The Evolution of Ownership Structures: Privatization, Business Groups, and Pyramids*

Felipe Aldunate Felipe González Mounu Prem Francisco Urzúa I.†

Abstract What is the contribution of government policies to the formation of business groups and pyramids? We use new data to study how Pinochet's privatizations in Chile (1973-1990) affected the evolution of ownership structures. Using non-privatized firms in the same industry as comparison, and accounting for pre-privatization characteristics, we find that privatized firms were more likely to become part of business groups, began to act as providers of credit within groups, and pyramidal ownership structures were built on top of them. As most privatized firms became part of new (instead of traditional) business groups we argue that this privatization reform facilitated the renovation of elites and contributed to the formation of contemporaneous business groups.

Keywords business groups, privatization, ownership.

*October 2019. We would like to thank Emanuele Colonnelli, José Díaz, Andrew Ellul, Eric Hilt, Borja Larraín, Pablo Muñoz, Paola Sapienza, Martín Rossi, Giorgo Sertsios, Rodrigo Soares, Juan F. Vargas, Eduardo Walker, and Yishay Yafeh for comments and suggestions. Jorge Araya and Pablo Valenzuela provided excellent research assistantship. Aldunate acknowledges funding from Proyecto Fondecyt Iniciación #11160874 and González acknowledges funding from Proyecto Fondecyt Iniciación #11170258.

†Aldunate: Pontificia Universidad Católica de Chile, Escuela de Administración. González: Pontificia Universidad Católica de Chile, Instituto de Economía. Prem: Universidad del Rosario, Department of Economics. Urzúa: City University of London, Cass Business School.

1 Introduction

Business groups and pyramidal ownership structures are prevalent across the world, affecting the performance of firms, their internal capital and labor markets, tunneling activities, and contributing to the formation of corporate empires.[1] Given their importance, scholars have studied these ownerships since at least the beginning of the twentieth-century (Berle and Means, 1932). Moreover, theoretical work studying conditions that facilitate the formation of groups and pyramids exists (Almeida and Wolfenzon, 2006), yet it is somewhat surprising that empirical work pointing to specific factors facilitating their appearance is almost non-existent. Authors have studied why business groups disappear (Kandel et al., 2018) and how groups grow and evolve over time (Almeida et al., 2011; Colpan and Hikino, 2018), but econometric evidence showing the conditions or factors underlying the *appearance* of these ownership structures remains elusive. One of the reasons for the lack of evidence is the challenging data requirements. To study the origins of groups and pyramids we need to observe firm ownership over an extended period of time and examine critical factors that could generate opportunities for these to emerge.

This paper uses newly collected firm-level data to show that the origins of business groups and pyramids in modern democratic Chile can be traced back to the privatization process implemented in the 1970s and 1980s. To the best of our knowledge this is the first paper to *empirically* document a relationship between privatization, business groups, and pyramids. In Khanna and Yafeh (2007) the authors also point out that government policies – such as a privatization reform – might explain the origins of groups in China, Japan, Malaysia, and Russia, among many others. Relatedly Morck and Nakamura (2007) argue that privatization reforms can be historical circumstances that facilitate a "big push" coordinated by the private sector through business groups and pyramids. However, this and related work consist mostly of case studies and systematic evidence is lacking. Our primary contribution is to econometrically test if privatizations lead to the formation of business groups and pyramids. In doing so, we highlight how government policies contribute to the replacement of traditional business groups.

The privatization process we study took place in the context of the Pinochet dictatorship

[1] A business group is defined as a set of firms with a common controlling shareholder. Examples of papers studying the effects of business groups include Khanna and Palepu (2000); Johnson et al. (2000); Bertrand et al. (2002); Bae et al. (2002); Morck et al. (2005); Baek et al. (2006); Cheung et al. (2006); Gopalan et al. (2007); Belenzon and Berkovitz (2010); Almeida et al. (2011); Masulis et al. (2011); Belenzon et al. (2013); Lins et al. (2013); Almeida et al. (2015); Huneeus et al. (2018); Larrain et al. (2018); Cestone et al. (2018); Buchuk et al. (2019). Pyramidal ownership structures allow shareholders to control other firms indirectly (Bertrand and Mullainathan, 2003) and their presence is common outside of the United States (La Porta et al., 1999). Colli and Colpan (2015) offers a thorough review.

(1973-1990), after the socialist government of Salvador Allende (1970-1973) nationalized a large number of firms. At the time Chile was a developing country in the civil law tradition where business groups were relatively common. In 1970 little more than 20% of publicly traded firms were affiliated to business groups (Salvaj and Couyoumdjian, 2016). In 1990, however, group affiliation jumped to 70% of publicly traded firms. Our analysis reveals that Pinochet's privatizations contributed to this rise. We show that new pyramidal ownership structures and business groups were built on top of privatized firms, and these firms began to acted as providers of credit within groups. As most privatized firms contributed to the formation of *new* business groups – instead of being bought by *traditional* groups – we argue that Pinochet's privatization facilitated the renovation of elites and shaped contemporaneous business groups.

The empirical analysis uses new data of listed firms observed over four decades (1970-2005). We digitized this information from the archives of the regulatory agency in charge of collecting annual reports with firms' activities. Besides balance sheets, income statements, and other information, we recovered firm ownership at different points in time. Additionally, we identified firms that were privatized during the 1970s and 1980s, together with information about the buyers of these firms. Privatization reforms are often plagued by poor implementation (Fisman and Wang, 2014) and Chile is not different (González et al., 2020). Hence, to account for heterogeneity in the implementation of this policy we classified firms into those sold to buyers that worked for Pinochet and other "politically unconnected" buyers. Our econometric strategy is to then compare the evolution of business ownership between privatized and non-privatized firms within the same industry after adjusting for firm-level differences in the years that preceded each corresponding privatization.

Besides showing that privatized firms were more likely to become part of business groups after the transition to democracy in 1990, we also study the formation of pyramidal ownership structures (Bertrand and Mullainathan, 2003). Pyramids did not exist in 1970 Chile, these appeared in the 1990s. We find that pyramids were built bottom-up, i.e. controlling shareholders listed firms holding shares in the privatized firm. This result is at odds with Almeida and Wolfenzon (2006) model on the top-down emergence of pyramids thanks to the retained earnings of firms. It is also at odds with recent evidence on pyramidal structures in Europe's private firms (Bena and Ortiz-Molina, 2013). Instead, we observe that in our context pyramids facilitate fund raising in the privatized firm without losing control.

We also explore whether the type of privatization – i.e. connected vs. unconnected – played a role in pyramidal formation. Firms sold to connected buyers were twice more likely to be

controlled using pyramidal structures in the 1990s than firms sold to unconnected buyers. Similarly, connected firms also had a higher difference between voting and cash flow rights. As with group affiliation, pyramidal structures were very resilient, showing little signs of unravelling even though significant legislation preventing corporate abuses and capital markets development was implemented and enforced during our sample period.

After documenting how business groups and pyramids were affected by the privatization process, we study the performance of these firms and their role within their corresponding groups. To measure the latter we focus on internal capital markets and construct two indicators following Buchuk et al. (2014). The first takes the value of one for firms that provide credit within the group, and the second equals one for firms who receive credit. If privatized firms had lower performance and provided capital in the group, the evidence would suggest that minority shareholders were being expropriated. Such result would lend support to the idea that groups are parasites (Khanna and Yafeh, 2007). We find, however, this not to be the case. Firm performance is lower only among firms sold to connected buyers – but the difference is not always statistically significant – and only these firms became providers of capital. These results suggest that business groups could be parasites or paragons, depending on how they were created. This is important as it shows that, if we want to understand whether business groups create value, we need to understand their origins.

All results are robust to a wide range of empirical exercises. Results are similar when we use three different matching estimators providing arguably better comparisons than ordinary least squares (Dehejia and Wahba, 2002; Crump et al., 2009). Importantly, results are also similar when we use historical data to control for group affiliation in 1970, when we drop from the estimating sample the few firms which experienced takeovers, and when we include additional listed firms to increase the size of the comparison group. Finally, we reach the same conclusions when we employ a coefficient stability method that provides estimates which are adjusted for the role of potentially relevant unobservable variables (Altonji et al., 2005; Oster, 2019).

Our paper is related to the literature studying the evolution of business groups and pyramidal ownership. Empirical research studying the origins of business groups is scarce, but the literature studying their evolution, growth, and disappearance is more developed. A key contribution is Kandel et al. (2018) who show how groups disappeared in the U.S. because of government policies and anti-big business sentiments. Theoretically a business group can appear as a consequence of market underdevelopment or market imperfections (Leff, 1978; Almeida and Wolfenzon, 2006), institutional voids (Khanna and Yafeh, 2007), economic circumstances combined

with managerial capabilities (Guillén, 2000), or targeted policies (Morck and Nakamura, 2007; Schneider, 2010). In contrast, pyramids might arise because of advantages derived from internal capital markets within groups (Bena and Ortiz-Molina, 2013) and portfolio diversification (Manikandan and Ramachandran, 2015). Case studies analyzing what factors might affect the evolution of groups are more common. Previous research emphasizes the importance of vertical versus horizontal group growth as a function of firms' previous profitability (Almeida et al., 2011) and point to case studies of East asian economies (Carney and Child, 2013), the Koç group in Turkey (Colpan and Jones, 2015), and British merchants (Jones, 2000), among others. In the case of Chile, Larrain and Urzúa (2016) find that over a 20 year period with deep economic transformations, the structure and characteristics of Chilean business groups remained unchanged.

