and preference for internal debt, we would expect group level variables to be more important in explaining subsidiaries' use of internal debt as compared to their use of bank financing.

3.2. Individual firm characteristics and subsidiary bank and internal debt concentration

As argued in Section 2, we would expect stand alone-firms that easily obtain bank debt to show similar characteristics as subsidiaries toward which groups channel this type of debt. For stand-alone firms the debt source literature has shown that profitability, tangibility, size, age, growth and total leverage are key variables. After summarising, as a benchmark, the major arguments for the stand-alone companies, we evaluate how subsidiary level variables relate to the use of bank and internal debt in affiliates.¹⁰

Profitability – Low profitability may lead to credit rationing by banks, and therefore to a positive relationship between profitability and bank debt use. Smith (1987) shows that this relationship materializes when banks attempt to overcome adverse selection problems by

¹⁰ Some of the arguments in this literature may depend upon the type of firm under consideration. Specifically, for studies covering only public companies, the relationships between firm specific variables and bank debt may be the opposite to those in private firms because the former have access to both public equity and public debt (Johnson 1997, 1998; Hooks, 2003; Bevan and Danbold, 2002, among others). Other studies consider very small firms and/or start ups (e.g. Petersen and Rajan, 1994; Huyghebaert and Van de Gucht, 2007). As to be expected, the evidence in these cases may show class specific properties of the debt acquisition process.

refusing loans to companies with high probability of default. Carey et al. (1998) find indeed that high risk projects are less often financed with bank debt. Conversely, private companies may attract additional bank debt to fill (temporary) cash shortages of low profitability, as it may be less costly than other types of private debt. This happens if banks have a competitive advantage in rendering valuable monitoring services (Diamond, 1984, 1991; Fama, 1984; Ramakrishnan and Thakor, 1984; among others). In the latter case there should be a negative relation between the portion of bank debt and profitability.

For subsidiaries of private business groups similar arguments may be formulated. One could argue that, especially in weakly performing affiliates, the extra monitoring and moral hazard costs of tunnelling would disfavour the use of bank debt. This idea is supported by Bond (2004) who shows in a theoretical model that group financing is preferred above bank debt for low-quality projects. On the other hand, just as in the case of stand-alone firms, low profitability may lead to more financing needs and hence more bank debt if banks have a competitive advantage over other external debt providers. Weak profitability may also foster the use of internal debt, if it serves to fill additional financing needs caused by low profitability. Furthermore, as implied by Ghatak and Kali (2001) or Bond (2004), next to avoiding extra monitoring and moral hazard costs, the flexibility of internal debt may turn it into the more appropriate instrument to fill the extra cash needs of poorly performing group firms. Hence preceding arguments would predict a negative relation between profitability and the use of internal debt.

Tangibility – When private stand-alone firms use tangible assets as collateral, they reduce the cost of bank loans by limiting exposure and asset-substitution problems (Myers and Majluf,

1984; Detragiache, 1994; Boot et al., 1991; Leeth and Scott, 1989; among others). Consequently higher levels of tangibility would imply more bank debt, *ceteris paribus*.¹¹

The same positive relationship can be expected for an affiliate if its tangible assets are used as collateral. Hence, *ceteris paribus*, we would again expect more tangibility to be associated with more bank debt. As tangibility does not have a clear link with the specific properties of internal debt, no *a priori* relationship is predicted.

Size – *Ceteris paribus*, larger private stand-alone firms have lower costs of financial distress (Rajan and Zingales, 1995), and are less likely to engage in asset substitution activities that hurt debt holders. Larger companies are also more likely to have access to bank financing (Petersen and Rajan, 1994). Therefore, we predict a positive relationship between size and the concentration of bank debt.¹²

In a business group context one would expect that affiliate size favours the use of bank debt. For, similar to tangibility, the moral hazard problems and asset substitution linked to the subsidiary's limited liability should decrease with its size, while one would not predict a specific relationship between subsidiary size and internal debt.

Age – The age of a stand-alone company is often regarded as a proxy for reputation. Older companies have a longer track-record and should have better relationships with lenders, lowering the costs of debt. For private firms this may lead to more bank financing (Petersen and Rajan, 1997). By contrast, for private firms whose access to financing usually is limited to

¹¹ Note that the situation may be different for quoted companies: tangibility may more strongly promote the use of public debt, leading to a negative relation between bank debt use and tangibility (e.g. Johnson, 1997 and Denis and Mihov, 2003).

¹² Just as in the case of tangibility, the relationship between size and the use of bank debt may be different for public firms. Johnson (1997) and Hooks (2003) among others document a negative relation between bank debt and size but a positive relation between public debt and size.

self financing and private debt, age may also be associated with availability of more internally generated funds, and hence reduced need for bank debt (Hall et al., 2000).

As for stand-alone companies, the reputation interpretation of age predicts that older affiliates use more bank debt. However, the perspective that older subsidiaries may have less need for it, predicts the opposite. Because of the owner provided nature of internal debt, the reputation effect of age is unlikely to cause a positive relationship between age and the use of intra-group debt. By contrast, if older group firms have access to more internally generated funds (i.e. generated at subsidiary level), we would predict a negative relationship between age and intra-group financing.

Growth opportunities – Financial pressure caused by bank debt may negatively impact on growth firms.¹³ Especially for private companies, debt servicing may enhance capital constraints. Growth may also enhance asymmetric information and moral hazard problems and therefore disfavour the use of bank debt. Conversely, as growth firms need more financial resources, one could argue that private companies with limited alternative financing sources may be forced to fill their extra needs through more bank debt.

