

Business Groups and the Value Implications of Ownership Transparency

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Abstract

We examine Korean business groups firms' transitions from circular-shareholding to pyramidal shareholding structures between 2011-2019. With the removal of circular-shareholdings, neither the *chaebol* families' degree of control of group firms nor the separation between their cash flow and ownership rights changed. Nevertheless, the removal of circular-shareholdings corresponded to a 10% decline in Tobin's Q and market returns relative to other group firms. This relative value decline is not explained by an increase in observed expropriation or erosion of access to internal capital markets. Instead, our evidence is consistent with shareholding transparency allowing investors to better identify agency issues among business group firms.

Keywords: Business groups; Cross shareholding; Pyramid shareholding; Corporate governance; Valuation

JEL: G18, G34, G38, G41, L51, M14, M52

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1. Introduction

Around the world, most companies are controlled by a dominant group of shareholders, typically the companies' founders and their family members (Burkart, Panunzi, and Shleifer, 2003).¹ A variety of mechanisms are used to facilitate and maintain the dominant shareholder's control, such as establishing share classes with differential voting rights or voting trusts. In the context of business groups, also pervasive around the world, control-enhancing ownership structures such as stock pyramids and cross (or circular) shareholdings are common mechanisms for maintaining control (Masulis et al., 2011).

The empirical literature has examined the consequences of business groups, but has generally taken the group structure as exogenously given and studied the consequences of the structures. The literature has traditionally focused on the wedge between the controlling family's voting and cash flow rights and how they influence accounting performance and valuation (Claessens, Djankov, and Lang, 2000; Faccio and Lang, 2002). Researchers have only begun to analyze the features of business group structures, addressing questions around why they arise, how they evolve, and the consequences of these features. As a first step in this direction, Almeida, Park, Subrahmanyam, and Wolfenzon (2011) develop empirical measures that describe the attributes and complexity of business groups (see Section 2. for a full description) and document novel empirical facts about the evolution of Korean *chaebols* (business groups). Among its main findings, Almeida et al. (2011) shows *how* corporate pyramids are formed and the prevalence of circular shareholdings in *chaebol* firms.

However, relatively little attention has been devoted to understand the *implications* of such circular shareholdings, despite their prevalence as a control-enhancing mechanism around the world. Compared to other control enhancing mechanisms, such as pyramidal or dual-class share structures, circular shareholdings make ownership structures substantially more opaque (Bebchuk, Kraakman,

¹Using a sample of public firms from 45 countries, Masulis, Pham, and Zein (2011) estimate that 19% of listed firms are part of family-controlled business groups; in emerging market economies, this number is estimated to be 40%.

and Triantis, 2000). Indeed, one of the open questions in this literature relates to the implications of ownership structure opacity.

A circular shareholding structure results from the cross ownership of group firms that create ownership “loops.” In its simplest variant, ownership loops can be created with reciprocal ownership between two firms: when firm A owns shares in firm B and vice versa. However, ownership loops can result from more complex arrangements, such as when firm A has ownership in B, B in C, and C in A.² Such ownership loops obfuscates the ultimate voting and cash flow rights in each firm. For example, a firm that pays out a dividend in such a loop is also a recipient of the payout. To the extent it mitigates investors’ ability to understand their cash flow rights from investing in the firm or their incentive alignment with the controlling shareholders of the firm (e.g., the controller’s wedge between cash flow and voting rights in the firm), the opacity of ownership resulting from ownership loops could portend significant valuation consequences.

In this paper, we examine the valuation implications of ownership opacity by exploiting a unique setting in South Korea: the regulatory mandate for *chaebols* to remove circular ownership structures and transition to a holding company (i.e., stock pyramid) structure. In the aftermath of the 1997 Asian Financial Crisis, the corporate governance of South Korean firms became a matter of significant priority and policy debate (Lee, 2017). Subsequently, through a series of legal amendments, the Korean Fair Trade Commission (KFTC) allowed for and incentivized the establishment of holding companies.³ A desired benefit of the holding company structure is its

²Masulis et al. (2011) estimates that 10% of business groups around the world employ reciprocal ownership structures. Claessens et al. (2000) obtains a similar estimate by analyzing business groups in East Asian countries. Because circular shareholding structures can result from structures more general and complex than reciprocal ownership, they are likely to be significantly more prevalent than the 10% estimate. For example, in our sample of South Korean *chaebol* firms, only 10% were part of reciprocal ownership arrangements; however, nearly 30% of firms were part of a circular ownership loop.

³In 1999, the “Fair Trade Act” was amended to allow for the establishment of holding companies under certain conditions. In 2007, the requirements for establishing holding company structure were relaxed. For example, the debt-to-equity ratio ceiling for the holding company was raised from 100% to 200%; the holding company’s legally required minimum shareholdings in subsidiaries was lowered from 30% to 20% for public subsidiaries and from 50% to 40% for private subsidiaries. To incentivize the transition to a holding company structure, the tax code was amended to provide holding companies tax relief on their dividend income. Holding companies’ dividend income from subsidiaries are fully tax exempt so long as it holds a significant portion of the subsidiary’s shares (40% ownership of public or 80% of private subsidiary shares); holding companies that do not meet these statutory ownership thresholds receive

relative transparency: unlike a circular cross-shareholding structure, in which capital flows through a complex web of circular inter-corporate linkages, capital flows through the business group in a linear fashion in a stock pyramid structure.