We contribute to this literature by studying the origins of business groups and pyramidal ownership after a large privatization. Our results support descriptive evidence gathered by Khanna and Yafeh (2007) which suggests that government policies are behind the origins of groups in many countries around the world. Privatized firms in Chile were more likely to belong to a business group, and firms sold to buyers connected to the government were more likely to be placed at the bottom of pyramids. Also consistent with Franks et al. (2011) and Larrain and Urzúa (2016) we report evidence of persistence in the ownership results; we find that in 2005, after fifteen years of ruling by a democratically elected center left coalition which was very critical of the dictatorship' policies, the ownership differences remain. We also show that most privatized firms became part of new (instead of traditional) business groups. Hence, we argue that the privatization reform facilitated the renovation of elites and contributed to the formation of contemporaneous business groups, similar to processes unfolded in Japan, Russia, and South Africa, among others (Khanna and Yafeh, 2007).

Finally, we also contribute to the literature that studies the consequences of privatization reforms. Although the traditional literature focused mostly on changes in productivity after a privatization, more recent research emphasizes that *how* this policy is implemented is key to understand their effects.[2] In a seminal paper, Fisman and Wang (2014) find that privatization had a positive effect on the operating performance of Chinese firms, except when privatizations were corrupt. The authors link the lower performance to the existence of value destroying related party transactions. Similarly, Black et al. (2000) argue that the massive Russian privatization

[2]Prominent examples in the traditional literature include Barberis et al. (1996); La Porta and López-de-Silanes (1999); D'Souza and Megginson (1999) and Frydman et al. (1999), among others. See Megginson and Netter (2001) and Estrin et al. (2009) for surveys of this literature.

program resulted in widespread expropriation through self-dealing by the new owners. Other research also emphasizes that privatization might be used as a policy to increase political support (Bel, 2010) or to create political corporations that are instrumental to gain or retain economic power (González et al., 2020). We contribute to this literature by showing that privatizations can help to create business groups, and that pyramids are built on top of privatized firms.

2 Business groups and privatization in Chile

Business groups have been important in Chilean history. Both external and internal economic and political shocks have played an important role in the formation of these groups. Chile was one the countries most negatively affected by the Great Depression in the 1930s, an economic experience which led the state to develop an economic policy of import substitution industrialization (Eichengreen and Irwin, 2010). In a matter of years the state became owner of multiple firms in different sectors and hence one of the most important 'business groups' in the country (Salvaj and Couyoumdjian, 2016). In the following decades several studies reported an increasing concern about economic concentration and technological stagnation arising from the existence of groups (Lagos, 1962; Zeitlin et al., 1974).

The increasing economic concentration and the rise of the left wing in the 1960s facilitated the electoral victory of a left wing coalition in the 1970 presidential election (González, 2013). In November of that year Salvador Allende was elected president of the country and the economy took an abrupt turn. Allende's government implemented a deep firm nationalization program. As a consequence, the importance of the public sector rose and the development of business groups formed in previous decades suffered a large shock that incentivized their extinction. While in 1965 state companies represented 14% of gross domestic product (GDP), by 1973 this percentage had almost tripled to 39% of GDP (Hachette, 2000).

The poor economic performance of Salvador Allende's government was at the root of increasing social tensions that led to a coup d'etat. In 1973 inflation rose to 441% and the fiscal deficit of the central government reached 25% of GDP (Lüders, 1993). On September 11, 1973 Allende was removed from power by a military coup led by the Chilean armed forces and the police. Hundreds of firms that were in the process of statization were returned to their owners and the country experienced another radical turn now towards market-based economic policies. The economic process that unfolded in previous decades continued its course and business groups began to flourish once again (Dahse, 1979).

The dictatorship that followed lasted 17 years. The leaders of the armed forces shared power in a military *junta* until 1974 when Augusto Pinochet, the leader of the army, took control. One of Pinochet's most important policies was a massive privatization program implemented between 1974 an 1989. Behind the privatization reform was a group of economists trained at the University of Chicago, popularly known as the "Chicago Boys," who believed in the efficiency of the market and the role of the private sector.[3] According to the most comprehensive report studying this reform, the process was characterized by a lack of information about the sales, a variety of unpredictable methods behind the transactions, and relatively low sale prices (Congress Report, 2004). Individuals who worked for Pinochet ended up buying some of these firms (González et al., 2020).

The objectives of the privatization reform was to reduce the state intervention in the economy and the fiscal deficit. By 1983 the percentage of GDP represented by state owned firms had been reduced to 24% (Hachette, 2000). In 1982 and 1983 Chile experienced a severe economic crisis with GDP falling 14%. The government responded by buying back several of the previously privatized firms. A second wave of privatizations followed this crisis and lasted until 1990. Overall, the number of public firms decreased from a peak of 596 in 1973 to 45 in 1989, representing only 12.5% of GDP (Hachette, 2000) and several traditional business groups disappear.

In 1988 Pinochet lost a referendum in which he intended to extend his presidency for eight more years. As a consequence, presidential elections were held in 1989 and a central left coalition won and took power in March 1990. Pinochet's privatization process has been generally considered as successful (Galal et al., 1994). However, some privatizations have generated controversy because firms were arguably sold underpriced to individuals connected with the dictatorship. Marcel (1989) estimates that in the sale of the 12 largest public companies over 1986-1987 the underpricing ranged from 50% to 64% of total asset value of those firms, which corresponds to more than 4% of GDP in 1987 (Meller, 1993). In several cases the buyers were connected to the dictatorship (Marcel, 1989; Mönckeberg, 2015). For example, the Chemical and Mining Society of Chile (SQM), the largest Chilean non metallic mining company, was sold to Julio Ponce Lerou, Pinochet's son in law in 1986.

[3]How this group of economists reached that level of influence has been an active area of research. Scholars have emphasized how the right-wing party and their associated technocrats took advantage of the military coup to advice the armed forces and suggest policies (Spooner, 1999; Huneeus, 2006; Cavallo et al., 2011).

3 Data construction

3.1 Administrative sources

We use administrative data for publicly traded firms operating in the period 1970-2005. These firms were mandated to submit annual reports to the *Superintendencia de Valores y Seguros*, a regulatory agency equivalent to the Securities and Exchange commission in the U.S. Firms submitted balance sheets, income statements, and ownership information. Since 1985 the agency required all firms to submit the same information. In earlier years the information was not standardized and hence the number of variables we observe is more limited. We collected these reports directly from the agency, transforming all monetary variables to 1998 Chilean pesos using the price index of the Central Bank.

The main caveat with the reports is the missing information about ownership structures *before* the Pinochet dictatorship. Fortunately, the Santiago Stock Exchange produced a report with the names of all publicly traded firms in the early 1970s (Santiago Stock Exchange, 1970) and information about which firms were affiliated to a business groups at that time can be found in a book titled "The book of the 91 [firms]" (own translation, Movimiento de Acción Popular 1972), constructed under the socialist government of Salvador Allende with the goal of studying economic concentration (Salvaj and Couyoumdjian, 2016).

We detected the name of firms privatized by the Pinochet regime using a report produced by the Chilean Congress after the return to democracy (Congress Report, 2004). Our final sample uses (i) all firms that were privatized and for which we have data from the reports *before* the year of privatization, and (ii) all publicly traded firms that were private during the whole study period and for which we have data from the reports before the last year of privatization in its industry. The latter will be our comparison group. The final sample are 79 firms, 50 privatized and 29 not privatized. Figure 1-A shows the number of privatizations by year during the dictatorship. The first and second waves of privatizations are clearly visible. Figure 1-B shows a similar distribution of privatizations in our sample.[4]

Finally, inspired by recent evidence showing that privatization reforms can be implemented in different ways (Fisman and Wang, 2014; González et al., 2020), we use data to classify each privatization in one of two categories: (i) firms sold to buyers who were "connected" to the

[4] As a robustness exercise we expand the sample of firms not privatized by relaxing the data availability requirement, increasing the number of firms to 112. We find similar results.

Pinochet dictatorship (the seller), and (ii) firms sold to "unconnected" buyers. We say a buyer was connected if he worked for Pinochet before buying the firm.[5] We find that 28% of firms in our data were sold to a connected buyer and 35% were sold to an unconnected buyer, with the rest of firms not being privatized. The majority of connected buyers were bureaucrats and a few were members of Pinochet's family.

3.2 Business ownership and firms within groups

Our outcomes of interest are business ownership structures, performance, and internal credit markets. We constructed indicators for firms that were part of business groups or pyramidal ownership in different points in time. Pyramids have been empirically and theoretically associated to the expropriation of minority shareholders and tunneling (Johnson et al., 2000; Almeida and Wolfenzon, 2006; Lin et al., 2011) and the source of anecdotal controversy in the Chilean case as some individuals involved in Pinochet's privatizations were legally charged of using complex ownership structures to extract financial benefits.[6]

We uncover the ownership of firms using the names of shareholders – available in one of the mandatory modules in the reports – and complement it with additional information available at the website of the regulatory agency.[7] Although the reports reveal the name of the twelve largest shareholders, the majority of these are other firms. Therefore, we had to perform a detailed analysis of owners of all additional firms listed as shareholders to understand how the firms in our data are ultimately controlled. We repeat this process for all firms in our data in years 1995, 2000, and 2005 to track the evolution of business ownership.

As an example of our approach to uncover business ownership, consider the case of the Chemical and Mining Society of Chile (SQM), nowadays the world's biggest lithium producer (The Economist, 2017). This firm is controlled by a pyramid formed by listed firms – named Norte Grande, Oro Blanco and Pampa Calichera – and privately held firms – named Inversiones SQYA and Global Mining Investments, among others. Julio Ponce Lerou owned 90 percent of Norte Grande, which through successive controlling stakes in Oro Blanco and Pampa Calichera allowed him to control SQM. Our approach is important because if we were only taking into

[5] Operationally we take all buyers and find the intersection with all secretaries of state and all high-ranked militaries in the period 1973-1990, restricting attention to the period before each corresponding sale.