For subsidiaries similar arguments concerning bank borrowing hold. By contrast, because of its owner provided nature, internal debt does not suffer from the asymmetric information and moral hazard problems associated with growth. Furthermore its flexibility matches the additional financing needs of such firms. Hence one would predict a positive relationship between internal debt and subsidiary growth.

¹³ McConnell and Servaes (1995) document that even in public firms, debt servicing hinders growth firms. In line with this perspective, Bevan and Danbolt (2002) report a negative relationship between growth opportunities and the relative importance of bank debt for their sample of public firms.

Leverage – When, as mentioned above, banks have an advantage in offering valuable monitoring services over other forms of private debt, one would expect a positive relationship between the level of leverage and the importance of bank debt for stand-alone firms: relative to other forms of private debt, bank debt reduces asymmetric information and asset substitution problems, and hence allows for an ex ante higher level of leverage. This may be particularly true for private firms.

In business groups, the advantages of bank debt over other external debt types should still be valid. Hence the portion of bank debt is likely to be positively related to subsidiary leverage. Preceding arguments may be even more valid for internal financing, because of the latter's superior capacity to reduce asymmetric information problems (cf. Hoshi et al, 1990). We therefore also predict a positive relationship between subsidiary leverage and intra-group debt use.

4. Sample and univariate statistics

4.1. Sample composition

We start out from a data set containing externally audited accounting information on all private Belgian non-financial companies that file complete annual accounts¹⁴ for the fiscal years 1997 to 2002. These data were obtained from Bureau Van Dijk EP's BelFirst database. Using ownership and financial information from the same source, we construct two samples: one containing only stand-alone companies and another consisting of members of domestic non-financial business groups.

¹⁴ Under Belgian Accounting Law, companies are required to file complete (unconsolidated) accounts if they meet at least two of the following criteria: total assets exceed 3.125 million euro, operating revenue exceeds 6.25 million euro, more than 50 full time equivalent employees. Companies with more than 100 full time equivalent employees always have to file complete accounts. All other firms may file abbreviated accounts.

In our context, internal or intra-group debt is debt received from ‘affiliated’ companies. Under Belgian Accounting Law, all firms which are controlled by, or are controlling a corporation, are considered to be affiliated.¹⁵ For the group sample, we select operating subsidiaries of non-financial private business groups filing both unconsolidated accounts at subsidiary level and consolidated accounts at the level of the group.¹⁶ A company is classified as a business group member if at least 50% of its shares are held (directly or indirectly) by the controlling company of the group. Because of the high level of control within Belgian business groups, setting a lower threshold (e.g. 25 or 33%) would only have a marginal impact on the number of included companies. We exclude subsidiaries of groups which are controlled by foreign corporations or which are State controlled. Finally, to minimize the risk of classification errors, we only include a firm in the stand-alone sample if it has no dominant incorporated shareholder *and* if it uses no internal debt. We consider a dominant incorporated shareholder to be absent when the largest incorporated shareholder does not control more than 20% of the sample company, either through direct or indirect ownership.

Following common practice, we exclude companies with zero sales, firms with extremely high leverage levels (>100% of total assets) and several categories of service companies. Using the criteria described above, we construct a group sample of 553 companies (1,742 firm years) which are part of 253 different business groups and a stand-

¹⁵ The Law defines control as owning more than 50% of the shares or the votes, or having common controlling shareholders who can appoint the majority of the board or can make strategic decisions. This control can also be the result of company bylaws, contracts or the existence of a consortium. Information on affiliated companies is reported in the comments to the financial statements.

¹⁶ Although limiting the data set to groups with consolidated accounts introduces a potential size bias, it ensures that the information at the group level captures economic reality as accurately as possible. Specifically, companies are exempted from filing consolidated accounts if they do not surpass more than one of the following criteria: revenues of 20 million EUR, total assets of 10 million EUR, or 250 employees (on average, in full time equivalents). As an alternative to using consolidated accounts Manos et al. (2001) or Chang and Hong (2000) compute group level variables as the value weighted average of the individual member firms’ variables. Although this approach circumvents the need for consolidated statements, it is likely to lead to information quality problems in our non-quoted sample.

alone sample of 1,521 companies (5,679 firm years). Finally, to improve comparability, we select a one-to-one sub-sample of stand-alone companies that matches the industry and the size of the group sample firms as closely as possible.^{17,18} Table 1 shows the sample’s industry composition. All major industries are included, with manufacturing and distribution being best represented, in line with the Belgian economy as a whole.

 Table 1 about here

4.2. Univariate statistics

For each firm year we compute standard proxies for the variables discussed in the hypotheses Section. Definitions are included in Table 2. Panel A of Table 3 contains summary statistics of the key variables. The left hand side of the Table reports medians for the stand-alone and group samples, and Mann-Whitney equality test statistics. The right hand side shows means and t-test statistics. Minimal and maximal values (left hand side) and standard deviations (right hand side) are reported in square brackets. To reduce the potential impact of outliers, all continuous explanatory variables have been winsorized at 1% and 99%.