The Korean setting provides a unique opportunity to study the implications of cross-ownership structures and ownership opacity. First, the regulatory push towards a transition to holding company structures induces time series variation in business group ownership structure and its transparency. Second, the availability of extremely detailed data on the ownership structure of the country's business groups allows us to empirically study these questions of interest. Since the mid-1990s, the *chaebols* have been required to report the details of their group firms' cross ownership to the KFTC. As noted in [Almeida et al. \(2011\)](#), such detailed and comprehensive data about business groups' ownership structures are generally not available in other countries.

We study a comprehensive sample of public firms belonging to Korean *chaebols* from 2011 to 2019. To ensure the comparability and consistency of accounting information, our study period begins in 2011, when the transition to IFRS was completed in Korea. The focus on the 2011-2019 period is also appropriate since the vast majority of the transitions to a pyramidal structure took place after the 2008-2009 financial crisis. We leverage the business group shareholding data published by the KFTC to compute a variety of variables to characterize the structure of the business group. One of the main features of the business group that we focus on is whether a group firm is part of a circular shareholding ("loop") and, if so, the size of such a circular shareholding structure. To study the consequences of ownership structure opacity, we merge in financial statement and stock return data from Worldscope. The final sample of firms with available financial and market data consists of 1,951 group-firm-year observations over the nine-year sample period, or about 240 public firms per year.

To study the effect of ownership structure opacity, our main analysis begins by examining how firm value evolves when group firms that were part of a circular shareholding structure were no

a 80% tax exemption.

longer part of any ownership loops. We find that firms experiencing such a transition (“loop-removal firms”), relative to group firms that were not part of ownership loops, experienced a significant decline in Tobin’s Q (about 7-11%) as well as significantly lower stock returns (about 13-16 percentage points).

We empirically test three hypotheses for why loop-removal firms experienced relative value declines. First, we examine whether the loop-removal process entailed significant changes in *chaebol* families’ control and thus the alignment of their incentives with respect to loop-removal firms’ minority shareholders. We find that, although a *chaebol* family significantly increased its control of a group firm when it is added to a circular shareholding loop, the family’s control in a group firm does not significantly change as a result of loop removal. In addition to maintaining the level of control in loop-removal firms, we also find that the separation between *chaebol* families’ cash-flow and voting rights do not experience any significant changes as a result of loop removals. We also examine whether the “centrality” of firms significantly change as a result of loop removals. [Almeida and Campello \(2010\)](#) argues that *chaebol* families use more central firms in the business group to materialize transactions that benefit the family at the expense of shareholders (e.g., acquisitions that destroy value for non-controlling shareholders of the firm). However, we find that although a group firm’s centrality significantly increases when it is added to a circular shareholding loop, its centrality does not significantly change with loop removals. Thus, the relative value declines in loop-removal firms do not appear to be driven by a significant increase in the conflict of interest between *chaebol* families and minority shareholders.

Second, we examine whether the relative value decline could be due to increased financial constraints stemming from an erosion in loop-removal firms’ access to internal capital markets. To the extent that circular shareholding structure facilitates access to internal capital markets, group firms that have greater financial constraints could experience bigger valuation decline following loop removals. However, we do not find such valuation decline for the financially constrained firms. Instead, we find that the relative value decline concentrates in low-financial-constraint loop-removal

firms, consistent with the possibility that the relative value decline in loop-removal firms could be due to expropriation.

Third, we examine whether firms engaged in more expropriation after loop removal. We find that, although a group firm experiences a significant increase in related party transactions after it is added to a circular shareholding loop, it does not experience any significant changes in related party transactions as a result of loop removal, suggesting that the transition to holding company structure does not hamper the ability (or willingness) to engage in such transactions. Consistent with these findings, we also show that the removal of circular shareholding structure is not associated with significant changes in profitability (i.e., *ROA*). In addition, we also show that this relative value decline is not driven by equity transactions (e.g., equity swaps or merger transactions) that favor *chaebol* families and at the expense of other minority shareholders. Thus, the relative value declines in loop-removal firms do not appear to be driven by a significant increase in the ability or willingness to expropriate from minority shareholders.

Finally, we show the relative value decline in loop-removal firms is consistent with improved ownership transparency allowing investors to better identify agency issues among business group firms. Consistent with this possibility, we find that the relative value decline in loop-removal firms concentrates in those with a relatively high degree of separation between ownership and control. Moreover, the relative value declines are more significant in those firms in which the removal of loops contributes more to the transparency of the cash flow and ownership rights of the firm. Thus, ownership transparency allows for a revelation of the differences in group firms' conflict of interests, which lead investors to price group firms differently in the absence of changes in *chaebol* families' effective control, observed expropriation among group firms, or access to internal capital markets.

Our work makes several contributions to the literature analyzing business groups and ownership structures. First, we build on the work in [Almeida et al. \(2011\)](#) in studying the evolution of business groups. Using the innovative metrics of group structure first introduced by [Almeida et al. \(2011\)](#), we are the first to empirically analyze and document the consequences of ownership loop removals,

by leveraging the South Korean regulatory push to eliminate circular shareholdings from *chaebols*.