[6] The buyer of the Chemical and Mining Society of Chile was charged with 70 million dollars by Chile's regulatory agency in 2014. See Superintendencia de Valores y Seguros (2014) for details.

[7] In contrast, the literature that studies business groups in Chilean history mostly uses the existence of interlocking board members as a definition for business groups (Lagos, 1962; Salvaj and Couyoumdjian, 2016).

account controlling stakes in listed firms we would be understating Ponce Lerou's real voting rights. Figure 2 presents details of this example.

After uncovering firm ownership, we reduced its dimensionality to use it in a regression framework. We constructed an indicator for firms that were part of a pyramid in the 1990-2005 period. Pyramids are ownership structures in which shareholders use indirect ownership to control many different firms (Bertrand and Mullainathan, 2003), a common business strategy outside of the United States (La Porta et al., 1999). We also constructed an indicator for differences between cash and voting rights, known in the literature as *wedge*. This variable has been used to capture the incentive and entrenchment effects of controlling shareholders (Claessens et al., 2002). Last but not least we used public information collected by the agency to identify firms in business groups after 1990, and the previously mentioned sources to measure business groups before the Pinochet dictatorship.

We also constructed two variables to study the behavior of firms within groups (Buchuk et al., 2014). We call these indicators *Providers* and *Receivers*. The former is equal to one for firms with intra-group loans larger than 5% and the latter is equal to one for firms with intra-group loans smaller than -5% respectively. These two variables are related to the internal capital markets of business groups and are important to understand the role of privatized firms within groups and pyramids after privatization. Pyramids have been argued to represent a solution for firms to ease financial constraints (Khanna and Palepu, 2000). However, pyramids can also be related to agency conflicts, tunneling, and inefficiencies (Johnson et al., 2000; Bertrand et al., 2002; Larrain et al., 2018). An analysis of wedges and capital markets within groups has the potential to help us to understand the relative importance of these opposing hypotheses.

4 Empirical framework

This section describes firms before privatization and, informed by this descriptive evidence, it then presents our empirical strategy to estimate the contribution of the privatization process to the evolution of business ownership and the formation of pyramids.

4.1 Descriptive statistics

We begin by describing business ownership in 1970. Table 1 shows that 22.1% of firms were part of a business group and these firms represented 22.4% of the total market capitalization.

The transportation industry and financial firms show the highest percentage of business groups affiliation, with 75% and 50% of firms being part of a group respectively. This table also shows that almost 50% of publicly traded firms were part of the manufacturing industry, representing 37% of market capitalization. Other important industries were "Agriculture, forestry and fishing" with 24% of market capitalization and "Financial services" with 11%.

Given the importance of unobserved industry characteristics in explaining business ownership structures, our empirical analysis will only compare firms within industries. Table 2 presents the distribution of firms in our sample by industry.[8] Column 1 shows that firms in our data operate in a diverse set of industries. Manufacturing is the most important one with 34 firms. Columns 2-4 split firms by privatization status. The distribution of privatizations is fairly balanced across industries: 26% of manufacturing firms were sold to connected buyers, 32% were sold to unconnected buyers, and 41% were not privatized.

Table 3 presents summary statistics for all firms in our sample, before (bottom panel) and after (upper panel) the dictatorship period. The upper panel shows that after the return to democracy in 1990 a total of 57% and 76% of firms were part of a pyramid and a business group respectively. The lower panel shows that these percentages were lower in 1983 before the second wave of privatizations (16% in both cases). In contrast, 36% of firms belonged to a business group in 1970. Figure 3 presents the evolution of business ownership. The statization process in the early 1970s can be clearly observed as an increase in state owned firms in 1974. The second wave of privatizations that started in 1983 gradually returned all these firms to private hands by the end of 1990.

Table 4 presents differences between firms by privatization status. Columns 1 and 4 show averages of privatized and non-privatized firms. Column 5 presents the statistical difference between these groups, with and without adjustment for small sample inference (Robinson and Robinson, 2001). Although privatized firms were larger than non-privatized, the two groups were similar in terms of their profitability, leverage, age, and business ownership in 1970 and 1983. Columns 2 and 3 compare firms that were privatized but that differed in the connectedness of the buyer. Column 6 present the corresponding statistical difference. Firms sold to connected buyers were smaller than those sold to unconnected buyers, but were similar in terms of their profitability, leverage, age, and ownership structure before privatization.

Overall, the main difference between types of firms was their size. Therefore, our econometric strategy will control for the logarithm of assets and sales, as well as by firm leverage and

[8] We classify firms into industries using Standard Industry Classification (four-digit SIC) codes.

return over equity, all of these measured before the privatization process began.

4.2 Econometric strategy

Our primary goal is to estimate the effect of privatization on the evolution of business ownership – i.e. business groups and pyramids – profitability, and internal capital markets. To fix ideas, let us begin discussing the workhorse regression specification we use to relate the dependent variables with Pinochet's privatizations:

$$Y_{ij}^{t} = \beta \text{ Privatization}_{ij} + \gamma' x_i + \eta_j + \epsilon_{ij} \quad (1)$$

where Y_{ij}^{t} is an outcome of interest for firm i, which operates in industry j, and we observe in year t. We use four sets of dependent variables. First, an indicator that takes the value of one for firms that were part of a business group in year t. Second, two variables that measure pyramidal ownership: an indicator for firms that are part of a pyramid, and the difference between cash and voting rights. Third, a measure of firm profitability, i.e. the return over equity. And fourth, two variables that measure the involvement of firms within business groups: an indicator for firms providing intra-group loans, and an indicator for firms receiving loans within groups. In addition, to capture fundamentals of these outcomes we measure them in two different ways, namely in the year Pinochet left power (1990) and as an average in the following 15 years of democracy (1991-2005).

The main variable of interest is $Privatization_{ij}$, an indicator that takes the value of one if firm i was privatized during the Pinochet dictatorship (1973-1990) and zero otherwise. Equation (1) also includes a vector x_i with pre-determined firm-level variables that could have been related to the privatization process and have the potential to affect our outcomes in the short- and long-run, i.e. the logarithm of assets, the logarithm of sales, the firm's leverage, and its return over equity. In the case of privatized firms, we compute each of these variables as a three-year average before the year of privatization. We do this to decrease the role of annual anomalies unrelated to firm's fundamental characteristics. In the case of non-privatized firms this benchmark year is absent and so we use three-year averages before the median year of privatization in the firm's industry, but results are robust to other definitions. To capture differences in the evolution of business ownership and profitability that are related to industry-level differences, equation (1) also includes a full set of industry fixed effects η_j. Finally, ϵ_{ijt} is an error term with a mean of zero and robust to heteroskedasticity.

We begin by estimating equation (1) using ordinary least squares. The coefficient of interest is $\widehat{\beta}$ and captures the differential evolution of business ownership and profitability among privatized firms. The comparison are other (non-privatized) firms in the same industry after adjusting for the effect of pre-privatization characteristics x_i. The main threat to interpret $\widehat{\beta}$ as the causal effect of privatization are potential omitted variables that explain both why a firm was privatized and the outcomes under study. For these omitted variables to be a threat they need to be firm-specific (instead of industry-specific) and unrelated to observables, otherwise their effects are captured by x_i and η_j. To assess this possibility we complement the analysis with three matching estimates that aim to produce improved comparisons, we use additional control variables, different regression specifications, and finally we employ the method proposed by Altonji et al. (2005) and extended by Oster (2019) to gauge the potential effects of unobservables.

In addition to equation (1) we also present estimates from a regression specification that allows different types of privatizations to have potentially different effects on business ownership, profitability, and internal markets. This decision is motivated by a recent empirical literature that shows privatizations can be implemented in different manners, with some firms sold to buyers who are socially close to the seller or at reduced prices (Fisman and Wang, 2014; González et al., 2020). Because firms might have been sold at different prices precisely because the buyer was close to the government, we use the identity of the buyer as the main source of heterogeneity. In particular, we augment equation (1) with an interaction term and estimate the following regression equation using ordinary least squares:

$$Y_{it}^{t} = \phi_1 \text{ Privatization}_{ij} + \phi_2 \left(\text{Privatization}_i \times \text{Connected}_i\right) + \gamma' x_i + \eta_j + \epsilon_{ij} \qquad (2)$$

where all variables are defined as in equation (1) and $Connected_i$ is an indicator that takes the value of one if firm i was sold to a connected buyer. When using this specification the coefficients of interest are ϕ_1 and ϕ_2. The former measures the effect of "unconnected" privatizations on the outcomes of interest, and the latter measures the differential effect for "connected" privatizations. If we estimate that $\widehat{\phi_2} \approx 0$, then both types of privatizations had similar effects.

5 Results

This section begins by showing that the privatization process affected the ownership structures of privatized firms. This differential evolution of business ownership appears to have affected their performance and the functioning of internal capital markets within business groups. We

end this section by showing that these results are robust to the use of a variety of alternative estimation strategies and discussing our interpretation of these results.

5.1 The formation of business groups and pyramids

Table 5 presents estimates of equation (1) and (2) using three different dimensions of ownership structures as dependent variables. In Panel A the dependent variable is measured in 1990, the first year of democracy after the Pinochet dictatorship, and Panel B uses the same variables but during the 1991-2005 period, i.e. the business group indicator in columns 1-2 is equal to one if the firm was affiliated to a business group at least one year during this period.

Column 1 in Table 5-A shows that firms privatized by Pinochet were 47 percentage points more likely to be part of a business group in the year 1990. Column 2 in the same panel allows for heterogeneous effects by buyer connectedness and reveals that this increase in business group affiliation is similar across firms sold to connected and unconnected individuals. For a better understanding of the magnitude of this estimate consider that 41% of non-privatized firms belonged to a business group during this period. Therefore, the privatization process doubled the probability that a firm was part of a business group, an economically large effect.