 Table 2 about here

 Table 3 about here

¹⁷ Using the full stand-alone sample would lead to important differences in size and industry distribution across samples. The total assets of the median group sample company are more than twice as large as those of the median firm in the full stand-alone sample. The latter sample contains substantially more wholesale and retail companies (46.4% vs. 24.2% in the group sample), while the group sample has more manufacturers (37.3% vs. 27.5% in the stand-alone sample). Industry matching is based on a 2-digit NACE classification code. As a robustness check, all tests were rerun on the full stand-alone sample. Results are analogous and available upon request.

¹⁸ Because we only select non-financial subsidiaries that file complete accounts, the average number of subsidiaries per group only amounts to 2.18 firms. Within the sample, the maximal number of subsidiaries from the same group is 13 implying that no business group has a dominant presence.

Most company level variables differ between stand-alone firms and subsidiaries. Stand-alone companies have a better median profitability (ROA) and use relatively more tangible assets (TANG). Even after matching, subsidiaries remain statistically larger (SIZE) than stand-alones, although from an economic perspective the difference is unlikely to be important (median total assets of 9.6 million euros for the stand-alone sample as compared to 13.1 million euros for the group sample). Concerning age (AGE), both samples contain mature companies, although those in the group sample are somewhat younger (median age of 23 years for the stand-alone and 19 years for the group sample). Subsidiaries have a lower growth rate (GROWTH) but a slightly higher level of leverage (LEV) as compared to stand-alone firms.¹⁹ However the difference in leverage is not statistically significant. Within the group sample, we observe that the median leverage of affiliates is 67%, which is substantially higher than the median leverage of 63.7% at group level (GLEV). This is not surprising if the subsidiary uses internal debt – at least partly – as a substitute for external debt. In consolidated statements the intra-group debt is netted out, leaving only the business group’s external debt. It is also interesting to note that, contrary to median subsidiary profitability, group level profitability (GROA) is comparable to the profitability of stand-alone firms. This could indicate that subsidiary profits are partially transferred to the parent or to financial group firms. Furthermore, the size of affiliates relative to the group to which they belong is relatively small: the ratio between subsidiary size (e^{SIZE}) and group size ($e^{G\text{SIZE}}$) is about 8%.²⁰

¹⁹ Note that we use an overall leverage proxy (LT + ST liabilities over total assets) – which is close to the one used in Desai et al. (2004) – while the vast majority of Anglo-Saxon studies use long term debt as a measure of leverage. However, Titman and Wessels (1988) point out that in countries where short term liabilities are important financing sources, measures of leverage should include these as well. The importance of short term debt in Belgium has been confirmed by e.g. Deloof and Jegers (1999). Some authors argue that one should empirically distinguish between short and long term debt. However, as pointed out by Johnson (1997), due to roll-over structures, debt covenants, etc., it is often impossible to distinguish short term from long term debt in a meaningful way.

²⁰ This implies that potential endogeneity problems between subsidiary and group level variables are limited. The correlation matrix of key variables (not reported but available upon request) corroborates this as it shows relatively low levels of correlation between company level variables and their group level counterparts (correlation coefficients range between -0.00 for age (AGE) and group age (GAGE) and 0.41 for profitability (ROA) and group profitability (GROA)).

Stand-alone companies use more bank debt (BANK). Specifically, this form of financing only accounts for 11.76% of total liabilities within the group sample, while for the median stand-alone firm it amounts to 19.61%. One reason for this important difference is the fact that fewer subsidiaries (i.e. 70.1%) have bank debt outstanding as compared to stand-alone firms (80.6%). The use of internal debt (INT) is another reason: with a median of 13.45% intra-group debt is more important than bank financing in group subsidiaries.²¹ Its use is also more widely spread (i.e. 84.6%) as compared to bank debt.^{22,23}

At group level, the relative importance of bank financing is much larger than for subsidiaries. In the median consolidated business group, bank debt makes up 35.43% of total

²¹ As a robustness check, we considered alternative definitions of intra-group debt. For subsidiaries can use the internal capital markets in two directions. It could lead to potential interpretation problems if the companies in our sample are not the actual beneficiaries of the internal debt, but pass the intra-group resources through to another subsidiary. To address this issue we compute an extra variable expressing the net group financing received as a fraction of total debt (NETGROUP, i.e. (internal debt - financing provided to other group members)/total liabilities)). Note that NETGROUP can no longer be interpreted as a standard debt concentration ratio as it turns negative if the company is a net provider of intra-group financing. We also compute the fraction of financing given to other group members to total debt (TOGROUP). If the group companies in our sample systematically pass through the internal debt they receive to other companies, the correlation coefficient between INT and TOGROUP should be highly positive. However, this is not the case: ρ is only 0.163. On the other hand, the correlation between INT and NETGROUP is very strong (0.836). This indicates that passing through internal debt may occur, but is unlikely to substantially affect our findings.

²² Only trade credit (median of 40.74% in stand-alone companies and 35.88% in group firms) is an important alternative source of finance. We do not explicitly include trade credit in our analysis because the transaction motive for the use of this form of financing is likely to dominate in large and mature firms as in our sample. As an extra robustness check on this assumption we ran an OLS regression for the 1-yr change in trade credit concentration. In this regression, the profitability proxy (ROA) has a negative sign, but is not significant, while the sales growth proxy (GROWTH) is highly significant with a positive sign. The same results are found in both subsets of firms. Nevertheless, it is interesting to note that the relative use of trade credit is significantly lower for group member companies as compared to stand-alone companies, both in means (43.45% in stand-alone companies and 39.50% in group companies; t-test score: 4.600) and in medians (40.74% in stand-alone companies and 35.88% in group companies; Mann-Whitney test score: 5.210). The difference in use of external trade credit likely is even larger, given the fact that in the stand-alone sample all trade credit is external by definition and part of the trade credit in the group sample may be internal. It may be hypothesized that the (expensive) use of trade credit, which a limited number of the stand-alone companies may have to resort to, can be avoided by affiliates. This could be interpreted as an extra advantage of the presence of internal capital markets. Unfortunately, the comments to the financial statements do not include a break-up of trade credit into internal and external sources, so this issue cannot be explored further (cf. Desai et al., 2004).

