

The Internal Capital Markets of Pyramidal Business Groups: Evidence from Chile

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Abstract

We study intra-group loans within pyramidal business groups using Chilean data from 1990-2009. On average, loans are received by firms with high capital intensity, which is consistent with the financing advantage of pyramids in Almeida and Wolfenson (2006). Loan providers are firms where the controlling shareholder has lower cash-flow rights than in receiving firms, although both providers and receivers tend to be in the lower part of pyramids. This suggests that tunneling plays a role only in the margin. We do not find evidence that market valuations or short-run cash-flow fluctuations play an important role in these internal capital markets.

The importance of understanding the inner workings of business groups can be hardly overstated. From Korea to Mexico, and India to Brazil, business groups are the dominant form of corporate structure. Groups are typically controlled by families through pyramidal structures, which connect public and private firms, both in related and non-related lines of business, through a complex web of ownership links. Business groups, or more precisely the elites behind them, control a significant fraction of the economies where they operate. For instance, Faccio and Lang (2002) show that the Agnelli family in Italy controls approximately 10% of the stock market capitalization of that country. Similarly, Claessens, Djankov, and Lang (2000) find that the wealthiest family in Philippines controls 17% of the country's market capitalization. In the period we study in this paper groups as a whole control more than 60% of Chile's total market capitalization, and more than 50% of Chile's GDP. The fact that a few business groups control such a large fraction of a country's wealth can have both positive and negative effects. On the one hand, through a concerted development effort *a la* Big Push business groups can overcome the kind of coordination problems that many emerging economies face (Morck (2011)). On the other hand, the fact that a few groups decide how to allocate the lion's share of capital in a country can lead to what Morck, Wolfenson, and Yeung (2005) call "economic entrenchment". In such scenario, economic development can be severely hampered since business groups can "bias capital allocation, retard capital market development, obstruct entry by outside entrepreneurs, and retard growth" (Morck, Wolfenson, and Yeung (2005)).

However, and despite the importance of business groups around the world, we still don't know much about how capital is allocated within them. As Almeida and Wolfenson (2006b) show, business groups can severely affect capital allocation in a

country despite the fact that their internal allocations are efficient. However, it is still an open debate whether capital markets within groups are efficient or not, and more fundamentally, what determines the allocations of capital within business groups. The lack of empirical evidence in this regard is probably due to data availability and the opacity of business groups. In this paper we provide direct evidence of intra-group borrowing and lending that can shed light on the inner workings of internal capital markets.

Previous literature shows that internal capital markets serve three non-mutually exclusive purposes. First, the internal capital markets of groups can alleviate financial constraints both by providing support in the face of short-run shocks, and by financing long-term projects. For example, Gopalan, Nanda, and Seru (2007) show that Indian business groups' affiliated firms benefit from the support of other related firms when they suffer cash-flow shocks, which avoids bankruptcy and negative spillovers in the rest of the group. Both Almeida and Wolfenzon (2006) and Almeida et al. (2011) show that groups use their internal revenues to set up (or acquire) capital intensive firms, which are the firms most in need of long-term financing. A second motive behind intra-group loans is tunneling, or the expropriation of minority shareholders (Johnson et al. (2000)). For example, Bertrand, Mehta, and Mullainathan (2002) show that Indian groups channel resources from firms at the bottom of pyramids to firms near the top of the pyramid.¹ Similarly, Jiang, Lee, and Yue (2010) show that the controlling shareholders of Chinese firms use inter-company loans to tunnel large amounts of money away from firms, and consequently damaging minority investors. Finally, a third broad motive for the existence of business groups is that their internal capital

¹ Although their methodology has been recently questioned by Siegel and Choudhury (2012).

markets substitute for under-developed external markets, or for under-developed legal and judicial institutions (see Khanna and Yafeh (2007)). If internal capital markets substitute for under-developed capital markets they can, for example, make up for the lack of funds given to firms with better investment opportunities (e.g., firms with higher Tobin's Q).

We benefit from the relative transparency of business groups in Chile, most of which was imposed by market regulators after the debt crisis of the early 1980s, and which gives us a long sample (20 years) on the activity of internal capital markets inside groups.² The key for our purposes is that the net lending (or borrowing) position in terms of intra-group loans must be disclosed as a separate line in the balance sheet of each firm. Disclosure requirements even force firms to separate between long and short term intra-groups loans. Furthermore, for the years 2001-2009 the notes to financial statements are also available on electronic form, and we can extract from there even more detail on intra-group lending. Through the notes we can identify the firm that lends and the firm that receives the loan within the group. Since we know both the lender and the borrower we can test more directly several theories on how capital is allocated within groups. From the notes we are also able to understand the web of ownership links in control pyramids. We can identify precisely the ultimate controlling shareholder, which is typically a family, together with their voting and cash flow rights for each firm in the pyramid. This process is particularly cumbersome since it requires an intimate knowledge of the corporate structure of many public and privately-held companies. Given all these unique

² Chilean business groups have been studied previously in terms of the benefits of group diversification (Khanna and Palepu (2000)), the synchronization of stock returns and firm interlocks (Khanna and Thomas (2009)), and tunneling (Urzua (2009)), among others, but not in terms of their internal capital markets.

characteristics of Chilean data we are able to provide a more complete picture on the workings of internal capital markets in business groups.

In the data we first note that the internal capital markets of business groups are quite active. On average net intra-group loans are 1.6% of book assets (individual, non-consolidated assets). Despite the tremendous development of Chile in the last two decades (e.g., per capita GDP tripled in this period), there is no discernible tendency for intra-group loans to disappear: on average net intra-group loans are still 2.4% of assets by the end of 2009. We define providers (receivers) as those firms which provide (receive) more than 5% of their assets as loans to other firms in the pyramid. Approximately 20% of firm-year observations are providers, whereas 12% are receivers. We find that capital intensity (PPE over assets) is the strongest predictor of the provider-receiver status. Firms with high capital intensity tend to receive intra-group loans and the opposite happens with firms with low capital intensity. This finding is in line with the prediction in Almeida and Wolfenzon (2006) that pyramids are partly set up to finance capital-intensive projects. The financing advantage of pyramidal ownership structures is the possibility to use the retained earnings of other firms in the pyramid to finance firms that need substantial fixed assets and long-term financing. Receivers also tend to be firms with high cash-flow rights in the hands of the controlling shareholder relative to providers. However, this does not have to be understood as firms at the bottom of pyramids (with low cash flow rights) lending heavily to firms at the top of pyramids (with high cash flow rights), because both providers and receivers are more frequent in the lower ranks of pyramids. In other words, the tunneling effect along the lines of Bertrand, Mehta, and Mullainathan (2002) is only relevant at the margin in our sample. This is perhaps not too surprising given that cash flow rights are on average

quite high (around 48%) when compared to pyramids in other countries where the separation of ownership and control is more extreme (see Adams and Ferreira (2008) for a survey). Finally, we find that current cash flows (EBIT) and Tobin's Q are not strong predictors of the provider-receiver status. These last two finds suggest that short-run support and market valuations (which can lead to "winner-picking" or "socialism" as in Stein (2003)) are not important determinants of intra-group lending.

With the data from the notes to the financial statements we can dig deeper into the determinants of intra-group loans. Notes provide loan balances for pairs of firms, instead of simply a generic balance of intra-group loans for each firm. On average, each firm reports loan balances with two other group-affiliated public firms, and loan balances last on average for two years in our sample. Consistent with the previous evidence, we see that high capital intensive firms receive loans from low capital intensive firms, and this is true both within and across industries. Capital intensity appears as the most robust predictor of loans across the battery of tests that we perform. For example, we take special care of firm-pairs with zero balances within a group and the potential biases that arise from ignoring these observations.

Finally, and in order to paint a complete picture of internal capital markets, we study the impact of intra-group loans on real investment and dividend payments. We observe a significant effect on fixed investment. Receivers have a 2.2% higher fixed investment rate when compared to other firms in business groups, whereas providers have a 1.3% lower fixed investment rate. We do not find evidence that investment in other assets (e.g., inventories) is affected, which suggests that loans are used for long-term investments rather than to fund short-term needs of working capital. There is no strong evidence that firms that receive intra-group loans increase

their dividend payments, or that the firms that provide loans decrease dividend payments. This also reinforces the idea that tunneling is only a marginal concern in our sample.