Columns 3 and 4 in Table 5-A repeat the previous estimations using as dependent variable the indicator for firms that were part of a pyramid in 1990. To facilitate the interpretation of estimates consider that 14% of non-privatized firms were part of a pyramid that year. Column 3 shows that for privatized firms this percentage increases by 39 percentage points, an economically large effect that is also statistically significant. In contrast to the business group results, column 4 reveals that most of this effect is explained by the set of firms sold to buyers who worked for the Pinochet dictatorship before privatization. Columns 5 and 6 use the difference between cash and voting rights (wedge) as dependent variable. We find that in privatized firms there was more likely to be a wedge between ownership and control, but only among those sold to connected buyers. Wedges and pyramids potentially allow the largest shareholder to control a firm despite having low cash flow rights, and has been linked in the literature to lower valuations (Claessens et al., 2002).[9]

Table 5-B shows that all previous results remain unchanged in terms of statistical significance if we consider a longer time horizon and measure the dependent variables in the period 1991-2005 instead of 1990. In addition, the magnitude of coefficients also remains similar.

[9]Similarly Belenzon et al. (2019) show that the organizational distance between a headquarter and its subsidiaries decreases the attention of the headquarter, thus increasing the autonomy of subsidiaries.

Overall, results in Table 5 support the hypothesis that privatizations affected business ownership and how privatized firms were controlled after Chile's return to democracy.

5.2 Profitability and internal capital markets

Table 6 present estimates of equations (1) and (2) using return over equity as a measure of profitability (columns 1 and 2) and two variables related to the internal capital markets of the group (columns 3-6). Data for internal capital markets in 1990 is unfortunately missing. As reference, the average return over equity for non-privatized firms was 0.14 in years 1991-2005, and the average for providers and receivers of capital markets among the same group of firms during those years was 0.27 and 0.13 respectively.

Columns 1 and 3 in Table 6 show that privatized firms were 43% less profitable than non-privatized firms ($0.06/0.14 \approx 0.43$), although the result is not statistically significant at the conventional levels when we use small sample inference (p-value of 0.12). Column 4 suggests that this point estimate is driven by the subset of firms sold to connected buyers, which had 4 percentage points lower return over equity, i.e. were 29% less profitable than other non-privatized firms in the same industry ($0.04/0.14 \approx 0.29$). This result is consistent with previous literature showing a negative effect in profitability for firms in a business group and owned via pyramids (Pérez-González, 2015), and with the negative effect of corrupt privatizations on performance (Black et al., 2000; Fisman and Wang, 2014). We emphasize that these results should be interpreted with caution because these are *not* statistically significant when we use small sample inference.

Next we study the role of newly privatized firms within their business group.[10] To measure their role we use the *Providers* and *Receivers* variables, i.e. indicators for firms who provide or receive capital to or from other firms in the group (see section 3.2). Estimates of equation (1) in columns 5 and 7 show that experiencing a privatization is *not* associated with a differential role within the group. Privatized firms are on average equally likely to be providers or receivers of capital within business groups after the transition to democracy. However, estimates of equation (2) in column 6 reveal that the subset of firms sold to connected buyers were significantly more likely to become providers of capital within their business group. Almost 50% of firms sold to connected buyers transformed into providers of credit in their business group, a result that is

[10] We assigned a value of zero to internal capital markets for the few firms that were not part of a business group after privatization. Recall that results in column 1 of Table 5 showed that almost 90% of privatized firms belonged to a business group after privatization. Therefore, these results applied to almost all firms.

statistically significant (p-value< 0.05). In contrast, columns 6 show that privatized firms were *not* more likely to become receivers within their group, with an economically small coefficient.

5.3 Robustness of results

This section shows that previous results are robust to specification decisions and estimation methods. All results are presented in Tables 7 and 8. We begin by showing that results are similar when we use three different matching exercises to minimize concerns about potential unobservables driving our results. Then for a subsample of firms we are able to show that results are robust to controlling for group affiliation in 1970, before the statization and privatization processes. We also report results dropping firms with takeovers, using a different definition of connected buyers, and extending the sample to include additional firm-level controls. Finally, we use the Altonji et al. (2005) approach and report estimated coefficients that account for potential effect of unobservables using the method proposed by Oster (2019).

The reader might worry about the role of potential omitted variables correlated with privatizations and business ownership. Two sets of evidence suggest that this is unlikely to be a concern. First, we use three matching estimators with the goal of making better comparisons across firms and results are similar. These matching estimators use the probability of a privatization, estimated using pre-privatizations variables and industry effects. Column 1 follows Crump et al. (2009) and truncate the propensity score distribution, eliminating a few firms without close comparisons. In addition, column 2 uses this propensity score as an additional control, and column 3 chooses the comparison firms with the k-nearest neighbors approach ($k = 1$). In all of these cases we observe similar results than before. Second, we follow the Altonji et al. (2005) approach and use the statistical power of observable variables that could be correlated with unobservables to adjust our estimates in order to account for the effect of potentially omitted variables. This approach was recently formalized by Oster (2019) and we use her method to adjust the coefficients from the our main regression equations. Column 6 shows that the adjusted coefficients remain similar to previous estimates.

Results are also similar when we control for group affiliation before Pinochet and when we drop firms with takeovers. For the former exercise we had to match firms in our data with the set of firms with business group affiliation data in 1970 (see section 4.1). We were able to find 36 out of the 79 firms.[11] Operationally we include as an additional control an indicator

[11]The remaining firms were not listed and hence were not mandated to report their ownership. Then we are unable to observe if these firms were part of some business group before 1973.

variable that is equal to one for firms affiliated to a business group in 1970. Column 4 shows that most results remain unchanged, although the smaller sample decreases the statistical power of the analysis. Results are also similar if we drop from estimation the few firms with takeovers during the 1990-2005 period (column 5). Although the relatively small sample reduces the statistical significance of the estimates, results taken as a whole point in a similar direction than before.

Finally, results are similar if we use an alternative definition for connected buyers and if we use an extended sample of firms. As an alternative definition of connected buyers we consider the names of eight firms mentioned in two well known investigations studying Pinochet's privatization process (Marcel, 1989; Mönckeberg, 2015). Importantly, these firms are in our sample as connected privatizations. Column 7 shows that all results are similar if we use this alternative definition. Column 8 uses an extended sample in which we include additional firms in the control group. To expand this group we relaxed the restriction that a firm needs to be observed three years before the last privatization year in its industry. For this exercise we use not-privatized firms with information for at least one year before the return to democracy in 1990. As "pre-privatization" controls we use the average over the first three years (or less, depending on the information available in the reports). The estimated coefficients are again similar.

6 Discussion and policy implications

6.1 Interpretation of results

Privatized firms were significantly more likely to become part of a business group after the transition to democracy, and also more likely to be controlled through pyramidal structures. The latter result regarding pyramids is mostly explained by the subset of firms which were sold to buyers who worked for Pinochet. Interestingly, these are the same firms that became providers of credit within their corresponding business groups. We now provide an interpretation of these results.

First and most importantly, our findings are consistent with the notion that pyramids enable controlling shareholders to control firms without having significant funds. This in turn can give birth to a range of corporate governance problems with potentially country-wide repercussions (Morck et al., 2005). Second, privatization reforms also constitute a financial opportunity for existent or potential business groups and can affect the distribution of economic power. If most

state-owned firms are being bought by *traditional* business groups then the sale of state-owned firms can provide a way to regain or consolidate their economic power. In contrast, if firms are bought by *new* business groups then these reforms can provide an opportunity for the creation of new economic elites. Which business groups are more prone to buy firms during privatization, or if new business groups form around the purchase of state-owned firms, are to the best of our knowledge open empirical questions.[12]

To test for the characteristics of the business groups in which privatized firms ended up being a part of, we begin by classifying groups in two categories. In the first category are those groups that existed before the Pinochet regime, which we call *old* or *traditional* business groups. In the second category are those that did not exist before that time, which we call *new* business groups.[13] Then we estimate two versions of equations (1) and (2). The first uses an indicator that takes the value of one for firms that belonged to a new business group after the dictatorship period, and the second uses an indicator for firms that belonged to traditional business groups in the same period.

Table 9 presents estimates of equations (1) and (2). Columns 1 and 2 reveal that most firms privatized by Pinochet which ended being part of a business group were part of groups that did *not* existed before the dictatorship. Columns 3 and 4 confirm this result, old business groups were not buying state-owned firms more than non-privatized firms. Recall that the comparison group are other non-privatized firms in the same industry. For reference, none of these firms contributed to the formation of new business groups and 41% of these firms were or became part of old groups. Then the fact that 37% of firms privatized by Pinochet became part of new business groups is economically meaningful. In contrast to previous findings we observe little heterogeneity by the type of privatization process.

Why were privatized firms contributing to the formation of new business groups? Why were traditional business groups not buying these firms? If buying is a dominant strategy, then old business groups might have to had faced some restriction to participate in these sales. This is a hard question to answer empirically but we hypothesize that the 1982 economic crisis might have acted as a financial restriction for traditional business groups. Some suggestive evidence for this mechanism can be found in the fact that most firms who ended up as part of new business

[12] A similar process to renovate business elites seemed to have occurred in Japan, with new *zaibatsus* like Toyota and Nissan forming to replace traditional groups (Hadley, 1970). Descriptive evidence from post-Apartheid South Africa, Malaysia, and Russia also fit into this narrative (Khanna and Yafeh, 2007).

[13] To classify business groups as new or old we make use of "The book of the 91 [firms]" mentioned in section 3. In particular, we take the set of business groups post 1990, find the intersection with the set of business groups in 1970, and call those "old business groups." The remaining are "new business groups."

groups were bought after the 1982 crisis, a time in which financial restrictions might have been binding for traditional business groups. In this sense, the evidence suggests that the interaction between an economic crisis and a privatization reform might at least partially facilitate the renovation of business elites.