²³ Debt sources other than bank debt, internal debt and trade credit are not important in our sample. Our sample firms cannot issue public bonds. They may issue private bonds or use leasing. Although a few companies actively use these debt sources, they are not important on average (median is zero for both sources). The differences in means for both bonds and leasing are statistically significant across samples (higher for group members), but do not appear to be economically meaningful (bonds/total liabilities: mean of 0.024 for stand-alones, 0.044 for group members; lease debt/total liabilities: mean of 0.011 for stand-alones, 0.015 for group members). The final debt source is taxes, wages and social security liabilities, which has a mean of around 0.10 and a median of about 0.07 for both samples. Typically, this debt source's importance is relatively constant through time and is unlikely to be used for financing purposes.

debt while this only amounts to 11.76% for group subsidiaries. Almost all groups (i.e. 97.1%) make use of this form of financing. Furthermore, bank borrowing at consolidated group level is higher than bank borrowing by stand-alones (i.e. 35.43% versus 20.42%). Together with the importance of internal debt, this is consistent with the hypothesis that groups tend to centralize bank borrowing at the level of the parent and hand down these financial resources to subsidiaries under the form of internal debt. Preceding findings are confirmed by the means and, overall, are consistent with earlier findings in the literature (Manos et al. 2001; Desai et al., 2004; Verschueren and Deloof, 2006; Bianco and Nicodano, 2006).

Panel B of Table 3 shows statistics for BANK, INT and LEV split up according to the level of group leverage, GLEV (i.e. subsidiaries belonging to a group which is among the 50% most (least) levered groups in our sample). On average, subsidiaries of groups with a higher level of group leverage carry more debt (LEV). Furthermore the relative amount of bank borrowing (BANK) by these subsidiaries is significantly higher, while the concentration of intra-group debt (INT) is far lower. Differences are significant for both means and medians. Together with Panel A these findings suggest that groups with low debt levels prefer and/or have the capacity to finance their subsidiaries through internal debt. As groups' leverage levels mount, subsidiaries increasingly take on bank debt, while the relative importance of internal financing dwindles. This indicates that the debt source choice of subsidiaries is not simply a matter of handing group level borrowing down from the central financing office, because then one would expect a positive relationship between group leverage and internal debt use by subsidiaries. Although the more important concentration of bank debt at group level suggests that handing down occurs, consistent with our argumentation in Section 2, Panel B shows that as group leverage rises, groups increasingly raise bank debt at subsidiary level, at the detriment of the relative importance of internal debt. However preceding univariate approach can only be suggestive, as group leverage

likely is also a function of the other group characteristics included in the analysis. Below these issues are investigated in more detail.

5. Tests and results

In this Section we first study the determinants of bank debt concentration for group firms and stand-alone companies (as a benchmark). Next we evaluate the determinants of the relative use of internal debt by affiliates. In view of the fact that a non-negligible part of the dependent variables' observations are zero (see univariate statistics in the previous Section), we run Tobit regressions.²⁴ Tables 4 and 5 present the results. Next, a two equation regression system (2SLS) is set up to investigate the nature of the trade-off between both variables for group firms. Results are given in Table 6. All models control for industry and time effects using dummy variables.²⁵ The reported standard errors are Huber-White robust.

5.1. Determinants of bank debt concentration

Model A from Table 4 serves as a benchmark and shows the results of a model that explains bank debt concentration in stand-alone firms. It includes the firm level variables discussed in Section 3. Note that the inclusion of the level of leverage (LEV) in the model could result in endogeneity problems, as the other independent variables have often been shown to be determinants of leverage.²⁶ Following Johnson (1997), we regress leverage on all other firm level variables, both in the sample of stand-alone firms and in the sample of subsidiaries.²⁷ We then use the residuals of these auxiliary regressions as instrumental variables for

²⁴ As a robustness check, all models were also estimated using panel data regressions with fixed firm effects. Our main findings (except for the age and group age variables which are no longer meaningful) remain unchanged.

²⁵ Industry effects are captured by 20 dummy variables based on 2-digit NACE codes (coefficients not reported). All 2-digit NACE codes with insufficient observations (less than 20) are included in the base category.

²⁶ Other multicollinearity problems should be relatively unimportant, as, except for GLEV and GRES, the correlation between company level variables is limited (correlation matrix available upon request).

²⁷ Alternatively, a separate model for leverage could be specified and simultaneously estimated with the debt source models. However, if the system of equations is recursive (as is the case; estimations not reported), simultaneous estimation becomes unnecessary and the auxiliary regression approach leads to correct results (Hooks, 2003).

leverage. A similar approach is applied to group leverage (GLEV) or group reserves (GRES) in models that include group level variables.