Our paper contributes primarily to the literature on business groups and pyramidal ownership structures, and more specifically, to the few papers that try to understand their internal capital markets. Other papers in this area have studied, for example, the investment-cash flow sensitivity of Korean chaebols (Shin and Park (1999), and Lee, Park, and Shin (2009)) or the efficiency of chaebols' investment after the Asian financial crisis (Almeida and Kim (2012)). Khanna and Yafeh (2007)'s view is that business groups can sometimes be paragons, and sometimes be parasites. In a sense our evidence is consistent with this view. Although intra-group loans are used to fund capital-intensive projects, tunneling also seems to play a role since loans are preferably given to firms with relatively higher cash flow rights of the controlling shareholder. We do not find strong evidence for the support motive documented by Gopalan, Nanda, and Seru (2007) among Indian business groups. One of the potential reasons for this difference is that bankruptcies are extremely rare during this period in Chile.

Our evidence also contributes to the large literature on internal capital markets, which is mostly focused on conglomerates in developed markets (see Stein (2002) for a survey). This literature tests several theories regarding the efficiency of investment within conglomerates. The fact that allocations are made within a conglomerate can increase efficiency, because, for example, relative performance evaluation is easier than absolute evaluation (i.e., a “winner-picking” effect), or it can decrease efficiency, because, for example, rent-seeking within the conglomerate leads to cross-subsidies (i.e., “socialism”). The sensitivity of investment to Tobin's Q

is usually considered in empirical applications as a metric of investment efficiency. In our setup Tobin's Q is largely irrelevant for intra-group lending which suggest that efficiency is not the main driver of internal capital markets. The main driver seems to be the desire to set up large-scale, capital-intensive projects.

The rest of the paper is organized as follows. In Section 1 we describe our data in detail. Section 2 presents the main regressions using net balances of all intra-group loans for a given firm, and with firm-pair balances. In Section 3 we look at the uses of intra-group loans. Section 4 presents our conclusions.

1. Data

a. Data on Internal Capital Markets

Chilean accounting standards are particularly strict with respect to internal capital markets due to the country's unique recent history. In 1981, and after several years of economic growth and liberalization policies implemented by the regime of General Pinochet, an economic crisis struck the country. External credit halted; there was a rise in interest rates, and terms of trade fell, all of which severely hit business groups. The effect was devastating for business groups since they were heavily indebted, in particular with their group-related banks. As a consequence many groups were intervened and nationalized. A limit was set for banks on their related lending activities, and crucially for our purposes, information on group-related transactions was required to be disclosed in the annual statements of companies. Therefore, in the balance sheet of every listed firm there is a line called "notes and account receivables/payables from related companies" (both for the short

and long term). Due to our interest in internal capital markets we focus on non-consolidated financial statements since whenever a firm consolidates its statements with a subsidiary any transaction between both parties disappears (as the transaction is both on the asset side and the liability side for the consolidating firm). We define net intra-group loans for a given firm as the difference between accounts receivable and accounts payable with related companies. We are able to collect this information for Chilean companies between 1990 and 2009.

In Figure 1 we provide a stylized example to get a grasp of our data. Firm A lends to firm B, and it receives a loan from firm C, both of which are in the same business group. Firms B and C can either be public or private firms, but as long as they are related to firm A through ownership links the balance sheet of firm A will provide information on these loans.⁴ The loan to firm B (L_{AB}) is considered an account receivable from a related firm, and the loan received from firm C (L_{CA}) is considered an account payable to a related firm. Net intra-groups loans for firm A correspond to the difference between these two outstanding loans ($= L_{AB} - L_{CA}$).

However, with the balance sheet data we get only half way in terms of identifying relevant data about internal capital markets. The main disadvantage of the balance sheet is that it pools together many different loans, to and from public and private firms, into a single line. We can dig deeper into intra-group loans by looking at the notes to the financial statements, which Chile's stock market's regulatory agency, the Superintendencia de Valores y Seguros (hereafter, SVS), compiles electronically since 2001. The notes provide detail on specific loans, identifying the related firm that extended and that received the loan. For instance, in our example above, we are able

⁴ In fact, the regulation requires that firms related not only through ownership links (e.g., firms that share a common director, although they are in different business groups) to report transactions between them as transactions between related parties. These tend to be small compared to intra-group transactions.

to identify firms B and C through the notes. If firm B or C is a public company we can match both ends of the loan to firm-level characteristics reported in public financial statements. Most of these loans, however, involve privately-held firms that typically do not report financial statements and that are outside the scope of the SVS. Since there is no data set covering private firms in Chile, such as Amadeus for example in Europe, we restrict our attention to loans between listed firms in this part.

Figure 2 provides a real example taken from our data. It shows both the structure and the activity of internal capital markets of the Chilean group controlled by the Claro family. The Claro group represents more than 2% of Chile's total market capitalization. By 2008 it controlled seven listed firms, ranging from a sea-shipping company (Vapores), to a glass and bottles producer (Cristales), and a vineyard (Viña Santa Rita), plus a multitude of private firms. Figure 2 shows all ownership links in the pyramid, for instance, that Cristales (listed) controls 54% of Viña Santa Rita (listed) and 99% of Constructora Apoger (private). It also shows that Cristales' net loans to Santa Rita are equivalent to 0.58% of its non-consolidated assets. The largest net loan position between listed firms in Figure 2 is the one between Elecmetal and Cristales, which accounts for 3.58% of Elecmetal's assets. Figure 2 shows that internal capital markets play a non-trivial role in Claro's group. Almost every firm receives a significant loan from its parent or from other group related company.

Table 1 shows examples of particular loans between public firms in our sample, and the specific amounts and conditions involved in each case. For instance, Navarino of the Claro group received CLP 762 million (approximately USD 1.1 million) from its parent company, Quemchi, in the year 2001. The rate of the loan

was 5.01%. Unlike the evidence presented in Gopalan, Nanda, and Seru (2007) for India, intra-group loans are almost never at an interest rate of zero in our sample. This happens because Chilean regulation requires related loans to be made at the prevailing “market interest rate”.

b. Financial and Ownership Data

Financial and accounting data for all firms is taken from *Economistica*, a data set covering publicly-traded companies in Latin America. However, our tests require an intimate knowledge of the ownership links between group-affiliated firms, which are not reported in standard data sets. We hand collected voting and cash flow rights for all Chilean listed firms between 1990 and 2009. The SVS requires all listed firms to provide the name of their twelve largest shareholders in their annual reports. Yet this information is in itself of little help in identifying the controlling shareholder, as these twelve largest shareholders are almost always other companies - some of them listed, some private. We check the annual reports of firms by hand in order to understand the web of companies connected through the pyramidal structure of each group. Annual reports typically explain whether control is exercised by the controlling shareholder through one holding company that owns all of the controller’s shares, or alternatively through several firms related to the controlling shareholder. With all this information in hand we compute both voting and cash-flow rights of controlling shareholders for all business groups between 1990 and 2009. To the best of our knowledge, such a long panel on ownership structures would be difficult to assemble in other countries, even the US. For instance, Helwege, Pirinsky, and Stulz (2007) use only a 16-year sample (1986-2001) in their study on ownership structures in the US.

We illustrate our methodology with Viña Santa Rita from Figure 2. This firm is controlled through a cascade of ownership links where the last two listed companies before Santa Rita correspond to Elecmetal and Cristales. Several intertwined privately-held companies, such as Bayona S.A., also affect the ultimate ownership of the Claro family in Santa Rita. The Claro family controls, both through private and public firms, 50% of Elecmetal, which directly holds 34% of Cristalerías which, in turn, holds 54% of Santa Rita. The Claro family, therefore, controls Santa Rita with 54% of the shares (votes). This assumes, as is standard in the literature on control (Adams and Ferreira (2008)), that control is achieved with a stake larger than 20%. Once considering all stakes the Claro family has, both through private and public firms, its voting rights increase from 54% to 78% in Santa Rita.

As in many other countries (for instance East Asia (Claessens, Djankov, and Lang (2000)), Europe (Faccio and Lang (2002)), and the US (Villalonga and Amit (2009))), separation of control and cash-flow rights is also common in our sample. We compute cash-flow rights, i.e. the fraction of dividends the controlling shareholder receives, by multiplying all ownership stakes in the pyramidal chain. Considering only links through listed companies, the claim of the Claro family on Santa Rita's dividends would be 9.2% ($=50\% \times 34\% \times 54\%$). Adding the stakes held through private companies, their cash-flow rights increase to 20%, which implies a 58% separation between voting and cash-flow rights.