Second, we contribute novel evidence to literature that examines the relation between features of business group ownership structure and firm performance and valuation (e.g., [Bertrand, Mehta, and Mullainathan, 2002](#); [Baek, Kang, and Suh Park, 2004](#); [Claessens, Djankov, Fan, and Lang, 2002](#); [Joh, 2003](#); [Lins, 2003](#)). In particular, we show that the removal of circular shareholding structures can be associated with a significant valuation impact even when they are not accompanied by significant changes in control, agency conflicts, observed expropriation, or access to internal capital markets. Our findings suggest that ownership transparency *per se* can have valuation consequences, and we argue these consequences result from investors' improved abilities to discern the relative degree of agency problems between business group firms. In doing so, we highlight the importance of attribute of information transparency—transparency of ownership—that has been previously ignored by the literature studying the implications of transparency on valuation (e.g., [Lang, Lins, and Maffett, 2012](#)).

Finally, our work evaluates the effects of an important policy effort aimed at addressing a longstanding governance issue in Korea. Our study has implications for both investors and policy makers in countries where cross-shareholdings and circular ownership are more prevalent ([Claessens et al., 2002](#)), as our results suggest that governance transparency can have negative valuation effects for some business group firms.

2. Background

In this section, we describe the history of cross-shareholdings and their importance in Korean *chaebols*, and the regulatory reform efforts to eliminate such structure.

2.1. Origins of Cross-Shareholdings in Korean Chaebols

Business groups worldwide have traditionally sought to enhance control over their group firms through cross-shareholdings, that is when a group firm holds an equity stake in other group firms.

Pyramids are the the most predominant control-enhancing cross-shareholding structure. Another common structure involves circular ownership among group firms. For example, cross-shareholding can be reciprocal where two group firms own a stake in each other, which creates a circularity of ownership (i.e., one firm owns itself through its ownership of another group firm). The literature (e.g., [Claessens et al., 2002](#); [Faccio and Lang, 2002](#); [Masulis et al., 2011](#)) has documented that around 10% of business group firms are part of such reciprocal ownership patterns. However, this is a likely underestimate of the prevalence of circular shareholding, which can involve more complex arrangements. A simple example is a circular ownership loop involving three firms, A, B, and C, in which A has ownership in B, B in C, and C in A. This kind of circular ownership was prevalent in Korea, particularly among large business groups or *chaebols*. Circular cross-shareholdings are also common in other parts of the world, such as Russia, Japan, and Germany.

The popularity of these circular loops in Korea traces back to the 1980's, when the holding company or pyramidal structure (in which the family has a stake in a holding company which, in turn, has stakes in group firms) was outlawed. Consequently, to expand in size while preserving control without having to build commensurate ownership, *chaebols* resorted to more complex organizational structures involving circular ownership. [Almeida et al. \(2011\)](#) documents that in the early 2000s, around 25% of *chaebol* group firms in Korea were parts of loops. In 2011, when our sample begins, we estimate that around 27% of public firms in Korea were parts of loops.

The organizational structures of *chaebols* could be highly complex, involving intricate webs of ownership patterns. As an illustration, Figure 1 present a partial depiction of the organizational structure of Lotte in April 2016, involving only 6 of the more than 70 affiliated firms in the group with the arrows indicating the direction of ownership. Even from this partial depiction, we can infer that computing ownership metrics for this small set of companies is not an easy task. In the figure, we can also observe an ownership loop in which Lotte Confectionery owns 7.9% of Lotte Shopping, which owns 34% of Daehong Communications, which again owns 3.3% of Lotte Confectionery. Such a circular loop, through which a firm can have ownership stake in itself, further obfuscates the cash

flow and voting rights of a group firm’s shareholders. To accurately estimate such rights requires one to understand the details of ownership structure across group firms, and to estimate the value of a group firm requires estimating the enterprise cash flows of group firms and solving a complex system of equations (Elliott, Golub, and Jackson, 2014). Clearly, circular ownership structures impose substantial information processing costs for governance and valuation purposes.

2.2. Reforming Cross-Shareholding

Over time, the complex web-like structures of cross-shareholding invited criticism from investors and regulators. The Asian Financial Crisis of 1997 first prompted concerns among regulators that the intricate networks of ownership among corporations exacerbated matters by propagating financial distress among firms.⁴

Subsequently, regulators have focused on governance opacity as a problematic feature of circular cross-shareholding. The persistent undervaluation of Korean firms (“the Korea discount”) relative to firms in other East Asian economies has been a source of concern for regulators and investors alike. Observers pointed to the ubiquity of cross-shareholdings loops as a driver behind this discount. They argued that the opaque ownership structures made it challenging to determine the control and ownership of the controlling family, thus obfuscating potential agency issues, making monitoring difficult, and driving valuations lower.