6.2 Policy implications

The history of privatizations in Chile provides at least two sets of valuable lessons. First, as suggested by Schneider (2010), policies can create important changes in the structure of organizations. Importantly, these changes can persist over time. In this sense our analysis complements that of Kandel et al. (2018) who show that government policies can contribute to the *disappearance* of business groups. Besides expanding their work to an empirical analysis of the *appearance* of groups, we also note that policies can foster a renovation of business elites, create corporate empires, and contribute to the concentration of economic power in the hands of few entrepreneurs, which might or might not be of temporary interest for a country depending on the economic context, the development process, and the potential benefits of a "big push" (Morck and Nakamura, 2007). Second, the impact of privatizations on the formation of business groups and pyramidal ownership structures calls for a reassessment of the costs and benefits of these reforms. When selling state-owned firms it is important to evaluate the intended policy impacts taking into account "general equilibrium" effects caused by the formation of new organizational structures in the economy. For example, privatizations might have the objetive of increasing economic performance and productivity more generally, but the creation of groups can increase the concentration in an industry and potentially increase market power, increase prices, and even lower wages (Jarosch et al., 2019). Because of this, potential restrictions to the identity of buyers are perhaps of interest for goverments when implementing these reforms.

7 Conclusion

We used new firm-level data to show how the privatization process implemented by a group of economists known as the "Chicago Boys" during the 1973-1990 dictatorship led by Augusto Pinochet contributed to the formation of business groups and pyramidal ownership structures. To the best of our knowledge this is the first paper to empirically show how a privatization reform might contribute to the formation of new business groups, arguably fostering the renovation of elites. When firms were sold to connected buyers some of these firms began to act as

providers of credit within their groups and pyramids were built on top of them. We argue that the context and which privatizations took place – i.e. after an economic crisis – and the way in which these were implemented can explain most of these results.

The study of the unintended impacts of privatizations and government policies on organizations is a promising area of future research as there are many open questions. Can government policies unintentionally increase market power? To what extent can these policies affect the structure of organizations? What are their long-run impacts on productivity and economic performance? What are the impacts on consumers? Can the temporary creation of business groups help economies by creating a "big push"? Our results on firm performance are unfortunately inconclusive but do point towards lower performance among privatized firms, casting doubt on the potential private benefits for formerly state-owned firms. If business groups benefitted as a whole after buying or forming around state-owned firms is yet another important question. The performance of firms and groups could be related to the persistence of these ownership structures. For how long these firms remain in their respective groups, or factors that affect the survival rate of different business groups, remain open questions.

References

Almeida, H., Kim, C.-S., and Kim, H. B. (2015). Internal capital markets in business groups: Evidence from the Asian financial crisis. *Journal of Finance*, 70(6):2539–2586.

Almeida, H., Park, S. Y., Subrahmanyam, M. G., and Wolfenzon, D. (2011). The structure and formation of business groups: Evidence from Korean chaebols. *Journal of Financial Economics*, 99(2):447–475.

Almeida, H. V. and Wolfenzon, D. (2006). A theory of pyramidal ownership and family business groups. *The Journal of Finance*, 61(6):2637–2680.

Altonji, J. G., Elder, T. E., and Taber, C. R. (2005). Selection on observed and unobserved variables: Assessing the effectiveness of catholic schools. *Journal of political economy*, 113(1):151–184.

Bae, K.-H., Kang, J.-K., and Kim, J.-M. (2002). Tunneling or value added? Evidence from mergers by Korean business groups. *Journal of Finance*, 57(6):2695–2740.

Baek, J.-S., Kang, J.-K., and Lee, I. (2006). Business groups and tunneling: Evidence from private securities offerings by Korean chaebols. *Journal of Finance*, 61(5):2415–2449.

Barberis, N., Boycko, M., Shleifer, A., and Tsukanova, N. (1996). How does Privatization Work? Evidence from the Russian shops. *Journal of Political Economy*, 104(4):764–790.

Bel, G. (2010). Against the mainstream: Nazi privatization in 1930s germany. *The Economic History Review*, 63(1):34–55.

Belenzon, S. and Berkovitz, T. (2010). Innovation in business groups. *Management Science*, 56(3):519–535.

Belenzon, S., Berkovitz, T., and Rios, L. A. (2013). Capital markets and firm organization: How financial development shapes european corporate groups. *Management Science*, 59(6):1326–1343.

Belenzon, S., Hashai, N., and Patacconi, A. (2019). The arquitecture of attention: Group structure and subsidiary autonomy. *Strategic Management Journal*, 40(10):1610–1643.

Bena, J. and Ortiz-Molina, H. (2013). Pyramidal ownership and the creation of new firms. *Journal of Financial Economics*, 108(3):798–821.

Berle, A. and Means, G. (1932). *Modern Corporation and Private Property*. New York, NY: Harcourt Brace and World.

Bertrand, M., Mehta, P., and Mullainathan, S. (2002). Ferreting out tunneling: An application to Indian business groups. *Quarterly Journal of Economics*, 117(1):121–148.

Bertrand, M. and Mullainathan, S. (2003). Pyramids. *Journal of the European Economic Association*, 1(2-3):478–483.

Black, B., Kraakman, R., and Tarassova, A. (2000). Russian privitization and corporate governance: What went wrong. *Stanford Law Review*, 52:1731–1808.

Buchuk, D., Larrain, B., Muñoz, F., and Urzúa, F. (2014). The internal capital markets of business groups: Evidence from intra-group loans. *Journal of Financial Economics*, 112(2):190–212.

Buchuk, D., Larrain, B., Prem, M., and Urzúa, F. (2019). How do internal capital markets work? evidence from the great recession. *Review of Finance*.

Carney, R. W. and Child, T. B. (2013). Changes to the ownership and control of east asian corporations between 1996 and 2008: The primacy of politics. *Journal of Financial Economics*, 107(2):494–513.

Cavallo, A., Salazar, M., and Sepúlveda, O. (2011). *La Historia Oculta del Régimen Militar: Memoria de una Época 1973–1988*. Uqbar editores.

Cestone, G., Fumagalli, C., Kramarz, F., and Pica, G. (2018). Insurance between firms: The role of internal labor markets. *BAFFI CAREFIN Centre Research Paper*, (2014-162).

Cheung, Y.-L., Rau, P. R., and Stouraitis, A. (2006). Tunneling, propping, and expropriation: Evidence from connected party transactions in Hong Kong. *Journal of Financial Economics*, 82(2):343–386.

Claessens, S., Djankov, S., Fan, J. P., and Lang, L. H. (2002). Disentangling the incentive and entrenchment effects of large shareholdings. *Journal of Finance*, 57(6):2741–2771.

Colli, A. and Colpan, A. (2015). Business groups and corporate governance: Review, synthesis, and extension. *Corporate Governance: An International Review*, 24(3):274–302.

Colpan, A. and Hikino, T. (2018). *Business Groups in the West: The Evolutionary Dynamics of Big Business*. Oxford University Press.

Colpan, A. and Jones, G. (2015). Business groups, entrepreneurship and the growth of the Koc group in Turkey. *Business History*, 58(1):69–88.

Congress Report (2004). Transparencia y patrimonio público. In *Informe de la comisión investigadora encargada de analizar presuntas irregularidades en las privatizaciones de empresas del estado ocurridas con anterioridad al año 1990*, chapter 2.

Crump, R. K., Hotz, V. J., Imbens, G. W., and Mitnik, O. A. (2009). Dealing with limited overlap in estimation of average treatment effects. *Biometrika*, 96(1):187–199.

Dahse, F. (1979). *Mapa de la extrema riqueza*. Editorial Aconcagua.

Dehejia, R. H. and Wahba, S. (2002). Propensity score-matching methods for nonexperimental causal studies. *Review of Economics and Statistics*, 84(1):151–161.

D'Souza, J. and Megginson, W. L. (1999). The Financial and Operating Performance of Privatized Firms during the 1990s. *Journal of Finance*, LIV(4):1397–1438.

Eichengreen, B. and Irwin, D. A. (2010). The slide to protectionism in the Great Depression: Who succumbed and why? *Journal of Economic History*, 70(4):871–897.

Estrin, S., Hanousek, J., Kocenda, E., and Svejnar, J. (2009). The Effects of Privatization and Ownership in Transition Economies. *Journal of Economic Literature*, 47(3):699–728.

Fisman, R. and Wang, Y. (2014). Corruption in chinese privatizations. *The Journal of Law, Economics, & Organization*, 31(1):1–29.

Franks, J., Mayer, C., Volpin, P., and Wagner, H. F. (2011). The life cycle of family ownership: International evidence. *The Review of Financial Studies*, 25(6):1675–1712.

Frydman, R., Gray, C., Hessel, M., and Rapaczynski, A. (1999). When does Privatization Work? The Impact of Private Ownership on Corporate Performance in the Transition Economies. *Quarterly Journal of Economics*, 114(4):1153–1191.

Galal, A., Jones, L., Tandon, P., and Vogelsang, I. (1994). *Welfare consequences of selling public enterprises: An empirical analysis: a summary*. The World Bank.

González, F. (2013). Can land reform avoid a left turn? evidence from chile after the cuban revolution. *The B.E. Journal of Economic Analysis and Policy*, 13(1):31–72.

González, F., Prem, M., and Urzúa, F. (2020). The privatization origins of political corporations. *Journal of Economic History*.

Gopalan, R., Nanda, V., and Seru, A. (2007). Affiliated firms and financial support: Evidence from indian business groups. *Journal of Financial Economics*, 86(3):759–795.

Guillén, M. (2000). Business groups in emerging economies: A resource-based view. *The Academy of Management Journal*, 43(3):362–380.

Hachette, D. (2000). Privatizaciones: Reforma estructural pero inconclusa. *La transformación económica de Chile. Santiago: Centro de Estudios Públicos*.