Table 4 about here

For stand-alone firms, five out of six company level characteristics are significant in explaining the relative use of bank debt. First, firms with weak profitability (ROA) use more of it. This is consistent with the hypothesis that shortages in cash generation are filled with extra bank debt. Within our sample this finding is not surprising as it contains mature stand-alone firms that, given their age, have been able to build a reputation, and hence should be able to increase bank borrowing even in bad times. Furthermore these private companies have no access to public markets and hence have little or no alternative solutions available. Preceding interpretation is also confirmed by the negative sign of age (AGE): older firms have more access to internally generated funds and thus have less need for bank debt. Next, tangibility (TANG), size (SIZE) and overall leverage (LEV) all have a positive sign, as predicted. The coefficient of growth (GROWTH) is negative but insignificant, probably again due to the fact that, although growth entails extra asymmetric information, the sample consists of mature firms which face fewer limitations on the use of bank debt. Overall, preceding findings indicate that mature private stand-alone firms that can limit the costs of moral hazard and asset substitution and/or are short of cash, use more bank debt.

Turning to models B and B', the models' fit (adjusted R²) shows that it is more difficult to explain the bank debt concentration for group subsidiaries than for stand-alone firms. However, adding group level variables improves R² from 19.22% for model B to 24.52% for model B'. For the subsidiary level variables, findings are in many respects similar

to those of the stand-alone sample. Except for growth – which remains insignificant – all coefficients have the same sign. However, after controlling for group characteristics in model B', profitability (ROA) and age (AGE) lose their significance. This could indicate that in group firms, contrary to stand-alones, extra financing needs are not necessarily filled by bank debt. Concerning the group level variables, group size (GSIZE) and group age (GAGE) are significantly negative, while group profitability (GROA) is negative but not significant. This is consistent with the view that as group size, age and profitability increase the scope and depth of the internal capital market, less bank debt is used by subsidiaries. Furthermore, leverage at the group level (GLEV) is significantly positive. In line with the univariate findings, this suggests that rising group leverage stimulates subsidiaries to acquire bank financing. It also indicates that, especially if the group has a heavy overall debt burden, large group member firms with important tangible assets borrow directly from a bank. As a robustness check and also to gain more insights, we replace group leverage by group reserves (GRES) in model B''. Group reserves has a significantly negative impact on bank borrowing by subsidiaries (the other variables remain unchanged). This is not surprising as GLEV and GRES are strongly negatively correlated (ρ of -0.61). Consistent with our analysis in Section 2 and 3, this indicates that groups tend to fill shortages of internally generated resources with debt so that the scope and depth of the internal capital market need not increase with group leverage. Rather, our findings suggest that as this shortage of resources increases, groups decrease moral hazard costs by offering external lenders priority rights on the assets of their subsidiaries by raising external debt through these firms. Not surprisingly, because of this optimization process, the firm characteristics that shape bank debt concentration in group companies shows many similarities with those that shape bank borrowing in stand-alone firms.

Finally, model C in Table 4 is estimated on the full sample (i.e. stand-alone plus group sample) and includes all company level characteristics and a dummy variable (GROUP) which has a value of 1 if a firm is part of the group sample. Remark that as compared to models A and B', its adjusted R² is lower, although the difference with model B' is only marginal. The significantly negative sign of the group dummy (GROUP = 1 if group member) confirms the univariate finding that stand-alone companies use more bank debt than group firms, all other things equal.

5.2. Determinants of internal debt concentration

Column D in Table 5 shows the results of estimating the relative use of internal debt by group subsidiaries if only firm level variables are used. Column D' contains the findings when group level information is included as well. Comparison of the two models shows that by adding the group level information, the adjusted R² almost doubles from 13.08% to 21.19%, a much larger increase than for the estimation of bank debt concentration in Table 4.²⁸ Consistent with expectations, this seems to indicate that group level variables are relatively more important in explaining the use of internal debt. In line with our hypotheses, we find a significant negative sign for subsidiary profitability (ROA) and age (AGE). Referring back to the findings of Table 4 where ROA was not significant in model B', this result may indicate that while stand-alones use bank debt to fill cash needs, in subsidiaries this role is taken over by internal debt. This is consistent with the use of the internal capital market as a flexible instrument to save on financing costs: intra-group debt comes before

²⁸ Remark that except for size (SIZE) the coefficients of the firm level variables in models D and D' are very similar. The change for size (SIZE), and especially its loss of significance in model D', may be explained by the fact that larger subsidiaries are more likely to be part of larger groups. As group size has a significant impact on the use of internal debt, contrary to model D' where group size has been included, in model D subsidiary size is likely to partially pick up this group size effect.

bank debt in the pecking order of financing sources.²⁹ Tangibility (TANG) is not significantly related to the concentration of internal debt. Furthermore size (SIZE) has the expected positive coefficient, although it is only significant in model D. Also as predicted, growth (GROWTH) has a positive sign, but it is not significant. Finally, again consistent with our hypothesis, the overall leverage of the subsidiary (LEV) is significantly positively related to the relative use of internal debt.

Table 5 about here

The findings for the group level variables in model D' are, just as in the case of bank debt, fully in line with expectations. As the depth and scope of the internal capital market improves with increasing group size (GSIZE), age (GAGE) and profitability (GROA), more internal debt is being used. Important group level leverage in place (GLEV) reduces intra-group debt concentration at subsidiary level. Analogous to model B'' in Table 4, model D'' replaces GLEV by group reserves (GRES). This variable is highly significant with a positive sign: the more internally generated funds are available, the higher the relative use of intra-group debt, *ceteris paribus*. Consistent with the findings for bank borrowing by subsidiaries, this points to a process where, as group leverage increases, shortages of internally generated resources tend to be filled by additional external debt taken up by subsidiaries, thereby decreasing the relative importance of internal debt in the financing of the latter firms.