Consequently, reforming *chaebols* by motivating them to unwind their cross-shareholding structure became a critical agenda of regulators. As a first step, in 1999, regulators amended the “Fair Trade Act” to allow for the establishment of holding companies under certain conditions; at the same time, reciprocal ownership between *chaebol* companies was outlawed.⁵ In 2007, the requirements for establishing holding company structure were further relaxed. For example, the

⁴Somewhat contrary to this notion, academic evidence (e.g., Almeida et al., 2011; Baek et al., 2004) suggests that *chaebols* withstood the financial crisis better than non-*chaebol* firms, primarily due to their internal capital markets.

⁵However, academics (e.g., Almeida et al., 2011; Claessens et al., 2002) have documented that this sort of cross-shareholding structures was still prevalent in Korean *chaebols* in the early 2000s. In our sample, we find that around 10% of cross-shareholding loops involved only two firms.

debt-to-equity ratio ceiling for the holding company was raised from 100% to 200%; the holding company's legally required minimum shareholdings in subsidiaries was lowered from 30% to 20% for public subsidiaries and from 50% to 40% for private subsidiaries. To incentivize the transition to a holding company structure, the government amended the tax code to provide holding companies tax relief on their dividend income. Holding companies' dividend income from subsidiaries are fully tax exempt so long as it holds a significant portion of the subsidiary's shares (40% ownership of public or 80% of private subsidiary shares); holding companies that do not meet these statutory ownership thresholds receive a 80% tax exemption.

The reform agenda has gathered momentum over the last decade, partly precipitated by popular pressure on politicians to reduce corruption among *chaebol* firms. In 2014, the KFTC revised the country's antitrust law to classify all business groups with 10 trillion won (approximately US\$10bn) in assets as conglomerates and put them on a watch-list to monitor the prevalence of circular cross-shareholdings. The drive to remove loops was further expedited with the election of a new political administration in 2017, which backed the reforms pursued by the KFTC.⁶ As a result of these regulatory pressures, the number of *chaebols* with any cross-shareholding loops dropped from 17 in 2011, when our sample begins, to only four (Hyundai Motor Group, Teakwang Group, SM Group, and KG Group) as of May 2021, a nearly 80% decline.

2.3. Popular Mechanisms to Unwind Cross-Shareholding

We briefly describe some of the popular mechanisms through which *chaebols* unwound circular cross-shareholding structures. One popular mechanism involved group firms selling their stake in other group firms on the open market or to the controlling family. However, this model was typically considered to be costly for the controlling family, which had to expend considerable additional resources of their own to purchase these stakes.⁷

⁶See, for example, "South Korea's chaebol edge closer to democracy," *Nikkei Asia*, Peter S. Kim, <https://asia.nikkei.com/Economy/South-Korea-s-chaebol-edge-closer-to-democracy> (accessed 9 May 21).

⁷For example, in implementing this strategy, the Shin family of Lotte spent approximately \$1bn during the group's transition to a holding company structure.

Another popular mechanism involved split-offs and mergers. Firms that were part of loops were first split off into two companies: a “holding company” and an “operating company.” In this structure, the holding company would own the operating company while shareholders would own shares of both companies. Next, the holding companies of all the firms which were parts of loops would merge to form a consolidated holding company where the founding family would concentrate their ownership. This model of transitioning placed a lower financial burden on the controlling family while preserving control. We illustrate this mechanism in Figure 2 with an example involving the Lotte Group. Initially, four companies within Lotte: Lotte Confectionery, Lotte Chilsung, Lotte Food, and Lotte Shopping (Step A) were part of a cross-shareholding structure. In the next step (Step B), these companies were individually split into holding companies and operating companies. Finally, in Step C the holding companies merged to form Lotte Corporation which had ownership in all four operating companies created in Step B. Following this transition, the partial example of Lotte’s cross-shareholding ownership structure in 2016 (shown in Fig. 1) changed to a more straightforward, linear holding company structure by 2017 (shown in Fig. 3). As can be seen from the figure, computing the family’s voting rights and effective ownership in the operating companies is more straightforward in this structure.

3. Measuring Changes in Business Group Structure

The push towards removing circular cross-shareholdings in Korea represents a unique effort to improve corporate governance by changing ownership structure and improving ownership transparency. Coupled with the detailed ownership data made available by the Korean Fair Trade Commission (KFTC), this phenomenon presents an ideal opportunity to study the valuation and governance implications of changes in organizational structure and ownership transparency. In this section, we briefly describe the measurement techniques and the data sources that allow us to accurately capture the phenomenon.

3.1. Metrics of Group Structure

In this section, we describe the formulation of, and intuition behind, the empirical measures of group structure we use. Almeida et al. (2011), which introduced these measures in the context of Korean *chaebols*, carries a more detailed explanation behind each measure.