Hadley, E. M. (1970). *Antitrust in Japan*. Princeton: Princeton University Press.

Huneeus, C. (2006). *The Pinochet Regime*. Lynne Rienner Publishers.

Huneeus, C., Huneeus, F., Larrain, B., Larrain, M., and Prem, M. (2018). The internal labor markets of business groups. *Workin Paper*.

Jarosch, G., Nimczik, J. S., and Sorkin, I. (2019). Granular search, market structure, and wages. *NBER Working Paper N. 26239*.

Johnson, S., La Porta, R., Lopez-de Silanes, F., and Shleifer, A. (2000). Tunneling. *American economic review*, 90(2):22–27.

Jones, G. (2000). *Merchants to Multinationals: British Trading Companies in the Nineteenth and Twentieth Centuries*. Oxford University Press.

Kandel, E., Kosenko, K., Morck, R., and Yafeh, Y. (2018). The great pyramids of America: A revised history of US business groups, corporate ownership and regulation, 1930-1950. *Strategic Management Journal*, 40(5):781–808.

Khanna, T. and Palepu, K. (2000). Is group affiliation profitable in emerging markets? an analysis of diversified indian business groups. *The journal of finance*, 55(2):867–891.

Khanna, T. and Yafeh, Y. (2007). Business groups in emerging markets: Paragons or parasites? *Journal of Economic literature*, 45(2):331–372.

La Porta, R. and López-de-Silanes, F. (1999). The Benefits of Privatization: Evidence from Mexico. *Quarterly Journal of Economics*, 114(4):1193–1242.

La Porta, R., Lopez-de Silanes, F., and Shleifer, A. (1999). Corporate ownership around the world. *The journal of finance*, 54(2):471–517.

Lagos, R. (1962). La concentración del poder económico. su teoría. realidad chilena. Master's thesis, Universidad de Chile.

Larrain, B., Sertsios, G., Urzúa, I., et al. (2018). The effects of losing a business group affiliation. *The Review of Financial Studies*.

Larrain, B. and Urzúa, F. (2016). Do business groups change with market development? *Journal of Economics & Management Strategy*, 25(3):750–784.

Leff, N. (1978). Industrial organization and entrepreneurship in the developing countries: The economic groups. *Economic Development and Cultural Change*, 26(4):661–675.

Lin, C., Ma, Y., Malatesta, P., and Xuan, Y. (2011). Ownership structure and the cost of corporate borrowing. *Journal of Financial Economics*, 100(1):1–23.

Lins, K. V., Volpin, P., and Wagner, H. F. (2013). Does family control matter? international evidence from the 2008–2009 financial crisis. *The Review of Financial Studies*, 26(10):2583–2619.

Lüders, R. J. (1993). The success and failure of state owned enterprise divestitures in a developing country: The case of chile. *The Columbia Journal of World Business*, 28(1):98–121.

Manikandan, K. S. and Ramachandran, J. (2015). Beyond institutional voids: Business groups, incomplete markets, and organizational form. *Strategic Management Journal*, 36(4):598–617.

Marcel, M. (1989). Privatización y finanzas públicas: el caso de chile, 1985-88. *Colección estudios CIEPLAN*, 26:5–60.

Masulis, R. W., Pham, P. K., and Zein, J. (2011). Family business groups around the world: Financing advantages, control motivations, and organizational choices. *The Review of Financial Studies*, 24(11):3556–3600.

Megginson, W. L. and Netter, J. M. (2001). From State to Market: A Survey of Empirical Studies on Privatization. *Journal of Economic Literature*, 39(2):321–389.

Meller, P. (1993). A review of chilean privatization experiences. *The Quarterly Review of Economics and Finance*, 33:95–112.

Mönckeberg, M. O. (2015). *El saqueo de los grupos económicos al Estado de Chile*. Ediciones Debolsillo.

Morck, R. and Nakamura, M. (2007). Business groups and the big push: Meiji Japan's mass privatization and subsequent growth. *Enterprise and Society*, 8(3):543–601.

Morck, R., Wolfenzon, D., and Yeung, B. (2005). Corporate governance, economic entrenchment, and growth. *Journal of economic literature*, 43(3):655–720.

Movimiento de Acción Popular (1972). El libro de las 91: las empresas monopólicas y el área social de la economía chilena. *Santiago: Barco de Papel*.

Oster, E. (2019). Unobservable selection and coefficient stability: Theory and evidence. *Journal of Business & Economic Statistics*, 37(2):187–204.

Pérez-González, F. (2015). Organizational form and firm performance: Evidence from the'death sentence'clause of the public utility act of 1935. Technical report, Instituto Tecnológico Autónomo de México (ITAM) Working Paper.

Robinson, M. J. and Robinson, J. (2001). Permutation Tests for Linear Models. *Australian and New Zealand Journal of Statistics*, 43(1):75–88.

Salvaj, E. and Couyoumdjian, J. P. (2016). 'Interlocked' business groups and the state in Chile (1970-2010). *Business History*, 58(1):129–148.

Santiago Stock Exchange (1970). Reseñas de valores bursátiles. *Departamento de Estadísticas y Estudios Económicos, Santiago de Chile*.

Schneider, B. R. (2010). Business groups and the state: The politics of expansion, reestructuring, and collapse. In Colpan, A., Hikino, T., and Lincoln, J. R., editors, *Business Groups and the State: The Politics of Expansion, Restructuring, and Collapse*. The Oxford Handbook of Business Groups.

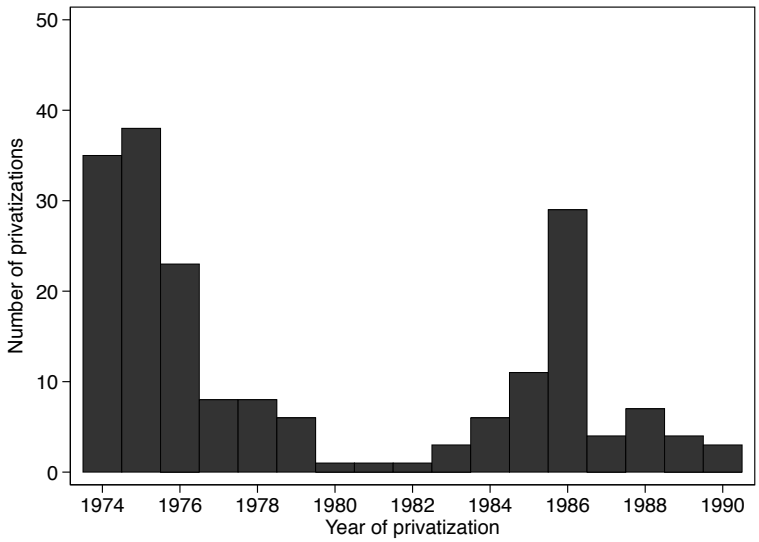
Spooner, M. H. (1999). *Soldiers in a Narrow Land: The Pinochet Regime in Chile*. University of California Press.

Superintendencia de Valores y Seguros (2014). Svs sanciona a personas, ejecutivos y corredora de bolsa en el marco de la investigación sobre sociedades cascada. *Comunicado de Prensa*.

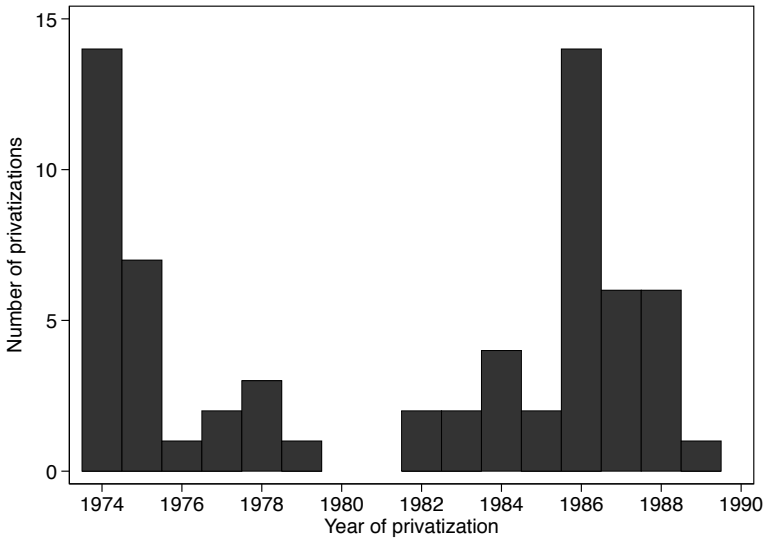
The Economist (2017). After electric cars, what more will it take for batteries to change the face of energy?

Zeitlin, M., Ewen, L. A., and Ratcliff, R. E. (1974). "New Princes" for old? The large corporation and the capitalist class in chile. *American Journal of Sociology*, 80(1):87–123.