Overall, our sample covers 20 pyramidal groups in Chile. The average pyramid has 5 listed firms, and multiple private firms associated to them. The pyramid with most public firms has 11 of them, while the pyramid with fewest public firms has only two of them. These 20 pyramids cover a substantial amount of Chile' stock market capitalization (approximately 60%), and certainly represent a significant

fraction of the economic activity of the country. Morck (2011) highlights that the importance of business groups resides in that a few families control a significant share of a country's wealth. In this sense we benefit again from Chile's unique recent history since Chile's largest firms are listed in the stock market and are therefore present in our data set, in contrast to, for example, what happens in Continental Europe (see Franks, Mayer, Volpin, and Wagner (2012) on the importance of private firms in Europe). After both President Salvador Allende's nationalization scheme in the early 1970s and the debt crisis of the 1980s, most large companies were nationalized. By the late 1980s the government of General Pinochet privatized most of these firms through the stock market. Most of those companies are now in our database. In addition, a few state-owned companies were privatized in the mid-1990s.

2. Providers and Receivers of Intra-Group Loans

a. Evidence From Firm Balances with all Intra-Group Loans

Table 2 reports summary statistics for the main variables in our analysis. On average net loans are 1.6% of book assets (individual, not consolidated assets). Short-term loans are the lion's share of loans (1.3% of assets), while the long-term portion is smaller. The evolution in time of net loans can be seen in Table 3. We see no tendency for these loans to disappear despite the rapid development of financial markets in Chile throughout the sample period. Notice that the average is positive in almost all years, implying that firms in our sample are on average lending to related

firms—including private firms whose balances we do not directly observe—rather than receiving funds.

Table 4 shows the frequency of providers (receivers) of intra-group loans defined as those firm-year observations with net intra-group loans larger (smaller) than 5% (-5%) of book assets. Approximately 20% of firm-year observations are labeled as providers and 12% as receivers. We also do the same categorization considering only the short or the long-term portion of net loans. In the data we are equally likely to observe short and long-term providers, and similarly among receivers. Since average long-term net loans are smaller than short-term ones according to Table 2, this implies that relatively small short-term loans (less than 5% of assets) are frequent in the data. Short-term receivers are also long-term borrowers, although by smaller amounts. Similarly, short-term providers also tend to be long-term lenders.

We further split firms according to their position in the control pyramid. We count the number of public companies between the controlling shareholder and the firm under study in order to determine its position in the pyramid. For example, firms in the second row of the pyramid are controlled through another public company instead of being controlled directly by the ultimate owner. In the case of the Claro Group in Figure 2, Navarino is a firm in the second row of the pyramid.

We find that providers are more frequent among firms down in the pyramid than among firms up in the pyramid. For example, 22% of firms at the top of pyramids are providers, while 29.5% of firms in position four or higher are providers. The difference is more pronounced among short-term loans, where only 7.4% of firms at the top are short-term providers, while 28.2% of firms in position four or higher are short-term providers. It is important to note that large firms (most likely at the

top of pyramids) can mechanically be outside the provider/receiver status since we are dividing net loans by total assets. However this is not always true. For example, firms in the first line of pyramids are the ones with the highest frequency of long-term providers in Table 4 (15.5% against an average of 10.1% among all firms).

Among receivers we see differences in the same direction as providers when comparing firms in different positions in the pyramid. Simply put, receivers are also more prevalent at the bottom of pyramids just like providers. For instance, 6.8% of firms at the top of pyramids are receivers, while 34.6% of firms in position four or higher are receivers. Perhaps a naïve tunneling prediction would be that firms up in the pyramid should receive loans from firms down in the pyramid. Our preliminary evidence suggests that loans in the pyramid are not on average from the bottom of the pyramid towards upstream firms, but are more horizontal in nature: firms at the bottom of the pyramid are active providers and receivers alike.

In Table 5 we show differences in firm characteristics between providers and receivers. Providers are in general larger, less profitable, less capital-intensive (lower PPE/assets), low Q firms, and where the cash-flow rights of the controlling shareholder are lower when compared to receivers. The differences in means are in general statistically significant, although less so when comparing short-term providers and receivers. In terms of cash-flow rights, although statistically significant, the differences are not large economically speaking. Controlling shareholders have on average 41% of the cash-flow rights of providers and 51% of receivers, but 41% is already quite high when compared to cash-flow rights in pyramids in other countries, in particular in East Asia where cash-flow rights can be less than 10% (see, for example, Claessens et al. (2002)). These results are,

nevertheless, consistent with tunneling in the sense that low cash-flow rights are more likely among receivers rather than providers.

In Table 6 we report results from the following OLS regression of net intra-group loans over total book assets provided by firm i in year t :

$$\begin{aligned}
 (\text{Net Loans/Assets})_{i,t} & \\
 &= a \text{ Cash Flow Rights}_{i,t-1} + b (\text{PPE/Assets})_{i,t-1} + c \ln(\text{Assets})_{i,t-1} \\
 &+ d (\text{EBIT/Assets})_{i,t-1} + e Q_{i,t-1} + \mu_i + \delta_t + \epsilon_{i,t}, \tag{1}
 \end{aligned}$$

where μ_i represents firm fixed effects and δ_t represents year fixed effects. Standard errors are clustered by firm. We report the regression for all loans, short-term loans, and long-term loans.

We find that cash-flow rights have a negative effect on net loans, although the effect is significant at the 10% level, and only when we include firm fixed effects which absorb the average level of cash-flow rights. This suggests that a few dramatic changes in cash-flow rights are associated with changes in net loans, but the levels of cash-flow rights are not generally correlated with loans following from the regression without the firm fixed effects (consistent with the previous evidence on providers are receivers). PPE over total assets has a strong and significant negative effect on net loans, implying that capital-intensive firms tend to receive intra-group loans rather than to provide them. Firm size has a positive effect on loans, but also only when firm fixed effects are included. Perhaps surprisingly, cash flow (EBIT over assets) does not have an effect on loans, contrary to what the findings of Gopalan, Nanda, and Seru (2007) for Indian business groups would suggest. Tobin's Q has a negative effect, which implies that high Q firms receive rather than provide funds. This is in

principle consistent with an efficient allocation of capital or “winner-picking” within the firms that belong to the business group. However, the effect is again only seen once we include firm fixed effects and is therefore associated with changes in time more than with average valuations.

Next we conduct a multivariate probit analysis where p_{it} is the probability that firm i is a provider (receiver) in year t . This probability is modeled as a function of the same explanatory variables of the previous regressions:

$$p_{it} = \Phi \left(a \text{ Cash Flow Rights}_{i,t-1} + b \left(\frac{\text{PPE}}{\text{Assets}} \right)_{i,t-1} + c \ln(\text{Assets})_{i,t-1} + d \left(\frac{\text{EBIT}}{\text{Assets}} \right)_{i,t-1} + e Q_{i,t-1} + \delta_t \right), \quad (2)$$

where Φ is the cumulative standard normal distribution. We also run an ordered probit model where the dependent variable takes a number 1 if the firm is a receiver, 2 if the firm is neither a receiver nor a provider, and 3 if the firm is a provider.

The results of the different probit estimations are provided in Table 7. High cash-flow rights reduce the chance of being a provider. According to these estimates, a one-standard-deviation increase in cash-flow rights reduces the frequency of providers from approximately 20% (see Table 4) to 13%. Higher cash-flow rights increase the chance of being a receiver, but only in the long term. In the short term, high cash flow rights reduce rather than increase the chances of being a receiver. This is consistent with the evidence in Table 4 regarding the abundance of short-term receivers at the bottom of pyramids.

High capital intensity reduces the chance of being a provider and increases the chance of being a receiver. The results are consistent for the short- and long-term

portions. A one-standard-deviation increase in capital intensity reduces the frequency of providers from 20% to 12%. Large firms are more likely to be providers and less likely to be receivers. Tobin's Q is a significant predictor of the receiver status, in particular for long-term receivers. However, the effect of Q disappears in the probit analysis of providers and in the ordered probit.

b. Evidence From Firm-Pair Balances

Following the Chilean law the total amount of intra-group loans is reported in the balance sheet of each firm. Through the notes to the financial statements we have more detailed information regarding loan balances with each individual related firm starting in the year 2001. In terms of the stylized example in Figure 1, we do not only know the overall balance of related loans in firm A ($= L_{AB} - L_{CA}$), but also the balances of firm A and B (L_{AB}) and firms A and C (L_{CA}). We need at least one of the firms in the pair to be publicly traded in order to get to this level of detail. For example, if both firms B and C are private firms we cannot know how much borrowing and lending there is between them, although we know how much borrowing and lending they have with firm A if this is publicly traded.