To derive these measures, we represent the inter-corporate holdings within a business group for a particular year as a matrix as follows:

$$C = \begin{bmatrix} 0 & c_{12} & \dots & c_{1N} \\ c_{21} & 0 & \dots & s_{2N} \\ \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot \\ c_{N1} & c_{N2} & \dots & 0 \end{bmatrix}$$

where c_{ij} represents the ownership of group firm i in group firm j and N represents the total number of firms in the group. We also represent the family's direct stake in all firms in the group as a vector $f = [f_1 \ f_2 \ \dots \ f_N]'$

3.1..1 Ultimate ownership

The family's ultimate ownership or cash-flow rights in a group firm, i , comprises its direct stake in the firm and the indirect stake through its holdings in other group firms that have direct or indirect stakes in i . Measuring ultimate ownership requires us to be able to observe all the ownership ties within a business group. Nevertheless, even with ownership data, ultimate ownership is difficult to compute. We would need to trace all possible links from the family to a group firm in a purely pyramidal structure. We would then need to multiply the ownerships along each chain and add them to the ultimate ownership. For *chaebols* with intricate networks of both pyramidal ownership and cross-shareholding loops, this approach is infeasible because firms in loops theoretically have *infinite* chains leading to it. Almeida et al. (2011) offer an elegant approach to compute this using

the matrices defined above.

If we represent the family's ultimate ownership in group firms as $u = \begin{bmatrix} u_1 & u_2 & \dots & u_N \end{bmatrix}'$, we can derive:

$$u = f'(I_N - C)^{-1} \quad (1)$$

where I_N is the $N \times N$ identity matrix.

The elements of the above vector represent the family's ultimate percentage ownership of the cash-flows of each group firm for a particular year. We label this variable as *Ultimate ownership*. The intuition behind this formula lies in tracing the flow of one dollar of dividends paid by a group firm, i . In the first round, the family and all other group firms receive what their direct ownership in i dictates. In the next round, we imagine all group firms paying out what they receive from i . The family will receive part of this again through their direct stake in all group firms. However, a smaller portion will again accrue to all group firms based on the cross-shareholding matrix. We can iterate this forward infinitely to arrive at the formula for ultimate ownership of the family in the dollar of dividend paid by firm i .

3.1.2 Loop

We can use the same framework to identify whether a firm is part of a cross-shareholding loop. If a firm, i , that is part of a loop, pays out a dollar of dividends, then a part of that dividend will reappear in firm i . We can denote the dividend paid by i as a vector of zeroes with a one in the i th position. Let

$$loop_i = \min[n/n \geq 1 \text{ and } d_i' C^n d_i > 0] \quad (2)$$

Firm i is a part of a loop if and only if $loop_i < \infty$. $loop_i$ gives the number of firms in the shortest loop i is a part of. We create an indicator variable, *Loop* denoting whether a firm is a

part of a loop in a particular year. We separate changes in this variable into mutually exclusive partitions – *Add loop* indicates if *Loop* was 0 in the prior year and 1 in the current year; *Remove loop* indicates if *Loop* was 1 in the prior year and 0 in the current year. We also create a variable, *Loop size*, to capture $loop_i$. We use this variable to capture more continuous change in a firm’s loops. *Add loop-size* captures increases in *Loop size* while *Remove loop* captures decreases. We multiple *Remove loop* by -1 such that higher values of *Remove loop* captures greater reductions in *Loop size*.

3.1..3 Control

Computation of control rights presents an even more challenging exercise for the *chaebols* with their intricate network of ownership ties. To determine whether a group firm is under the family’s control, we need to determine the fraction of voting rights held by intermediate firms that the family controls. In order to do that, we need to determine which of the intermediate firms are controlled by the family. For pyramids, the literature (e.g., [La Porta, Lopez-De-Silanes, and Shleifer, 1999](#)) has taken the approach of identifying a “chain of control”. This approach requires determining a threshold of ownership for control and then identifying chains leading up to the family, in which each entity (firm or family) owns more than the threshold in the firm just below it in the chain. All firms which are a part of such a chain of control are assumed to be controlled by the family. [Faccio and Lang \(2002\)](#) use the idea of the weakest link to compute the effective voting rights in firms controlled by the family through a chain of control. The weakest link is defined as the minimum stake along the chain of control for a particular firm. If the family controls a firm through multiple chains of control, this approach would require adding up the minimum stakes over all the chains. As [Almeida et al. \(2011\)](#) points out, there is no clear intuition behind the idea of adding up the weakest links. Moreover, if there are multiple chains of control leading to a firm, adding up the weakest links could imply the family owns more than 100% of the voting rights in the firm. The idea of the weakest link is also not well-defined for firms that are parts of loops because, theoretically,

they are parts of infinite chains.

Almeida et al. (2011) introduces a robust way of identifying control and computing voting rights which is agnostic of the structure of the group. We adopt this approach for our purposes. We are required to make two assumptions for this approach: (1) There is a threshold of voting rights, T , which determines whether a firm is under the family’s control or not (2) If a family controls a firm, it controls the votes that this firm holds directly in other firms. Then, for a given threshold, T , we can identify the set of firms controlled by the family as:

$$C(T) = \left\{ i \in N : f_i + \sum_{j \in C(T), j \neq i} c_{ji} \geq T \right\} \quad (3)$$

We compute this set for each group every year by assuming a control threshold of 30%.⁸ We designate firms in this set as being under the family’s control in that year and create an indicator variable, *Control*, to capture this set.

3.1..4 Voting Rights

Computing the family’s effective voting rights in a group firm is relatively simple once we have obtained the set of firms controlled by the family for a particular threshold. For each group firm, we simply add up the direct ownerships of the family and all other group firms which are controlled by the family to arrive at effective voting rights. We label this variable *VR* for our analysis. We subtract *Ultimate ownership* from *VR* to create *Separation* which captures the separation between the family’s effective voting rights and ultimate cash-flow rights in a group firm.