Overall, the Tobit regressions for internal debt indicate that this form of financing is mainly driven by the depth of the internal capital market. However, subsidiary level

²⁹ Also note that, contrary to our findings, the taxation argument for using internal debt predicts that internal debt use should be higher for profitable subsidiaries. Again this indicates that taxation optimization is not likely to be an important factor in determining the debt source mix for our sample of affiliates.

characteristics also play a significant role when the flexibility of internal debt becomes important. As both the bank debt and intra-group debt concentration have drivers in common, the question of the interaction of both forms of financing remains. Section 5.3 below looks into this issue.

5.3. Simultaneous estimation of bank debt and internal debt concentration

We test for the nature of the relationship between the relative importance of bank debt (BANK) and internal debt (INT) through a 2SLS system in which both are estimated simultaneously. This approach also addresses potential endogeneity problems which may influence the findings from the previous regressions. Given their poor performance in the previous tests, we exclude company growth opportunities (GROWTH) and group level performance (GROA) from the system of equations. Furthermore, to get consistent estimates, not all explanatory variables should be included in both equations: we delete group age (GAGE) from the BANK equation (B' in Table 4) and tangibility (TANG) from the INT equation (D' in Table 5). 2SLS regression results are reported in Table 6.³⁰

Table 6 about here

Comparison of the INT column of Table 6 with model D' in Table 5, shows that the equation explaining the use of internal debt is not affected by taking potential simultaneity into account. Neither the sign nor the significance of any of the variables is affected. Also the impact on the size of the coefficients and adjusted R² is small. However, the same does not hold true for the equation explaining bank debt. In fact, Table 6 shows foremost that internal debt has a significant negative effect on bank debt, while the latter does not significantly

³⁰ GLEV is preferred over GRES, as Tables 4 and 5 show the former leads to a better fit. As a robustness check we re-estimated the system of Table 6 with GLEV replaced by GRES. Results are consistent with those reported.

explains the use of internal debt. This confirms that groups use a pecking order in favour of intra-group debt for financing their subsidiaries. Furthermore, by adding internal debt (INT) to the bank debt model, the significance of the group level variables from the separate Tobit estimation (model B' of Table 4) disappears. Hence the INT-variable subsumes all relevant group information for explaining the concentration of bank debt. Interestingly, the variables on the level of the individual subsidiary are not much affected compared to model B' in Table 4, except for profitability (ROA) which becomes significant. A likely reason is that, as shown by the equation explaining internal debt, weakly performing group firms receive more internal debt. However, in practice this type of debt usually is subordinated to bank financing. Consequently, by adding subordinated internal debt – from the perspective of the bank almost as good as adding equity – the group opens up additional opportunities for bank borrowing to help fill cash needs caused by a subsidiary's weak profitability. This simultaneity is not captured by the separate Tobit models, and hence could have biased results in Table 4. Hence, just as stand-alones, group subsidiaries do sometimes also resort to bank debt to fill cash flow shortages. However, groups have the opportunity to use internal debt as an instrument to reduce credit rationing and dissipative costs of bank borrowing by a group firm. This is in line with the predictions of Ghatak and Kali (2001) and the results of e.g. Schiantarelli and Sembenelli (2000). Finally it is interesting to note that the results for the BANK-equation in Table 6 are very similar to those for the stand-alone sample of model A in Table 4. In fact, all variables have the same sign, and there is also a strong correspondence in terms of significance of variables. The only difference concerns the significance of age (AGE). In fact – and not surprisingly – the data support the notion that the role of the availability of internally generated funds, captured by the significant AGE-variable for the stand-alone firms, is taken over by internal debt (INT) for group subsidiaries.

6. Conclusions

This paper is the first to empirically examine how domestic private business groups use the debt source concentration of subsidiaries to minimize financing costs. This is realized by modelling in detail the mix of bank and internal debt in affiliates. Simultaneously, as this research also considers stand-alone firms as a benchmark, it compares the bank debt acquisition process between both types of firms and pinpoints the impact of group membership.

We find that the firm level variables that drive the acquisition process of bank debt are very similar between stand-alones and group member companies. Large firms with many tangible assets use more bank debt, while – a standard result in the literature – a higher level of total leverage is also associated with a larger portion of bank borrowing. However there is one major difference: a pecking order in favour of internal debt negatively impacts on bank debt concentration in group firms, so that the latter make less use of it than comparable stand-alone firms. This pecking order in favour of internal debt can be explained by significant cost savings from the use of the internal capital market. Not surprisingly then, the internal debt concentration of a subsidiary is mainly driven by the characteristics of the latter market. The larger its depth and scope, the more intra-group debt is used while bank debt financing at subsidiary level decreases. However, because important overall group level leverage is associated with a shortfall in internally generated resources, extra group leverage reduces internal debt concentration and stimulates bank borrowing by large subsidiaries with many tangible assets. This finding indicates that in such a case moral hazard problems are minimised as direct contracting with the subsidiary allows the bank to acquire seniority claims over the subsidiary's assets.