Figure 1: Privatizations by year



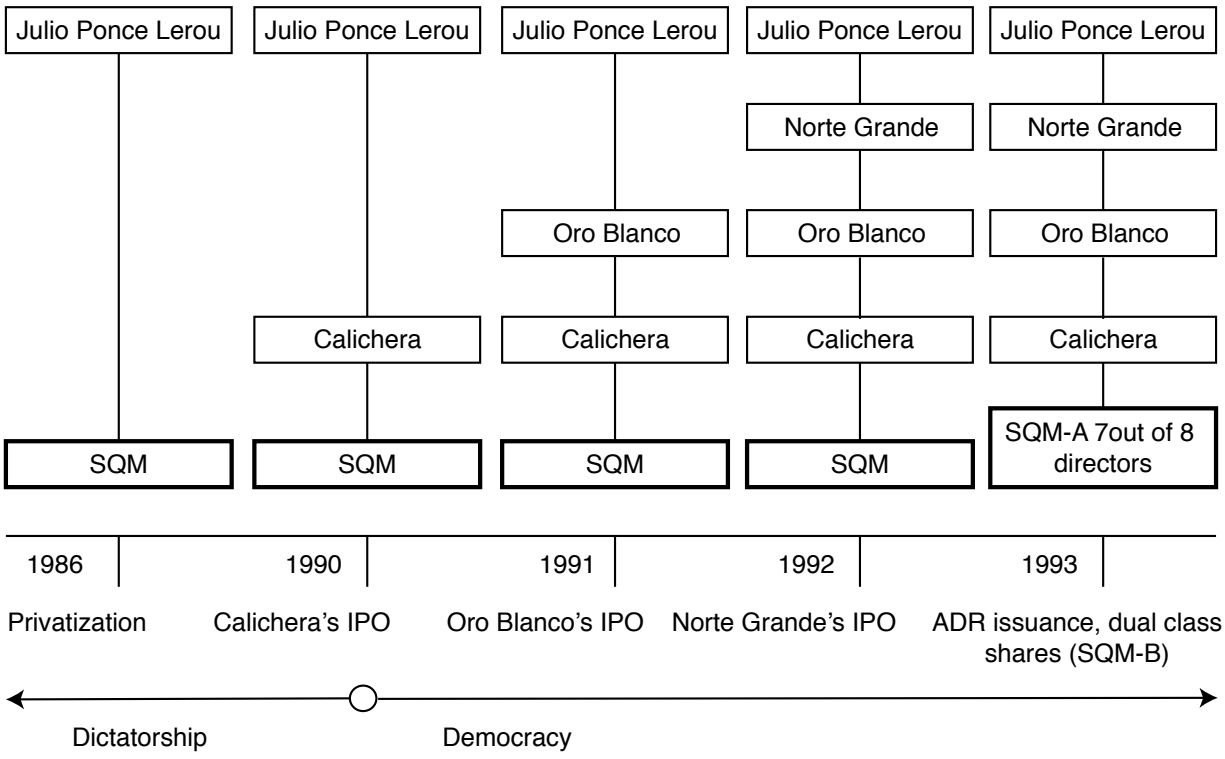
(a) All firms privatized by the Pinochet regime



(b) Our data of privatized firms

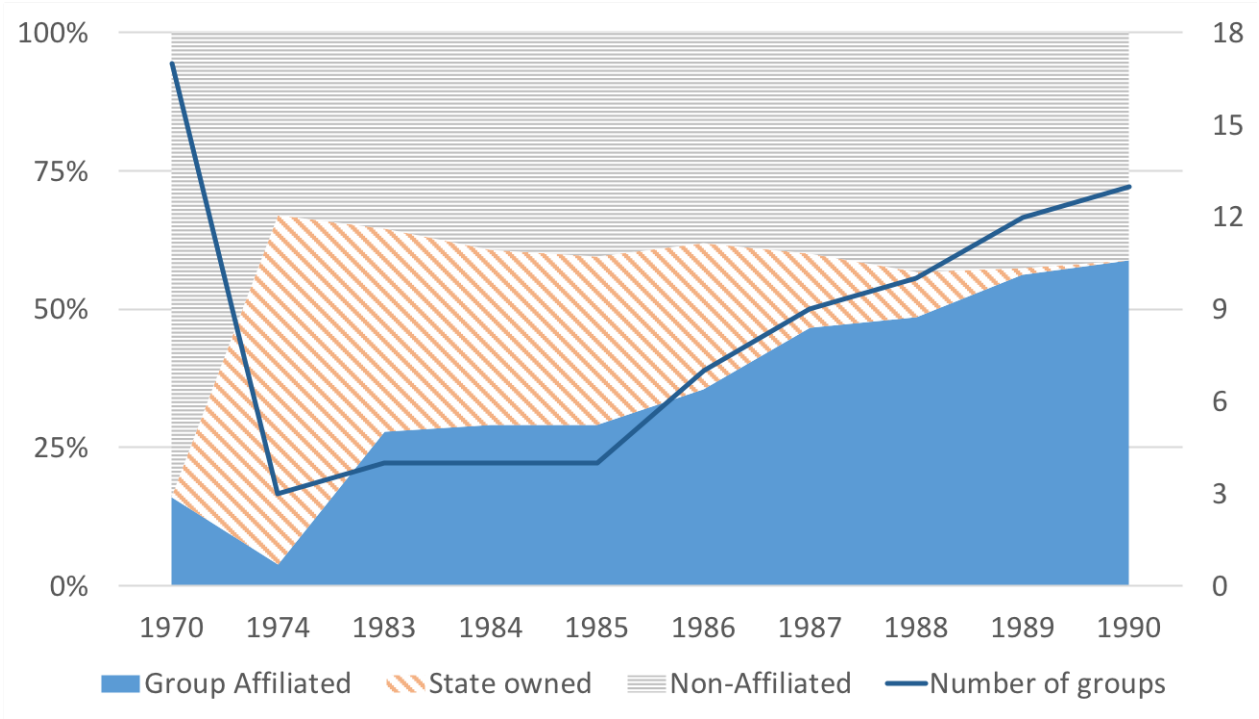
Notes: This figure shows the distribution of privatizations by year during the Pinochet dictatorship (1973–1990). The upper panel shows all privatizations implemented by the regime as presented in Congress Report (2004). The lower panel shows the distribution of privatizations in our dataset.

Figure 2: Example for the evolution of ownership structures



Notes: Ownership evolution of SQM, a connected privatization in our dataset.

Figure 3: Evolution of Affiliation Status for Firms Privatized after 1983



Notes: This figure shows the evolution of affiliation status for firms in our main sample.

Table 1: Publicly traded firms and group membership in 1970

	All publicly traded firms in 1970			Group member firms in 1970	
	Number of firms	Number as percent of total (%)	Market cap. as percent of total (%)	Percentage of firms in industry that are group members (%)	Percentage of industry market cap of group members firms (%)
Industry:	(1)	(2)	(3)	(4)	(5)
Accommodation and food services	1	0.5	0.9	0	0
Agriculture, forestry and fishing	23	10.6	4.8	34.8	40.1
Construction	8	3.7	23.5	12.5	0.4
Electricity and gas	5	2.3	2.8	0	0
Financial and insurance activities	15	6.9	10.5	46.7	25.2
Information and communication	2	0.9	4.2	0	0
Manufacturing	107	49.3	37.3	23.4	34.7
Mining and quarrying	21	9.7	8.2	9.5	2.7
Real estate activities	11	5.1	2.8	9.1	83.4
Transportation and storage	4	1.8	2.1	75.0	98.2
Wholesale and retail trade	20	9.2	2.6	5.0	3.5
Total	217	100	100	22.1	22.4

Notes: This table presents the distribution across industries of all publicly traded firms in 1970 (columns 1–3) and of the subsample of these firms that were affiliated to a business group in that year (columns 4–5). The list of publicly traded firms is collected from a report issued by the Santiago Stock Exchange (Santiago Stock Exchange, 1970). while business group affiliation data come from Movimiento de Acción Popular (1972). More details in section 3.

Table 2: Distribution of firms by industry

Industry:	All firms in our data (1)	Firms sold to connected buyers (2)	Firms sold to unconnected buyer (3)	Firms *not* sold (comparison group) (4)
Accommodation and food services	1	0	0	1
Agriculture, forestry and fishing	9	2	1	6
Construction	1	0	1	0
Electricity and gas	13	5	7	1
Health	1	0	0	1
Information and communication	4	1	3	0
Manufacturing	34	9	11	14
Mining and quarrying	7	3	2	2
Real state activity	1	0	0	1
Transportation and storage	5	1	3	1
Wholesale and retail trade	2	0	1	1
Number of firms:	79	21	29	29

Notes: This table shows the distribution of firms in our data by industry. We classify privatized firms into industries using Standard Industry Classification (four-digit SIC) codes. Column 1 shows the industries for all firms in our data. Columns 2-4 separate firms by their privatization status. More details in section 3.

Table 3: Summary statistics

	Mean	Standard deviation	90th pctile	10th pctile
	(1)	(2)	(3)	(4)
Ownership and other outcomes				
Owned by business group	0.76	0.43	1	0
Owned by pyramid	0.57	0.50	1	0
Wedge cash-voting rights	0.51	0.50	1	0
Return over equity	0.15	0.11	0.30	0.03
Provider within group	0.28	0.29	0.73	0
Receiver within group	0.12	0.17	0.33	0
Pre-privatization characteristics				
Logarithm of total assets	20.26	6.05	30.19	15.26
Logarithm of sales	18.88	6.94	29.11	13.61
Return over equity	0.15	0.19	0.39	-0.03
Leverage	0.43	0.26	0.83	0.08
Year of foundation	1940	31	1981	1902
Privatization year	1982	5	1988	1974
Owned by business group in 1970	0.36	0.49	1	0
Owned by business group in 1983	0.16	0.37	1	0
Owned by pyramid in 1983	0.16	0.37	1	0

Notes: This table presents summary statistics for firms in our sample. Panel A presents the outcome variables and Panel B presents several firm characteristics in the pre privatization period.