⁸Our choice of 30% is relatively conservative compared to some other papers in the literature (e.g., Faccio and Lang, 2002; La Porta et al., 1999). Even with this threshold, the family controls more than 65% of all group firms (public and private) in our sample. In untabulated tests, we verify that our results are robust to lower values of the threshold.

3.1.5 Centrality

Almeida et al. (2011) introduce two measures of “centrality”, i.e., the role played by a group firm in ensuring the family’s control over other group firms. We adopt the relatively simpler measure, the aggregate equity stake of group firm, i , in other group firms scaled by i ’s assets. In the absence of data on private firms, we only consider public group firms while computing our measure of *Centrality*.

3.1.6 Loop dependency

We create an additional measure of group structure, *Loop dependency*, to capture a loop’s effect on the difference between effective ownership and direct ownership. Equation (1) shows that the family’s direct ownership in any group firm is translated to effective ownership by the $(I_n - C)^{-1}$ matrix. We refer to this matrix as the dependency matrix, D . Elliott et al. (2014) show that for firms that are parts of loops, the diagonal elements of D are necessarily greater than 1. The intuition here is that since loop firms also own themselves, effective ownership in a loop firm is always greater than direct ownership. When a firm is removed from a loop, this value reverts to 1. Therefore, for a group firm, i , we compute *Loop dependency* as the change in D_{ii} from the prior year to the current year, multiplied by 100. For firms that are not parts of loops, this variable is necessarily zero. All else equal, this change will reflect the percentage change in effective ownership when a loop is removed. To the extent that loops obfuscate true ownership, we posit that *Loop dependency* captures the degree of this obfuscation. However, we recognize this proxy only captures a part of the transparency effects of the removal of loops.

3.2. Data Description

To compute the measures of group structure described in the previous section, we rely on ownership data from the Korean Fair Trade Commission (KFTC). A key mandate of the KFTC is restraining the concentration of economic power, especially among a small number of business

groups. For that purpose, the KFTC has a special division, called “Business Group Bureau,” which regulates *chaebol* activities that include formulating and administering corporate governance policies. Among other regulations, the KFTC requires detailed disclosure of ownership data. KFTC has managed the *Business Group Portal* website as a market monitoring tool since July 2007, where *chaebol* firms are required to disclose their complete ownership data on April 1 of each year. There are two primary datasets: cross-shareholding and insider ownership data. The cross-shareholding dataset captures, both in numbers and in percentage, how much each *chaebol* company owns in another group company. The insider ownership dataset provides details on how much of a group firm is owned by the controlling family, relatives of the family, affiliates, etc. From the ownership database, we obtain data on all *chaebol* firms for 2011 - 2019. Using this dataset, we compute metrics of group structures for all *chaebol* firms, both public and private.

For accounting and financial data of listed Korean companies, we rely on Datastream and Worldscope, which we manually match with the KFTC data. We match KFTC data from April of a particular year to financial data for the prior fiscal year for our analyses. Our matching procedure yields a sample of approximately 1,850 firm-year observations on public *chaebol* firms between 2011-2019. Finally, we obtain data on related party transactions from the Korean Listed Company’s Association database.

3.3. Summary Statistics

Table 1 reports summary statistics for accounting and financial variables, as well as variables related to group structure and ownership for the sample of listed *chaebol* firms used in our analyses.

Given data availability, we end up with a sample of around 1,850 firm-years between 2011 and 2019. The difference between the number of observations on variables related to group characteristics and ownership and the financial variables is due to attrition while merging the KFTC data with the Worldscope-Datastream database. The sample with related party transactions, which we obtain from the Korean Listed Companies Association database, is smaller, amounting to 1,576

firm-years. We use this smaller sample only for our analyses in Table 7.

The summary statistics suggest that, in our sample, the family controls the median listed group firm with only 1% direct ownership. The family’s direct stake, *Family stake*, in the median firm is only 1%. However, through a mix of pyramids and loops, the family’s cash-flow rights, *Ultimate ownership*, in the median firm is 17%. The family’s voting rights, *VR*, in the median firm (assuming a control threshold of 30%) is even higher at 33%, which means the family controls the median firm at a threshold of 30% – the median value of *Control* is 1. The average value for *Control* suggests that at a threshold of 30%, the family controls 54% of listed group firms. *Loop* which indicates the presence of a cross-shareholding in a firm for a particular year, has an average value of 0.16, i.e., over our entire sample, 16% of listed group firms were part of a cross-shareholding loop. Naturally, the prevalence of a loop varies over time as groups unwind their circular cross-shareholdings. The average for *Loop* is 0.27 in 2011, when our sample begins, but decreases significantly to 0.05 in 2019, the last year in our sample.

4. Empirical Analysis

In this section, we test the valuation implications of the removal of cross-shareholding loops. We also examine potential mechanisms behind the valuation effects to describe their relative influence in the data.