Our results show that optimization of financing costs through internal capital markets is not limited to multinational corporations as described by Desai et al. (2004), but that optimization also takes place across subsidiaries operating within the same legal and taxation framework. Although capital structure optimization may give multinational corporations an advantage over local competitors, our research indicates that this advantage is not equally important across different types of domestic companies. Domestic business groups also have optimization advantages over stand-alone competitors. In this respect, it would be interesting to study whether multinational corporations not only optimize across countries, but also across affiliates within the same country, and which type of optimization offers the best scope for cost savings. Our analysis also suggests that the process of acquiring bank and internal debt may be significantly influenced by the presence of a stock market quotation, as the latter may affect some of the trade-offs that shape the choice between the use of bank or internal debt by subsidiaries.

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Table 1
Sample industry composition

Industry	Number of firms in group and stand-alone samples	%
Food	78	14.1
Manufacturing	206	37.3
Construction	66	11.9
Trade (Wholesale & Retail)	134	24.2
Transportation	59	10.7
Other	10	1.8
	553	

Table 2
Definition of main variables

Variable Name	Definition	Proxy for
<i>Debt Source Variables</i>		
BANK	$(\text{bank debt}) / (\text{ST liabilities} + \text{LT liabilities})$	Bank Debt Concentration
INT	$(\text{intra - group debt}) / (\text{ST liabilities} + \text{LT liabilities})$	Internal Debt Concentration
<i>Company Level Characteristics</i>		
ROA	$(\text{operating profits}) / (\text{total assets})$	Profitability
TANG	$(\text{tangible fixed assets} + \text{inventory}) / (\text{total assets})$	Tangibility
SIZE	$\text{Ln}(\text{total assets})$	Size
AGE	$\text{Ln}(\text{years since incorporation date})$	Age
GROWTH	$(\text{sales}_t - \text{sales}_{t-1}) / \text{sales}_{t-1}$	Growth Opportunities
LEV	$(\text{ST liabilities} + \text{LT liabilities}) / (\text{total assets})$	Leverage
<i>Group Level Characteristics</i>		
GSIZE	$\text{Ln}(\text{group total assets})$	Group Size
GAGE	$\text{Ln}(\text{years since group incorporation date})$	Group Age
GROA	$(\text{group operating profits}) / (\text{group total assets})$	Group Profitability
GLEV	$(\text{group ST liabilities} + \text{group LT liabilities}) / (\text{group total assets})$	Group Leverage
GRES	$(\text{group reserves} + \text{retained earnings}) / (\text{group total assets})$	Group Reserves

Table 3
Summary statistics and univariate tests
Panel A – General descriptives and tests

Variable	Median [Min;Max]			Mean [StDev]		
	Stand-Alone Sample	Group Sample		Stand-Alone Sample	Group Sample	
<i>Company level characteristics</i>						
ROA	0.0442 [-0.344;0.486]	0.0377 [-0.361;0.447]	(2.923)***	0.0555 [0.079]	0.0489 [0.083]	(2.024)**
TANG	0.4370 [0;0.991]	0.3453 [0;0.979]	(6.983)***	0.4274 [0.228]	0.3639 [0.234]	(6.935)***
SIZE	9.1718 [7.515;12.008]	9.4848 [5.389;11.784]	(7.965)***	9.2540 [0.645]	9.5989 [1.091]	(9.890)***
AGE	3.0910 [0.693;4.605]	2.9444 [0.693;4.615]	(2.163)**	3.0322 [0.711]	2.9622 [0.745]	(2.434)**
GROWTH	0.0469 [-0.319;0.622]	0.0326 [-0.264;0.584]	(2.242)**	0.0645 [0.178]	0.0541 [0.178]	(1.469)
LEV	0.6634 [0.109;0.999]	0.6708 [0.102;0.998]	(1.261)	0.6176 [0.227]	0.6309 [0.213]	(1.536)
<i>Group level characteristics</i>						
GSIZE	-	11.7266 [7.367;15.918]	-	-	11.7747 [1.177]	-
GAGE	-	2.9957 [0.693;4.615]	-	-	3.0472 [0.977]	-
GROA	-	0.0421 [-0.117;0.368]	-	-	0.0470 [0.050]	-
GLEV	-	0.6370 [0.101;0.975]	-	-	0.6205 [0.163]	-
GRES	-	0.1432 [-0.551;0.848]	-	-	0.1445 [0.158]	-
<i>Debt sources</i>						
BANK	0.1961 [0;0.944]	0.1176 [0;0.995]	(5.525)***	0.2438 [0.228]	0.2128 [0.242]	(4.134)***
% non-zero	80.6%	70.1%		80.6%	70.1%	
INT	-	0.1345 [0;0.999]	-	-	0.2496 [0.274]	-
% non-zero	-	84.6%	-	-	84.6%	-
GBANK	-	0.3244 [0;0.864]	-	-	0.3349 [0.198]	-
% non-zero	-	97.2%	-	-	97.2%	-

Panel B – Leverage, bank and internal debt concentration & group leverage

Variable	Median			Mean		
	Highest 50%	Lowest 50%		Highest 50%	Lowest 50%	
	GLEV	GLEV		GLEV	GLEV	
BANK	0.2019	0.0336	(8.818)***	0.2672	0.1580	(8.001)***
INT	0.0897	0.2434	(7.273)***	0.1826	0.3172	(8.726)***
LEV	0.7265	0.6014	(8.346)***	0.6834	0.5780	(8.806)***