We focus in this section in balances between public firms since in this case we can compute firm characteristics in both ends of the loan. Since financial information is not in general available for private firms, we do not know, for example, their size or EBIT, and by definition we cannot compute market-related variables such as Tobin's Q. Table 8 shows the average number of connections to other public firms for each public firm in our database. Firm pairs are only counted once, e.g., we count the pair AB if both firms are listed and if they have an outstanding loan between them, but we do not count the pair BA as a different connection. The overall average is about

two connections, with a minimum of one connection and a maximum of ten connections per firm. In our sample we have slightly more than 500 observations of loan balances between related firms.

In Table 8 we also report some statistics about the “creation” and “destruction” of loan connections in time. There is time series variation provided by changes in the size of the loans, but this can exist even if we always have the same pair of firms. In this table we want to get a sense of how much variation there is in the pairs of firms lending and borrowing to each other each year. We measure creation and destruction by comparing the loan connections of a given firm in two consecutive years. If firm A was connected to firm B in year t , but is connected to firms B and C in year $t+1$, we count this as one connection created. If subsequently in year $t+2$, firm A is connected only to firm C we count this as one connection destroyed in that year. In each year we add up the creation and destruction for each firm and then we average across firms. In Table 8 we see that the average of creation and destruction is 0.49, which means approximately that one connection is created or destroyed every two years. This is a substantial amount of turnover in loan connections, so it is not the case that the same lenders lend to the same borrowers throughout the entire sample period.

Table 9 reports some summary statistics for these balances. We report averages always from the perspective of the lender (i.e., all numbers are positive). The average balance of 2.4% of assets is above the average of 1.6% reported in Table 2.⁵ However, unlike Table 2, the long-term portion constitutes the lion’s share of this average rather than the short-term portion. Differences between Tables 2 and 9

⁵ We divide loans by total book assets of the first firm reporting the loan in our sample (we exclude the second mention of the same loan by the other firm in the pair). We have explored dividing always by book assets of the lending firm or the borrowing firm and it does not make a significant difference for the results.

depend on three factors: first, balances in Table 2 can be positive or negative; second, balances in Table 2 include loans to and from private firms; and finally, the balances in Table 2 net out loans in opposite directions from two listed firms (e.g., the balance of firm A nets out the loan extended to public firm B and the loan received from public firm C). Therefore, the results in Table 9 are expected if loans from listed firms are significant.

Since now we are able to identify firms in both ends of the loan we can compute average balances between firms in the same and in different industries.⁶ This is interesting since firms in the same industry naturally trade more between them and are more inclined to give credit to one another, in particular short-term financing (see, for example, Helpman and Krugman (1989) on the extent of intra-industry trade). Also, some of the theories on internal capital markets are naturally applied to firms in conglomerates that operate in the same industry. For example, the relative comparison of projects and “winner picking” are more easily applicable to firms in closely related lines of business (Stein (2003)). We find that balances are on average larger among same-industry firms (3.5% vs. 1.3%), and particularly in the long-term portion. On the other hand, this evidence shows that intra-industry trade-credit is not the sole story behind loans in business groups because there is significant lending and borrowing across industries.

In the lower panel of Table 9 we show means of the difference in characteristics between firm pairs. We report means of the difference between the lender and the borrower in each pair. We see that differences between lender and borrower characteristics go in the same direction for loans within and across industries. For instance, lenders tend to be less capital intensive than borrowers in

⁶ Industries are defined at the four-digit level.

both cases. On average, lenders have 12% lower PPE over assets than borrowers. Only for the case of EBIT over assets we find a significant difference between firms in the same and in different industries, but in both cases we find that lenders are less profitable than borrowers. These findings suggest that similar stories drive lending within and across industries.

We report results from the following OLS regression of net loans of firm i with firm j in year t :

$$\begin{aligned}
 & \text{(Net Loans/Assets)}_{ij,t} \\
 &= a \Delta_{ij,t-1} \text{Cash Flow Rights} + b \Delta_{ij,t-1} \left(\frac{\text{PPE}}{\text{Assets}} \right) + c \Delta_{ij,t-1} \ln(\text{Assets}) \\
 &+ d \Delta_{ij,t-1} \left(\frac{\text{EBIT}}{\text{Assets}} \right) + e \Delta_{ij,t-1} Q + \delta_t + \epsilon_{i,t}, \tag{3}
 \end{aligned}$$

Where the operator $\Delta_{ij,t-1}$ represents the difference in a given variable between firm i and firm j in year $t-1$. The difference allows us to estimate directly if loans flow, for example, from a low cash-flow right firm to a high cash-flow right firm, or from a low Q firm to a high Q firm, etc. We do not include firm fixed effects because we do not have enough data points and consequently variation in time in this case. In some regressions we also include a dummy variable if the firm pair i - j is in the same industry and the interaction between this dummy and the other variables. When interactions are included they capture the effect of the differential within firms of the same industry, and the variables that are not interacted capture the effect of the differential across firms in different industries.

Table 10 shows results from the regressions with firm pairs. The strongest result is that loans tend to go towards the high capital-intensity firm in the pair, i.e.,

the b coefficient in the regression above is negative and strongly significant. This is true within the same industry and across industries, in particular for long-term loans. The effect of cash-flow rights is less clear. The firm where the controlling shareholder has more cash flow rights tends to receive loans. However, this is true for long-term loans, yet the effect is reversed for short-term loans. Both effects are seen within the same industry and across industries.

One potential bias that we have ignored so far is that we are considering only firm pairs where there is a loan. However, many firms within the same pyramid are not lending and borrowing from each other. In other words, there are lots of firm pairs with a zero balance. The results so far in Table 10 can be interpreted as the effect of different firm characteristics in the direction and magnitude of a loan *conditional on observing a loan*. The potential problem is that the firm pairs with zero balance can have similar characteristics as those pairs with a non-zero balance, and therefore interpreting the results as unconditional effects becomes problematic. For example, we found before that lenders tend to be less capital intensive than borrowers. But what if there are important differences in capital intensity in firm pairs where we do not see a loan? In other words, we cannot be sure that capital intensity is an unconditional predictor of intra-group loans if we do not take into account the pairs of firms with no loans between them.⁷

We approach this problem in two ways. First, we run simple OLS regressions as in (3) but including the pairs of group-firms with zero balance. Second, we run a Heckit model to take into account the selection bias in considering only pairs with non-zero loans. It is important to note that we include the pairs of firms with zero

⁷ The situation is similar to the one in the literature on international trade related to the determinants of exports and imports. There are many country-pairs with no trade between them and this becomes important for evaluating trade theories (see Helpman, Melitz, and Rubinstein (2008) among others).

loans within groups and not all potential pairs of firms with zero loans. In other words, we take the structure of groups as exogenous in determining the set of potential connections of each firm. In a long run sense this is perhaps not correct since firms can be sold and bought by another group, or they can simply disappear. However, and consistent with evidence from groups around the world in Khanna and Yafeh (2005), this is not a restrictive assumption in the short or medium run given the slow-moving nature of group structures.

In the second panel of Table 10 we run the OLS regressions with the zero-pairs included. The key effect of capital intensity remains after including these observations. High capital intensity firms tend to receive funds from low capital intensity firms. There is also a marginally significant effect of cash-flow rights, but it goes in opposite directions for firms in the same and in different industry, which blurs the interpretation a bit. The effect of Tobin's Q goes in the right direction (i.e., low-Q firms lend to high-Q firms) across industries, but there is no effect of Q within the same industry as "winner picking" theories might suggest.

In Table 11 we present the Heckit estimations. The first stage of Heckit is a probit model where the dependent variable is 1 if there is a loan and 0 otherwise. The second stage is a standard regression that includes the inverse of Mill's ratio to account for the self-selection bias (Wooldridge (2002)). We report two versions of the Heckit model. First, a model where the first stage is run with observations from all the pyramids and including pyramid fixed effects. In the second model we run the first stage only with the observations of a single pyramid, and therefore the estimation is specific to each pyramid. The first model is probably more efficient since it uses more observations, and the second model is more flexible by not imposing the same parameter estimates across all pyramids. We have fewer overall

observations in the second model since we need a minimum of observations to run the probit for each pyramid in the first stage.