4.1. Valuation Effects of Cross-shareholding Changes

In our first set of tests, we estimate the following empirical model to test whether changes in a firm’s loop status is associated with future valuation, as measured by Tobin’s Q:

$$\begin{aligned}
 Q_{i,t+1} &= \alpha + \beta_1 \times \text{Add Loop}_{i,t} + \beta_2 \times \text{Remove Loop}_{i,t} + \gamma X_{i,t} \\
 &+ \text{year}_t + \text{group}_g + \text{industry}_j + \epsilon_{i,t}.
 \end{aligned}
 \tag{4}$$

Here the outcome variable is a firm’s Tobin Q in the year following changes in cross-shareholding status. *Add Loop* and *Remove Loop* capture these changes, indicating if a firm became a part of a loop or whether it ceased to be part of a pre-existing loop in the current year, respectively. We partition the changes in the cross-shareholding structure into additions and removals, separately, for two main reasons. First, to the extent that addition and removals might have asymmetric effects, this partition allows us to identify better the effect of removal from loops which directly reflects the phenomenon we are interested in – the transition of Korean *chaebols* to a holding-company structure. Second, instances of loop-additions are significantly fewer than loop-removals.⁹ The vector of controls, $X_{i,t}$, includes return-on-assets, log of market capitalization, leverage, and the past 12-month’s stock returns. To control for the separation between the family’s ownership and voting rights in a group firm, we include other measures of group structure (*Ultimate ownership*, *Control* and *VR*) as controls.¹⁰ Our main empirical specification includes group, time, and industry fixed effects. The industry classification is based on the first digit of a firm’s primary industry classification and is analogous to a one-digit standard industrial classification (SIC) in the US. To alleviate the concern that our results might reflect a general association between loops and valuation, we also test a specification with firm fixed effects. To address the concern that time-varying factors at the group and firm level might confound our inferences, we also test specifications with group-year fixed effects and lagged versions of Tobin’s Q as additional controls. We cluster standard errors at the firm level.

The results, reported in Table 2 suggest that the removal of loops, for a particular firm, is associated with lower Tobin’s Q in the following year. Column 1 estimates the simplest specification with the indicators for changes in loop-status, group fixed effects, and time fixed effects. The coefficient on *Remove loop* suggests that compared to firms in other *chaebols* in the particular year, as well as firms in its *chaebol*, firms that were extricated from loops experience a statistically significant

⁹There are 28 instances of a public firm becoming a part of a loop relative to 67 instances of a firm being extricated from a loop in the sample for our main analyses

¹⁰In untabulated tests, we also include controls for a firm’s relative position in the group structure (namely *Position* and *Centrality*). The results are quantitatively and qualitatively similar.

(at the 1% level) relative decrease in Tobin’s Q of 0.115. This effect is economically significant and represents around 10% of the average Tobin’s Q of Korean *chaebol* firms in our sample period. Columns 2-5 of report estimates from increasingly robust estimates relative to Column 1. Column 2 introduces industry fixed effects while Column 3 adds controls for contemporaneous financials and measures of group structure. The coefficient on *Remove loop* remains both economically and statistically significant. Column 4 imposes our design’s most restrictive fixed effects structure by switching out industry and group fixed effects for firm and group-year fixed effects. The coefficient of -0.071 on *Remove loop*, though somewhat smaller, is still economically meaningful and statistically significant at the 5% level. Finally, Column 5 switches out the firm fixed effects for the contemporaneous and lagged values of Tobin’s Q to control for time trends in firm valuation that might be correlated with the removal of loops. The coefficient on *Remove loop* remains stable and statistically significant.

In Table 3 we augment our analyses of Q by documenting a similar association between future stock returns and removal of loops. These results suggest that lower stock returns drive the relatively lower Q for firms that had loops removed. They also alleviate two other concerns — that mismeasurement of Q drive our main results or that Q was already low for firms that had loops removed. The empirical model for the analyses involving returns is the same as in Equation (4) except that we now use stock market returns over the next fiscal year as the outcome variable. As in Table 2, Columns 1 - 4 report results from increasingly robust specifications. Column 1 reports the simplest specification involving the indicator variables of interest and group and year fixed effects, while column 2 introduces industry fixed effects. The coefficients on *Remove Loop* suggests that in the year following the removal of loops, the treated firms experienced stock returns that were relatively lower by approximately 15 percentage points. This effect is statistically significant at the 1% level. Column 3 adds firm controls barring the lagged dependent variable, i.e., stocks returns from the contemporaneous fiscal year. Column 4 includes the full set of firm controls used in Table 2. The coefficient on *Remove Loop* remains negative, economically meaningful at an average of 13.6

percentage points, and statistically significant at the 5% level.

Overall, the results in Tables 2 and 3 suggest that loop firms tend to have relatively lower valuations following the unwinding of loops. We want to stress the relative nature of our results because the unwinding of loops is unlikely to affect just the firms that were part of loops. If the unwinding of loops reduces opacity surrounding ownership and control, that will extend to other firms in the group.

4.2. Exploring Mechanisms

The results in the previous section document a robust negative association between the removal of loops and future valuations and stock returns. While the unwinding of loops makes it easier to trace the flow of ownership and control within the group, the redesign could also very plausibly induce *actual* changes in the way a group operates. In this section, we examine three channels of real changes which could explain the lower valuation of loop firms following the removal of loops.