Table 4: Pre-privatization differences across firms

	Privatized firms			Not privatized	Difference	
	All	Sold to connected buyer	Sold to unconnected buyer			
	(1)	(2)	(3)	(4)	(1)–(4)	(3)–(2)
Log assets	22.52	20.81	23.76	16.35	6.17	-2.95
	(6.58)	(5.09)	(7.31)	(1.18)	(1.30)	(1.65)
					[0.00]	[0.23]
Log sales	21.33	18.99	23.02	14.65	6.68	-4.04
	(7.32)	(6.71)	(7.38)	(3.34)	(1.56)	(1.87)
					[0.00]	[0.11]
Return over equity	0.17	0.13	0.19	0.12	0.04	-0.06
	(0.19)	(0.21)	(0.17)	(0.19)	(0.07)	(0.05)
					[0.33]	[0.13]
Leverage	0.41	0.42	0.41	0.45	-0.04	0.01
	(0.24)	(0.26)	(0.23)	(0.31)	(0.07)	(0.07)
					[0.98]	[0.99]
Year of foundation	1937	1944	1932	1945	-8	12
	(33)	(27)	(37)	(26)	(7)	(9)
					[0.29]	[0.22]
Bus. group in 1970	0.38	0.50	0.31	0.30	0.08	0.19
	(0.50)	(0.53)	(0.48)	(0.48)	(0.23)	(0.23)
					[0.87]	[0.34]
Bus. group in 1983	0.18	0.21	0.14	0.12	0.05	0.07
	(0.39)	(0.43)	(0.36)	(0.34)	(0.14)	(0.16)
					[0.19]	[0.93]
Pyramid in 1983	0.18	0.21	0.14	0.12	0.05	0.07
	(0.39)	(0.43)	(0.36)	(0.34)	(0.14)	(0.16)
					[0.17]	[0.92]

Notes: This table presents the average and standard deviation in columns 1-4. The last two columns present the univariate regressions results to determine the statistical significance of the differences between columns 1 and 4, and 2 and 3 respectively. In these columns we present robust standard errors in parenthesis and p-values correcting for small sample inference in square brackets. Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5: Privatization and the evolution of ownership

	Bus. group		Pyramid		Wedge	
Panel A – Year 1990	(1)	(2)	(3)	(4)	(5)	(6)
Firm privatized by Pinochet	0.47	0.38	0.39	0.18	0.24	0.02
	(0.16)	(0.20)	(0.17)	(0.18)	(0.15)	(0.16)
	[0.00]	[0.06]	[0.02]	[0.35]	[0.11]	[0.89]
Firm sold to connected buyer		0.14		0.32		0.33
		(0.14)		(0.15)		(0.14)
		[0.36]		[0.03]		[0.01]
Panel B – Years 1991-2005						
Firm privatized by Pinochet	0.28	0.21	0.29	0.04	0.16	-0.09
	(0.13)	(0.15)	(0.18)	(0.19)	(0.19)	(0.20)
	[0.05]	[0.18]	[0.08]	[0.87]	[0.36]	[0.65]
Firm sold to connected buyer		0.11		0.39		0.38
		(0.10)		(0.13)		(0.15)
		[0.40]		[0.01]		[0.02]
Firms	79	79	79	79	79	79
Industry fixed effects	X	X	X	X	X	X
Pre-privatization controls	X	X	X	X	X	X

Notes: Each observation is a firm. All firms in our sample were privatized in the period 1973–1989. To facilitate the interpretation of coefficients consider that the mean of the dependent variable in Panel A among firms not privatized is 0.41, 0.14, and 0.14 in columns 1-2, 3-4, and 5-6 respectively. The mean of the dependent variable in Panel B among firms not privatized is 0.62, 0.38, and 0.41 in columns 1-2, 3-4, and 5-6 respectively. The upper panel measures ownership in 1990 and the bottom panel in 1991-2005. Robust standard errors in parenthesis and p-values correcting for small sample inference in square brackets. Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. More details in section 5.1.

Table 6: Privatization, profitability, and internal capital markets

Dependent variable:	Return over equity				Providers		Receivers	
	Year 1990		Year 1991-2005		Year 1991-2005			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm privatized by Pinochet	-0.07	-0.08	-0.06	-0.03	0.09	-0.03	-0.05	-0.04
	(0.08)	(0.08)	(0.04)	(0.04)	(0.10)	(0.12)	(0.06)	(0.07)
	(0.30)	[0.29]	[0.12]	[0.49]	[0.34]	[0.77]	[0.38]	[0.53]
Firm sold to connected buyer		0.02		-0.04		0.20		-0.02
		(0.07)		(0.03)		(0.09)		(0.05)
		[0.75]		[0.23]		[0.03]		[0.75]
Firms	79	79	79	79	79	79	79	79
Industry fixed effects	X	X	X	X	X	X	X	X
Pre-privatization controls	X	X	X	X	X	X	X	X
Avg. dep. variable (non-privatized)	??	??	0.14	0.14	0.27	0.27	0.13	0.13

Notes: Each observation is a firm. All firms in our sample were privatized in the period 1973–1989. Robust standard errors in parenthesis and p-values correcting for small sample inference in square brackets. Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. More details in section 5.2.

Table 7: Robustness of results and omitted variables I

	Truncate matching (Crump et al. 2009)	Matching controls pscore controversial	Matching using k-nearest neighbor	Adds control for bus group pre	Drops firms with takeovers	Coefficient stability (Oster 2017)	Journalistic investig. (Mönckeberg 2001)	Extended sample
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Business group								
Privatized	0.21	0.21	0.04	0.25	0.27	0.42	0.27	0.01
	(0.14)	(0.15)	(0.13)	(0.31)	(0.19)		(0.13)	(0.14)
Connected buyer	0.11	0.11	0.14	0.09	0.14	-0.12	0.08	0.23
	(0.09)	(0.10)	(0.08)	(0.24)	(0.13)		(0.04)	(0.11)
Pyramid								
Privatized	0.04	0.03	0.24	0.08	0.08	-0.23	0.26	-0.12
	(0.19)	(0.19)	(0.13)	(0.41)	(0.23)		(0.18)	(0.13)
Connected buyer	0.39	0.40	0.43	0.56	0.49	0.39	0.25	0.48
	(0.13)	(0.13)	(0.17)	(0.25)	(0.17)		(0.10)	(0.12)
Wedge								
Privatized	-0.09	-0.09	0.08	-0.16	-0.06	-0.38	0.14	-0.29
	(0.19)	(0.20)	(0.13)	(0.41)	(0.22)		(0.19)	(0.14)
Connected buyer	0.38	0.38	0.43	0.62	0.52	0.50	0.13	0.45
	(0.14)	(0.15)	(0.17)	(0.22)	(0.17)		(0.19)	(0.14)
Firms	72	79	79	36	68	79	79	112
Industry fixed effects	X	X	X	X	X	X	X	X
Pre-privatization controls	X	X	X	X	X	X	X	X

Notes: Each estimate comes from a different estimation strategy. See section 5.3 for details. Robust standard errors in parentheses. Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 8: Robustness of results and omitted variables II

	Truncate matching (Crump et al. 2009)	Matching controls pscore controversial	Matching using k-nearest neighbor	Adds control for bus group pre	Drops firms with takeovers	Coefficient stability (Oster 2017)	Journalistic investig. (Mönckeberg 2001)	Extended sample
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROE								
Privatized	-0.03	-0.03	-0.01	-0.12	-0.04	-0.22	-0.05	-0.07
	(0.04)	(0.04)	(0.05)	(0.04)	(0.05)		(0.04)	(0.04)
Connected buyer	-0.04	-0.04	-0.05	-0.07	-0.05	0.002	-0.08	-0.03
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)		(0.02)	(0.03)
Providers								
Privatized	-0.04	-0.03	-0.08	-0.09	0.04	0.09	0.03	-0.02
	(0.11)	(0.12)	(0.11)	(0.23)	(0.14)		(0.10)	(0.09)
Connected buyer	0.20	0.20	0.23	0.16	0.08	0.22	0.45	0.20
	(0.09)	(0.09)	(0.09)	(0.16)	(0.11)		(0.09)	(0.09)
Receivers								
Privatized	-0.04	-0.04	-0.02	-0.05	-0.05	-0.16	-0.04	-0.10
	(0.07)	(0.07)	(0.06)	(0.11)	(0.08)		(0.06)	(0.05)
Connected buyer	-0.02	-0.01	-0.04	0.04	0.01	0.02	-0.09	-0.004
	(0.05)	(0.05)	(0.05)	(0.09)	(0.05)		(0.05)	(0.05)
Firms	72	79	79	36	68	79	79	112
Industry fixed effects	X	X	X	X	X	X	X	X
Pre-privatization controls	X	X	X	X	X	X	X	X

Notes: Each estimate comes from a different estimation strategy. See section 5.3 for details. Robust standard errors in parentheses. Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 9: Traditional and new business groups

Dependent variable is an indicator for business group affiliation in democracy (1990-)

	Firm belongs to a *new* business group		Firm belongs to an *old* business group	
Panel A – Year 1990	(1)	(2)	(3)	(4)
Firm privatized by Pinochet	0.37	0.32	0.09	0.06
	(0.13)	(0.16)	(0.18)	(0.19)
	[0.00]	[0.03]	[0.60]	[0.78]
Firm sold to connected buyer		0.08		0.06
		(0.14)		(0.16)
		[0.47]		[0.72]
Firms	79	79	79	79
Industry fixed effects	X	X	X	X
Pre-privatization controls	X	X	X	X
Avg. dep. variable (non-privatized)	0.00	0.00	0.41	0.41
Panel B – Years 1991-2005				
Firm privatized by Pinochet	0.34	0.27	-0.06	-0.06
	(0.16)	(0.18)	(0.18)	(0.20)
	[0.02]	[0.10]	[0.75]	[0.76]
Firm sold to connected buyer		0.10		0.00
		(0.15)		(0.16)
		[0.43]		[0.97]
Firms	79	79	79	79
Industry fixed effects	X	X	X	X
Pre-privatization controls	X	X	X	X
Avg. dep. variable (non-privatized)	0.07	0.07	0.55	0.55

Notes: Each observation is a firm. Old (new) business groups are defined as those that (did not) existed before the Pinochet dictatorship. All firms in the sample were privatized in the period 1973–1989. The upper panel measures business groups in 1990 and the bottom panel in 1991-2005. Robust standard errors in parenthesis and p-values correcting for small sample inference in square brackets. Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. More details in section 5.1