The results in Table 11 show that the effect of capital intensity is fairly robust to applying the Heckit estimation. Overall, the message does not change much once we correct for the selection bias in this way. Perhaps the only difference is that now the effect of EBIT over assets appears strongly, implying that lenders tend to be high EBIT-firms and borrowers tend to be low-EBIT firms. This is in line with the support motive of internal capital markets as emphasized by Gopalan, Nanda, and Seru (2007).

3. The Use of Intra-Group Loans

Finally, we study the impact of intra-group loans on real investment and dividend payments in order to paint a complete picture of the potential uses of intra-group loans. We also examine briefly the connection with equity financing, which is an alternative source of funds for public firms.

In terms of real investment we run an OLS regression of the following type:

$$\begin{aligned}
 & (\text{Investment}/\text{Assets})_{i,t} \\
 & = a \text{ Net Provider}_{i,t} + b \text{ Cash Flow Rights}_{i,t-1} + c (\text{PPE}/\text{Assets})_{i,t-1} \\
 & + d \ln(\text{Assets})_{i,t-1} + e (\text{EBIT}/\text{Assets})_{i,t-1} + f Q_{i,t-1} + \mu_i + \delta_t \\
 & + \epsilon_{i,t}, \tag{4}
 \end{aligned}$$

In Table 12 we study fixed investment (changes in PPE) and non-fixed investment (changes in non-PPE assets). Net Provider is a dummy for the providers of intra-group loans as identified previously. The regressions using Net Receiver is analogous. We see significant effects in fixed investment, although not in non-fixed investment. The rate of fixed investment is 2.2% higher if the firm is a receiver, and 1.3% lower if the firm is a provider (estimates from the regression with firm fixed effects). The effect on fixed investment fits with the previous evidence that capital intensive firms are the ones most likely to receive intra-group loans.

Chilean law requires firms to distribute at least 30% of annual earnings as dividends; therefore earnings and dividends are tightly linked in the Chilean market. This type of regulation, which is a way to protect minority shareholders, is common in emerging markets as documented by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998). Firms can also decide to pay dividends above the 30% rate. We run two different models for dividend payments. First, we run a probit model where the dependent variable is a 1 if the firm distributed dividends above the 30% threshold and 0 otherwise. Then we run a tobit model for extraordinary dividends, which are defined as the actual amount of dividends paid during the year minus 30% of earnings. In this last case the dependent variable is censored in zero and consequently the tobit methodology is appropriate.

We show the results for dividends in Table 13. The provider-receiver status has no predictive power over dividends above and beyond the other firm characteristics. Only in the tobit estimation we see marginally significant effect of being a receiver in the amount of extraordinary dividends that are paid. Some of the other coefficients are interesting. For example, high cash-flow rights have a positive and highly significant impact on dividends, which is probably not too surprising.

Compared to the frequency of intra-group loans, equity issues are relatively rare in this market. They still represent an important source of funds for growing firms so it is interesting to see if there is a connection between these different sources of funds. In particular, we study whether there is a tendency to use some of the proceeds of the issuance to provide funds to other firms in the pyramid through intra-group loans. We show some suggestive evidence in this regard in Table 14. Net providers are more frequent among firms that issue equity than among non-issuers, in particular in the short-term. Among issuers, 17% are short-term providers, while among non-issuers only 12% are short-term providers. We do not find a difference in long-term providers. This is only suggestive evidence because it is hard to prove that the proceeds of the issuance are literally used for intra-group loans. It can be the case that providers and issuers share similar characteristics and that there is no redirecting of proceeds to other firms in the pyramid.

4. Conclusions

Business groups are present in almost every single country in the world. These sets of firms, managed by families and often structured through pyramids, typically comprise a significant fraction of the wealth of a country. They can have both positive and negative effects. On the one hand, they can effectively replace the government in Big Push development efforts (Morck 2011). On the other hand, they can lead to “economic entrenchment”, thus biasing capital allocation and hampering growth Morck, Wolfenson, and Yeung (2005).

In order to shed some light into the impact of business groups we focus on their internal capital markets. Using Chilean data we construct a 20 year (1990-2009)

panel database with the internal capital markets' activity of business groups. Furthermore, for the years 2001-2009 our data coverage improves and we can track every transaction within the group. Key for our purposes, we are able to understand the web of pyramids which is typical of business groups, obtaining, for each firm, both the voting and cash flow rights of the controlling shareholder.

Perhaps surprisingly, internal capital markets are extremely active, even by the end of our sample in 2009. We see that capital intensive firms tend to receive intra-group loans, therefore supporting the financing advantage of pyramids postulated by Almeida and Wolfenzon (2006). However, our results also support the existence of tunneling (Bertrand, Mehta, and Mullainathan (2002), and Jiang, Lee, and Yue (2010)), since firms with high cash flows rights on the side of the controlling shareholder are more likely to be receivers than providers. However, both providers and receivers are more frequent in the lower ranks of pyramids; therefore the tunneling motivation appears to be important only in the margin. We also study the impact of intra-group loans on investment and dividend payments. We observe significant effects in fixed investment, as receivers have higher fixed investment than other firms. We do not find strong evidence of intra-group loans affecting dividend payments in firms providing or receiving loans.

One potential area of future research is the interplay between internal capital markets and external capital markets. Understanding which firms get external financing within the group, and how the group subsequently allocates these funds can certainly improve our understanding of internal capital markets. In a similar way, understanding how providers of funds prevent business groups from doing this, i.e., by setting up covenants and guarantees, can shed some light on the functioning of capital markets in a host of similar countries.

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Table 1
Sample of Loans

This table reports loan terms for a random sample of pair of firms. The loan terms are obtained from the annual reports, while loan sizes are taken from Superintendencia de Valores y Seguros (SVS).

Firm Names	Main Industry	Year	Terms of the Loan
Emel & Eliqsa	Electricity	2001	Long term loan. Annual interest rate 6.76%. Loan size: MMCLP\$8,450 (MMUS\$12.6)
Emel & Elecda	Electricity	2001	Long term loan. Annual interest rate 6.76%. Loan size: MMCLP\$11,303 (MMUS\$16.9)
Quiñenco & Madeco	Manufacturing	2001	Long term loan. Annual interest rate 6.76%. Loan size: MMCLP\$5,303 (MMUS\$7.9)
CCU & San Pedro	Beverage products	2002	Short term loan. Annual interest rate TAB* + 0.35. Loan size: MMCLP\$5,917 (MMUS\$8.4)
Enersis & Chilectra	Electricity	2005	Three long term loans. Annual interest rate 6.41%, 6.48% and 1.74%. Loan size: MMCLP\$151,372 (MMUS\$294.3)
San Pedro & Fosforos	Beverage products	2008	Short term loan. Annual interest rate CPI + 3.55%. Loan size: MMCLP\$1,173 (MMUS\$1.8)
Nortegrande & Oroblanco	Mining	2008	Short term loan. Annual interest rate 7%. Loan size: MMUS\$59
Quemchi & Navarino	Transportation	2001	Long term loan. Annual interest rate 5.01%. Loan size: MMCLP\$762 (MMUS\$1.1)
		2009	Long term loan. Market interest rate. Loan size: MMCLP\$7,463 (MMUS\$14.9)

* The TAB is a fixed-rate equivalent to the Libor for Chile.

Table 2
Summary Statistics for Main Variables

This table reports aggregate summary statistics for total net loans, short term net loans, long term net loans (all over total assets), cash flow rights, PPE over total assets, the natural logarithm of total assets, EBIT over total assets and Tobin's Q. Short-term is defined as loans due in one year or less, while long-term is defined as loans due in more than one year. All variables except for cash flow rights are winsorized at the 1% level. The sample covers non-financial Chilean firms in pyramidal business groups from 1990 to 2009. Data are taken from Economatca, Fecus Plus, and Superintendencia de Valores y Seguros (SVS).