*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level
Medians for full sample and the group and stand-alone sub-samples; GBANK: bank debt concentration for the consolidated group = (group bank debt)/(group ST liabilities + group LT liabilities); minimum/maximum and standard deviations in square brackets; other variables as defined in Table 2; Wilcoxon Mann-Whitney tests for equality of medians across sub-samples (Wilcoxon T-statistics in parentheses); Panel B: bank and internal debt concentration split up according to whether group leverage is amongst the 50% highest or lowest of all groups in the sample

Table 4
Determinants of bank debt concentration

	Stand-alone	Group Sample			Full Sample
	Sample	B	B'	B''	C
	A				
ROA	-0.3197*** (0.082)	-0.3062*** (0.046)	-0.1807 (0.117)	-0.2225* (0.122)	-0.3370*** (0.072)
TANG	0.5235*** (0.029)	0.3969*** (0.046)	0.4144*** (0.041)	0.4135*** (0.045)	0.4779*** (0.027)
SIZE	0.0244** (0.011)	0.0396*** (0.008)	0.0514*** (0.009)	0.0569*** (0.009)	0.0352*** (0.007)
AGE	-0.0189** (0.008)	-0.0054 (0.012)	-0.0001 (0.011)	0.0002 (0.012)	-0.0084 (0.008)
GROWTH	-0.0257 (0.034)	0.0198 (0.048)	0.0021 (0.048)	-0.0145 (0.047)	-0.0134 (0.031)
LEV	0.4857*** (0.029)	0.3662*** (0.049)	0.1917*** (0.049)	0.2769*** (0.049)	0.4452*** (0.029)
GROUP	-	-	-	-	-0.0445*** (0.012)
GSIZE	-	-	-0.0399*** (0.008)	-0.0432*** (0.009)	-
GAGE	-	-	-0.0260*** (0.009)	-0.0252*** (0.009)	-
GROA	-	-	-0.1832 (0.191)	-0.1468 (0.193)	-
GLEV	-	-	0.5196*** (0.061)	-	-
GRES	-	-	-	-0.3874*** (0.067)	-
Intercept	-0.1387 (0.101)	-0.4653*** (0.109)	-0.0367 (0.138)	-0.0516 (0.125)	-0.3060*** (0.075)
Industry & time dummies	Yes	Yes	Yes	Yes	Yes
Log likelihood	-113.5583	-378.0689	-320.5819	-340.4964	-562.2786
Adj. R ²	0.3192	0.1922	0.2452	0.2276	0.2441

*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level; Tobit regressions (censored normal); Dependent variable: bank debt to total liabilities ratio (BANK); LEV, GLEV, GRES: residuals from auxiliary OLS regressions; GROUP: dummy variable (value of 1 if a company is part of a business group, 0 otherwise); Other variables as defined in Table 2; Huber-White robust standard errors in parentheses;

Table 5
Determinants of internal debt concentration

	D	D'	D''
ROA	-0.5769*** (0.109)	-0.6773*** (0.114)	-0.6650*** (0.113)
TANG	-0.0207 (0.046)	-0.0296 (0.044)	-0.0306 (0.046)
SIZE	0.0227** (0.009)	0.0129 (0.009)	0.0077 (0.009)
AGE	-0.0243** (0.012)	-0.0296*** (0.011)	-0.0262** (0.012)
GROWTH	0.0787 (0.051)	0.0243 (0.050)	0.0784 (0.051)
LEV	0.2316*** (0.047)	0.3459*** (0.049)	0.2710*** (0.048)
GSIZE	-	0.0365*** (0.008)	0.0399*** (0.009)
GAGE	-	0.0290*** (0.009)	0.0315*** (0.009)
GROA	-	0.2956 (0.193)	0.2604 (0.196)
GLEV	-	-0.4329*** (0.065)	-
GRES	-	-	0.1632** (0.068)
Intercept	0.0315 (0.124)	-0.4236*** (0.156)	-0.4392*** (0.158)
Industry & time dummies	Yes	Yes	Yes
Log likelihood	-331.9372	-286.1504	-306.1002
Adj. R ²	0.1308	0.2119	0.1750

*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level; Tobit Regressions (Censored Normal); Group sample only; Dependent variable: internal debt to total liabilities ratio (INT); LEV, GLEV, GRES: residuals from auxiliary OLS regressions; Other variables as defined in Table 2; Huber-White robust standard errors in parentheses

Table 6
Simultaneous determination of bank and internal debt concentration

	BANK	INT
ROA	-0.4676*** (0.163)	-0.5014*** (0.088)
TANG	0.2828*** (0.034)	-
SIZE	0.0327*** (0.007)	0.0098 (0.008)
AGE	-0.0154 (0.012)	-0.0237** (0.009)
LEV	0.3674*** (0.095)	0.3217*** (0.042)
BANK	-	-0.1037 (0.112)
INT	-0.7911*** (0.281)	-
GSIZE	0.0028 (0.013)	0.0323*** (0.007)
GAGE	-	0.0222*** (0.008)
GLEV	-0.0113 (0.130)	-0.3952*** (0.062)
Intercept	-0.0318 (0.129)	-0.2758** (0.112)
Industry & time dummies	Yes	Yes
Adj. R ²	0.2210	0.2185

*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level; 2SLS simultaneous regression models; LEV, GLEV: residuals from auxiliary OLS regressions; Other variables as defined in Table 2; standard errors in parentheses