	Number of Observations	Mean	Standard Deviation	25th Percentile	Median	75th Percentile
Net Loans / Total Assets	1187	1.6%	13.3%	-0.8%	0.4%	3.9%
Net Loans S-T / Total Assets	1187	1.3%	7.1%	-0.4%	0.2%	2.0%
Net Loans L-T / Total Assets	1187	0.2%	9.7%	0.0%	0.0%	0.2%
Cash Flow Rights	1243	48%	23%	32%	47%	64%
PPE / Total Assets	1187	27%	30%	0%	16%	50%
Ln (Total Assets)	1187	18.83	1.57	17.78	18.75	19.95
EBIT / Total Assets	1154	4.6%	7.5%	-0.2%	2.0%	8.3%
Tobin's Q	1134	1.27	0.78	0.79	1.08	1.54

Table 3
Evolution of Average Net Loans in Time

This table reports the evolution of the mean of total net loans, short-term net loans and long-term net loans, all over total assets. Short-term is defined as loans due in one year or less, while long-term is defined as loans due in more than one year. Net loans over total assets are winsorized at the 1% level. The sample covers non-financial Chilean firms in pyramidal business groups from 1990 to 2009. Data are taken from Economatica, Fecus Plus, and Superintendencia de Valores y Seguros (SVS).

Year	Net Loans / Total Assets		
	All	Short-Term	Long-Term
1990	1.87%	0.76%	1.11%
1991	1.78%	0.94%	0.84%
1992	1.86%	1.04%	0.82%
1993	1.30%	0.58%	1.14%
1994	0.51%	1.24%	-0.31%
1995	0.95%	0.29%	0.67%
1996	1.02%	0.26%	0.56%
1997	2.14%	0.71%	1.09%
1998	3.27%	1.41%	1.51%
1999	0.21%	0.57%	-0.62%
2000	3.72%	3.14%	0.49%
2001	1.27%	1.53%	-0.26%
2002	0.40%	1.50%	-1.12%
2003	-0.17%	0.82%	-0.81%
2004	0.74%	0.84%	-0.10%
2005	1.22%	1.01%	0.17%
2006	2.13%	2.09%	-0.14%
2007	2.22%	2.43%	-0.42%
2008	3.05%	2.32%	0.65%
2009	2.39%	0.83%	1.56%
Total	1.58%	1.30%	0.23%

Table 4
Summary Statistics for Providers and Receivers

This table reports summary statistics for provider and receivers at different terms. We define net provider as a dummy variable that identifies with 1 those firm-year observations with more than 5% of net loans over total assets, while net receiver is defined as a dummy variables that identifies with 1 those firm-year observations with less than -5% of net loans over total assets. We divide net providers and net receivers by the term of loans: all refers to all loans, short-term is defined as loans due in one year or less, while long-term is defined as loans due in more than one year. Panel A presents frequency for providers and receivers dummies in the whole pyramid and at different layers of the pyramid. Panel B reports average total net loans, short-term net loans, and long-term net loans, all over total assets. All variables except for cash flow rights are winsorized at the 1% level. The sample covers non-financial Chilean firms in pyramidal business groups from 1990 to 2009. Data are taken from Economatica, Fecus Plus, and Superintendencia de Valores y Seguros (SVS).

	All		Short-Term		Long-Term	
	Net Provider	Net Receiver	Net Provider	Net Receiver	Net Provider	Net Receiver
Panel A: Frequency						
All Firms	20.7%	12.2%	12.5%	7.5%	10.1%	8.4%
In Position 1 of Pyramids	22.0%	6.8%	7.4%	3.7%	15.5%	3.1%
In Position 2 of Pyramids	16.2%	14.4%	10.8%	8.1%	7.3%	12.7%
In Position 3 of Pyramids	34.8%	12.9%	22.9%	7.0%	13.4%	10.0%
In position 4 or more of Pyramids	29.5%	34.6%	28.2%	30.8%	14.1%	10.3%
Panel B: Average Net Loans						
Net Loans / Total Assets	17.6%	-19.5%	16.8%	-16.7%	19.4%	-20.8%
Net Loans S-T / Total Assets	8.5%	-6.0%	14.4%	-10.9%	2.0%	-0.9%
Net Loans L-T / Total Assets	8.5%	-12.8%	1.6%	-5.2%	17.2%	-19.5%

Table 5
Differences in Means of Characteristics for Providers and Receivers

This table reports mean and t-test statistics for the difference in means between provider and receivers at different terms. We define net provider as a dummy variable that identifies with 1 those firm-year observations with more than 5% of net loans over total assets, while net receiver is defined as a dummy variable that identifies with 1 those firms-year observations with less than -5% of net loans over total assets. We divide net providers and net receivers by the term of loans: all refers to all loans, short-term is defined as loans due in one year or less, while long-term is defined as loans due in more than one year. Statistics are presented for cash flow rights, PPE over total assets, the natural logarithm of total asset, EBIT over total assets and Tobin's Q. All variables except for cash flow rights are winsorized at the 1% level. The sample covers non-financial Chilean firms in pyramidal business groups from 1990 to 2009. Data are taken from Economatica, Fecus Plus, and Superintendencia de Valores y Seguros (SVS).

	All			Short-Term			Long-Term		
	Net Provider	Net Receiver	t-test	Net Provider	Net Receiver	t-test	Net Provider	Net Receiver	t-test
Cash Flow Rights	0.41	0.51	***	0.39	0.44	*	0.42	0.60	***
PPE / Total Assets	0.20	0.40	***	0.22	0.33	***	0.16	0.47	***
Ln (Total Assets)	19.28	18.55	***	19.16	18.33	***	19.57	18.72	***
EBIT / Total Assets	0.03	0.07	***	0.04	0.06	***	0.02	0.08	***
Tobin's Q	1.24	1.45	***	1.34	1.45		1.19	1.51	***

*** p<0.01, ** p<0.05, * p<0.1

Table 6
OLS Regressions for Net Loans

Firm fixed effect panel regressions for net loans over total assets on the cash flow rights, PPE over total assets, the natural logarithm of total asset, EBIT over total assets and Tobin's Q. Short-term is defined as loans due in one year or less, while long-term is defined as loans due in more than one year. All variables except for cash flow rights are winsorized at the 1% level. All regressions include year dummies and standard errors are clustered at a firm level. The sample covers non-financial Chilean firms in pyramidal business groups from 1990 to 2009. Data are taken from Economática, Fecus Plus, and Superintendencia de Valores y Seguros (SVS).

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	All	Short-Term	Long-Term	All	Short-Term	Long-Term
	Net Loans / Total Assets					
Cash Flow Rights	-0.108 (0.074)	-0.022 (0.036)	-0.077 (0.047)	-0.165* (0.090)	-0.026 (0.025)	-0.131* (0.071)
PPE / Total Assets	-0.098*** (0.036)	-0.016 (0.018)	-0.078*** (0.023)	-0.170*** (0.064)	-0.027 (0.026)	-0.135** (0.052)
Ln(Total Assets)	0.009 (0.007)	0.004 (0.003)	0.004 (0.006)	0.039** (0.019)	-0.003 (0.008)	0.040** (0.016)
EBIT / Total Assets	-0.145 (0.162)	-0.033 (0.088)	-0.096 (0.100)	0.215 (0.154)	0.061 (0.099)	0.144 (0.125)
Tobin's Q	0.000 (0.013)	0.003 (0.008)	-0.004 (0.007)	-0.020* (0.011)	-0.002 (0.008)	-0.017** (0.007)
Observations	1,051	1,051	1,051	1,051	1,051	1,051
Number of Firms	86	86	86	86	86	86
R-squared	0.117	0.038	0.116	0.611	0.497	0.546
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effect	No	No	No	Yes	Yes	Yes

Robust standard errors clustered by firm in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7**Probit and Ordered Probit Regressions for Providers and Receivers**

This table presents probit and order probit regressions. In the case of the probit our dependent variables are net provider, which is a dummy variable that identifies with 1 those firm-year observations with more than 5% of net loans over total assets and net receiver, defined as a dummy variable that identifies with 1 those firm-year observations with less than -5% of net loans over total assets. In the case of the order probit our dependent variable takes the number of 1 if is a net receiver, a number of 2 if it is neither a net receiver nor a net provider, and 3 if it is a net provider. We divide net providers and net receivers by the term of loans: all refers to all loans, short-term is defined as loans due in one year or less, while long-term is defined as loans due in more than one year. Our set of controls are cash flow rights, PPE over total assets, the natural logarithm of total asset, EBIT over total assets and Tobin's Q. All regressions include year dummies and standard errors are robust. All variables except for cash flow rights are winsorized at the 1% level. The sample covers non-financial Chilean firms in pyramidal business groups from 1990 to 2009. Data are taken from Economatica, Fecus Plus, and Superintendencia de Valores y Seguros (SVS).

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Net Provider			Net Receiver			Order Probit		
	All	Short-Term	Long-Term	All	Short-Term	Long-Term	All	Short-Term	Long-Term
Cash Flow Rights	-1.202*** (0.219)	-1.255*** (0.248)	-0.665** (0.274)	0.162 (0.260)	-0.945*** (0.297)	1.781*** (0.307)	-0.828*** (0.195)	-0.329 (0.213)	-1.088*** (0.206)
PPE / Total Assets	-0.608*** (0.181)	-0.485** (0.203)	-0.600*** (0.214)	0.627*** (0.190)	-0.024 (0.217)	1.403*** (0.214)	-0.602*** (0.140)	-0.201 (0.147)	-0.949*** (0.155)
Ln(Total Assets)	0.086*** (0.031)	0.015 (0.032)	0.140*** (0.040)	-0.081** (0.035)	-0.177*** (0.041)	0.061 (0.041)	0.084*** (0.025)	0.079*** (0.026)	0.077** (0.030)
EBIT / Total Assets	-0.572 (0.980)	-0.402 (0.981)	-1.394 (1.275)	0.553 (0.953)	0.522 (1.059)	0.431 (1.121)	-0.683 (0.786)	-0.630 (0.864)	-0.845 (0.892)
Tobin's Q	0.076 (0.070)	0.143* (0.074)	0.080 (0.076)	0.153** (0.072)	0.161** (0.077)	0.258*** (0.082)	-0.026 (0.064)	0.014 (0.072)	-0.073 (0.069)
Observations	1,093	1,093	1,093	1,069	1,093	1,045	1,093	1,093	1,093

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8
Loan Connections

This table reports the evolution of the average number of loan connections and the creation and destruction of loan connections. A connection is defined as a net loan balance greater than zero for a pair of public firms inside a pyramid. The sample covers non-financial Chilean firms in pyramidal business groups from 2001 to 2009. Data are taken from Superintendencia de Valores y Seguros (SVS).

Year	Number of Loan Connections			Creation/Destruction of Loan Connections		
	Mean	Min	Max	Mean	Min	Max
2001	2.19	1	7	.	.	.
2002	2.30	1	10	0.51	0	6
2003	2.23	1	7	0.47	0	4
2004	2.06	1	5	0.41	0	2
2005	1.94	1	6	0.49	0	3
2006	1.86	1	6	0.57	0	4
2007	1.80	1	6	0.42	0	3
2008	1.97	1	8	0.57	0	6
2009	1.73	1	5	0.43	0	2
All	2.02	1	10	0.49	0	6

Table 9**Means for Net Loans and Differences in Firm Characteristics for Firm-Pair Balances**

This table reports mean and t-test statistics for the difference in means between firm pairs in the same industry and firm pairs in different industries. Statistics are presented for total net loans, short term net loans and long term net loans over total assets, difference of cash flow rights, difference of PPE over total assets, difference of the natural logarithm of total asset, difference of EBIT over total assets and difference of Tobin's Q. Short-term is defined as loans due in one year or less, while long-term is defined for loans due in more than one year. All variables except from net loans and cash flow rights are winsorized at the 1% level. Same Industry indicates that both firms have the same four digit industry code. The sample covers non-financial Chilean firms in pyramidal business groups from 2001 to 2009. Data are taken from Economática, Fecus Plus, and Superintendencia de Valores y Seguros (SVS).

	All	Same Industry	Different Industry	t-test
Panel A: Average Net Loans				
Net Loans (All) / Total Assets	2.4%	3.5%	1.3%	**
Net Loans (S-T)/ Total Assets	0.9%	1.0%	0.8%	
Net Loans (L-T) / Total Assets	1.6%	2.7%	0.6%	***
Panel B: Differences in Firm Characteristics				
Δ Cash Flow Rights	3.0%	3.7%	2.3%	
Δ PPE / Total Assets	-12.3%	-11.7%	-12.9%	
Δ Ln (Total Assets)	0.273	0.153	0.391	
Δ EBIT / Total Assets	-1.9%	-1.2%	-2.6%	**
Δ Tobin's Q	-0.055	-0.028	-0.081	

Table 10

OLS Regressions for Net Loans in Firm-Pair Balances

OLS regressions for net loans in firms-pair balances over total assets on the difference of total assets, the difference of cash flow rights, the difference of PPE over total assets, the difference of the natural logarithm of total asset, the difference of EBIT over total assets and the difference of Tobin's Q. We divide net loans by their term: all refers to all loans, short-term is defined as loans due in one year or less, while long-term is defined as loans due in more than one year. All variables except from net loans and cash flow rights are winsorized at the 1% level. Same Industry is a dummy variable that identifies with 1 those firm-pair observations in which both firms belong to the same four digit industry code. All regressions include year dummies and standard errors are robust. The sample covers non-financial Chilean firms in pyramidal business groups from 2001 to 2009. Data are taken from Economatica, Fecus Plus, and Superintendencia de Valores y Seguros (SVS).

Panel A: Excluding Pairs of Firms with Net Loans equal to zero.						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Net Loans (All) / Total Assets	Net Loans (S-T) / Total Assets	Net Loans (L-T) / Total Assets	Net Loans (All) / Total Assets	Net Loans (S-T) / Total Assets	Net Loans (L-T) / Total Assets
Δ Cash Flow Rights	-0.014 (0.020)	0.009** (0.004)	-0.300* (0.152)	0.002 (0.005)	0.001 (0.002)	0.076** (0.035)
Δ PPE / Total Assets	-0.082*** (0.022)	-0.021** (0.008)	-0.160*** (0.051)	-0.021*** (0.006)	-0.001 (0.003)	-0.057*** (0.016)
Δ Ln (Total Assets)	-0.004 (0.002)	-0.002** (0.001)	-0.012 (0.009)	0.001 (0.001)	0.000 (0.000)	0.004 (0.006)
Δ EBIT / Total Assets	0.192 (0.134)	0.063* (0.034)	0.428 (0.381)	0.008 (0.024)	0.016 (0.016)	0.079 (0.161)
Δ Tobin's Q	0.008 (0.015)	0.001 (0.001)	0.031 (0.035)	-0.003 (0.003)	-0.001 (0.001)	-0.055** (0.027)
Same Industry				0.020** (0.010)	-0.008*** (0.003)	0.129*** (0.019)
Same Industry × Δ Cash Flow Rights				-0.121* (0.064)	0.030*** (0.012)	-0.934*** (0.146)
Same Industry × Δ PPE / Total Assets				-0.154*** (0.053)	-0.041** (0.017)	-0.309** (0.124)
Same Industry × Δ Ln (Total Assets)				-0.008* (0.005)	-0.004*** (0.001)	-0.019** (0.009)
Same Industry × Δ EBIT / Total Assets				0.440* (0.233)	0.079 (0.066)	0.507* (0.295)
Same Industry × Δ Tobin's Q				0.017 (0.020)	0.003 (0.003)	0.106*** (0.029)
Observations	481	464	102	481	464	102
R-squared	0.125	0.097	0.302	0.249	0.182	0.583
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 10
(Cont.)

Panel B: Including Pairs of Firms with Net Loans equal to zero.						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Net Loans (All) / Total Assets	Net Loans (S-T) / Total Assets	Net Loans (L-T) / Total Assets	Net Loans (All) / Total Assets	Net Loans (S-T) / Total Assets	Net Loans (L-T) / Total Assets
Δ Cash Flow Rights	-0.002 (0.004)	0.001** (0.001)	-0.003 (0.004)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)
Δ PPE / Total Assets	-0.020*** (0.006)	-0.004** (0.002)	-0.016*** (0.006)	-0.005*** (0.001)	-0.001 (0.000)	-0.004*** (0.001)
Δ Ln (Total Assets)	0.000 (0.001)	-0.000** (0.000)	0.000 (0.001)	0.000*** (0.000)	-0.000 (0.000)	0.000*** (0.000)
Δ EBIT / Total Assets	0.053** (0.026)	0.015** (0.007)	0.038 (0.026)	-0.001 (0.004)	-0.000 (0.002)	-0.001 (0.004)
Δ Tobin's Q	0.003 (0.003)	0.000* (0.000)	0.002 (0.003)	-0.000* (0.000)	-0.000 (0.000)	-0.000 (0.000)
Same Industry				0.009* (0.005)	-0.003** (0.001)	0.011** (0.005)
Same Industry × Δ Cash Flow Rights				-0.052* (0.031)	0.006 (0.005)	-0.058* (0.034)
Same Industry × Δ PPE / Total Assets				-0.116*** (0.040)	-0.025** (0.011)	-0.091** (0.041)
Same Industry × Δ Ln (Total Assets)				-0.005* (0.003)	-0.002*** (0.001)	-0.003 (0.003)
Same Industry × Δ EBIT / Total Assets				0.279* (0.165)	0.064 (0.041)	0.215 (0.176)
Same Industry × Δ Tobin's Q				0.007 (0.015)	0.001 (0.001)	0.006 (0.015)
Observations	1,434	1,434	1,434	1,434	1,434	1,434
R-squared	0.034	0.026	0.026	0.150	0.094	0.113
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11
Heckit Regressions for Firm-Pair Balances

Heckit two step regressions for net loans in firms-pair balances over total assets on the difference of total assets, the difference of cash flow rights, the difference of PPE over total assets, the difference of the natural logarithm of total asset, the difference of EBIT over total assets, and the difference of Tobin's Q. Short-term is defined as loans due in one year or less, while long-term is defined as loans due in more than one year. In column (1) and (2) we run a common first step for all firms, while in columns (3) and (4) we run the first step for each pyramid. All variables from net loans and cash flow rights are winsorized at the 1% level. Same Industry is a dummy variable that identifies with 1 those firm-pair observations in which both firms belong to the same four digit industry code. All regressions include year dummies. The sample covers non-financial Chilean firms in pyramidal business groups from 2001 to 2009. Data are taken from Economática, Fecus Plus, and Superintendencia de Valores y Seguros (SVS).

	(1)	(2)	(3)	(4)
	Net Loans / Total Assets			
Δ Cash Flow Rights	-0.007 (0.015)	0.004 (0.019)	-0.014 (0.013)	0.002 (0.003)
Δ PPE / Total Assets	-0.073*** (0.011)	-0.019 (0.014)	-0.020*** (0.006)	-0.011** (0.005)
Δ Ln (Total Assets)	-0.003 (0.002)	0.001 (0.003)	-0.003 (0.002)	0.000 (0.000)
Δ EBIT / Total Assets	0.161*** (0.054)	0.013 (0.072)	0.067*** (0.024)	0.039* (0.023)
Δ Tobin's Q	0.008* (0.005)	-0.004 (0.008)	-0.006 (0.006)	-0.001 (0.002)
Same Industry		0.010 (0.007)		0.007 (0.004)
Same Industry × Δ Cash Flow Rights		-0.077** (0.033)		-0.046 (0.040)
Same Industry × Δ PPE / Total Assets		-0.136*** (0.023)		-0.025 (0.016)
Same Industry × Δ Ln (Total Assets)		-0.004 (0.004)		-0.007* (0.004)
Same Industry × Δ EBIT / Total Assets		0.343*** (0.102)		0.041 (0.057)
Same Industry × Δ Tobin's Q		0.018* (0.010)		-0.010 (0.012)
Constant	0.004 (0.014)	-0.011 (0.015)	0.009*** (0.003)	0.005 (0.004)
Observations	1,434	1,434	411	411
Year FE	Yes	Yes	Yes	Yes

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 12
OLS Regressions for Firm Investment

Firm fixed effect panel regressions for firm investment on net provider and net receiver dummies at different terms, cash flow rights, PPE over total assets, the natural logarithm of total asset, EBIT over total assets and Tobin's Q. Investment in fixed assets (non-fixed assets) is defined as change in fixed assets (non-fixed assets) over the lag of total assets. Short-term is defined as loans due in one year or less, while long-term is defined as loans due in more than one year. All variables except for cash flow rights are winsorized at the 1% level. All regressions include year dummies and standard errors are clustered at a firm level. The sample covers non-financial Chilean firms in pyramidal business groups from 1990 to 2009. Data are taken from Economatica, Fecus Plus, and Superintendencia de Valores y Seguros (SVS).

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Investment in Fixed Assets				Investment in Non-Fixed Assets			
Net Provider	-0.008*		-0.013**		0.007		0.016	
	(0.004)		(0.006)		(0.015)		(0.021)	
Net Receiver		0.018***		0.022***		0.010		-0.007
		(0.005)		(0.007)		(0.018)		(0.027)
Cash Flow Rights	0.001	0.003	0.030	0.022	0.024	0.021	0.124	0.125
	(0.010)	(0.010)	(0.021)	(0.020)	(0.033)	(0.032)	(0.087)	(0.092)
PPE / Total Assets	0.012	0.011	-0.062**	-0.064**	-0.045**	-0.047**	0.255***	0.252***
	(0.013)	(0.013)	(0.028)	(0.026)	(0.022)	(0.023)	(0.065)	(0.065)
Ln (Total Assets)	-0.003*	-0.002*	-0.013*	-0.013*	0.001	0.001	-0.118**	-0.116**
	(0.001)	(0.001)	(0.008)	(0.007)	(0.005)	(0.005)	(0.048)	(0.048)
EBIT / Total Assets	0.059	0.058	0.064	0.078	-0.120	-0.123	-0.074	-0.081
	(0.064)	(0.064)	(0.104)	(0.100)	(0.176)	(0.175)	(0.214)	(0.216)
Tobin's Q	0.008**	0.007**	0.007	0.006	0.007	0.007	0.028*	0.028*
	(0.004)	(0.003)	(0.005)	(0.005)	(0.013)	(0.013)	(0.015)	(0.015)
Observations	1,051	1,051	1,051	1,051	1,051	1,051	1,051	1,051
Number of Firms	86	86	86	86	86	86	86	86
R-squared	0.111	0.120	0.238	0.245	0.084	0.084	0.229	0.229
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effect	No	No	Yes	Yes	No	No	Yes	Yes

Robust standard errors clustered by firm in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 13**Probit and Tobit Regressions for Dividends**

This table presents Probit (Tobit) regressions for high dividends (extraordinary dividends) on net provider/receiver dummies, cash flow rights, PPE over total assets, the natural logarithm of total asset, EBIT over total assets and Tobin's Q. Extraordinary dividends for the probit model is defined as dummy variable that takes the value of 1 when the firm pays more than 30% of dividends over profits of the past year, otherwise is zero. Extraordinary dividends for the tobit model is defined as dividends over total assets for those firms that pays more than 30% of dividends over profits of the past year and zero for the rest. All variables except for cash flow rights are winsorized at the 1% level. All regressions include year dummies and standard errors are robust. The sample covers non-financial Chilean firms in pyramidal business groups from 1990 to 2009. Data are taken from Economatica, Fecus Plus, and Superintendencia de Valores y Seguros (SVS).

VARIABLES	(1)	(2)	(3)	(4)
	Probit Extraordinary Dividends		Tobit Extraordinary Dividends / Total Assets	
Net Provider	0.114 (0.111)		0.004 (0.007)	
Net Receiver		0.188 (0.143)		0.013* (0.008)
Cash Flow Rights	0.638*** (0.199)	0.594*** (0.198)	0.035*** (0.011)	0.032*** (0.010)
PPE / Total Assets	-0.164 (0.197)	-0.200 (0.197)	-0.028*** (0.010)	-0.030*** (0.010)
Ln(Total Assets)	0.138*** (0.032)	0.143*** (0.032)	-0.004* (0.002)	-0.004* (0.002)
EBIT / Total Assets	10.170*** (1.451)	10.103*** (1.439)	0.552*** (0.070)	0.549*** (0.070)
Tobin's Q	0.181 (0.120)	0.181 (0.117)	0.034*** (0.008)	0.034*** (0.008)
Observations	1,093	1,093	1,093	1,093
Year Fixed Effect	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 14
Equity

This table shows frequency of net provider at different terms when there is an equity issuance in the previous year and when there are no equity issuance. We define net provider as a dummy variable that identifies with 1 those firm-year observations with more than 5% of net loans over total assets, while net receiver is defined as a dummy variable that identifies with 1 those firm-year observations with less than -5% of net loans over total assets. We divide net providers and net receivers by the term of loans: all refers to all loans, short-term is defined as loans due in one year or less, while long-term is defined as loans due in more than one year. The sample covers non-financial Chilean firms in pyramidal business groups from 1990 to 2009. Data are taken from Economatica, Fecus Plus, and Superintendencia de Valores y Seguros (SVS).

	Equity Issuance (Obs: 172)	Non-Equity Issuance (Obs: 1040)	Differential
	Mean	Mean	
Net Provider	25%	20%	5%*
Net Provider S-T	17%	12%	6%**
Net Provider L-T	10%	10%	0%

*** p<0.01, ** p<0.05, * p<0.1

Figure 1
Net Loans Definition