4.2.1 Changes in Ownership and Control Rights

Our first set of tests in this section suggest that an exacerbation of agency concerns between the family and minority shareholders in the loop firms is unlikely to explain our main result. We test this by examining three outcome variables – *Forward Control*, *Forward Separation*, and *Forward Centrality*. An extensive literature has documented that controlling families use group firms to undertake various activities that transfer wealth from firms where the family has a higher separation between ownership and control to ones where the separation is relatively lower. Consequently, we examine whether a loop firm is more likely to be under the family’s control and whether the separation of the family’s ownership and control in a loop firm changes following the unwinding of the loop. Almeida et al. (2011) also document that loop firms are likely to be more *central*, in that they are more critical for maintaining the family’s control over other group firms. They also document that *central* firms tend to trade at lower valuations. It is plausible that in the absence

of a loop, firms that were part of the loop become more critical in allowing the family to maintain the same levels of control over group firms which could explain our main result. To examine this possibility, we examine whether the *Centrality* of loop firms changes following the unwinding of the loop. The empirical tests follow the same design as in our main tests. We regress the outcome variables of interest on *Add Loop*, *Remove Loop* and the same set of controls and fixed effects used for the analyses reported in Column 3 of Table 2.

Table 4 tabulates the results of these analyses. Columns 1, 3, and 5 report results using the respective outcome variables and only financial controls. Columns 2, 4, and 6 augment the specification in the preceding column by adding group-structure controls. Columns 1-6 all report coefficients on *Remove Loop* which are statistically indistinguishable from zero. Interestingly, for all outcome variables, we find a positive and statistically significant coefficient on *Add Loop*. The coefficients on *Add Loop* in Columns 1 and 2 suggest that the likelihood that a group firm is under the family's control goes up by 18-40% of the sample average following the addition to a loop. The coefficient on *Add Loop* in Column 3, which is positive and significant at the 10% level, suggests that the separation of the family's ownership and voting rights in a group firm increases when it becomes part of a loop. The effect is economically meaningful and represents about 36% of average *Separation*. Similarly, the results in Columns 5 and 6 suggest that *Centrality* is meaningfully relatively higher for group firms after they are added to a loop.

Overall, these results suggest that actual changes in agency issues associated with group structure are unlikely to explain our results. Being added to a loop is associated with a potential exacerbation of agency issues between the family and a group firm's minority shareholders. However, the unwinding of loops does not seem to have a discernible effect on the proxies for agency problems. An alternative interpretation of our results might be that the lack of a positive and statistically significant coefficient on *Remove Loop* is indicative of a reversal of the effects captured by the coefficients on *Add Loop*. This alternative interpretation would suggest that agency issues are reduced following the unwinding of loops, suggesting a relative improvement in the value of

loop firms. We do not find that to be the case in our main results.¹¹

4.2.2 Internal Capital Markets

In our next set of tests, we attempt to rule out the possibility that the effects we observe are driven by the unwinding of loops leading to a disruption to internal capital markets within a business group. A large literature (e.g., [Gopalan, Nanda, and Seru, 2007](#); [Khanna and Palepu, 2000](#); [Stein, 1997](#)) discusses the role of business groups or conglomerates in internal capital allocation — financially constrained group firms are supported by group firms with excess capital relative to investment opportunities. [Almeida, Kim, and Kim \(2015\)](#) and [Baek et al. \(2004\)](#) also document the beneficial role of internal capital markets within Korean *chaebols*. It is plausible that the reorganization of business groups during the unwinding of loops could impede internal capital markets and thus affect firm value. We attempt to test this possibility by examining how the effect of loop removal varies with financial constraints. The internal capital markets explanation would predict that the loss in value following loop removal should be higher among financially constrained firms.

Table 5 examines the association between *Forward Q* and *Remove Loop* separately for firms with high or low levels of financial constraints. We proxy for financial constraints using the variables *Cash to Assets* and *Debt to CF* defined in Appendix A. We use the cross-sectional median of the proxies to classify firms as being constrained or not. Firms with higher (lower) than median values of *Cash to Assets* (*Debt to CF*) are classified as “Low Constraint” while the converse holds true for firms classified as “High Constraint”. Columns 1 and 2 report results of estimating Equation (4) separately for the subsamples partitioned by *Cash to Assets*. The coefficient on *Remove Loop* is negative and statistically significant at the 1% level for the “Low Constraint” sample while it is

¹¹Our analyses for *Forward Control* includes the contemporaneous *Control* as a control variable in Column 2. Column 4 includes the two components of *Separation*, *Ultimate ownership* and *VR* as control variables. If a firm’s removal from a loop meant a reversal of the effects of being added to a loop, we would expect to see a negative coefficient on *Remove Loop* in these specifications. In untabulated tests, we include the contemporaneous *Centrality* as a control variable and obtain qualitatively and quantitatively similar results.

statistically indistinguishable from zero for the “High Constraint” sample. These results contradict the explanation that an impediment to internal capital markets explains our main results. The results in Columns 3 and 4 using *Debt to CF* as the partitioning variable also do not suggest that our results are explained by variation in financing constraints. The coefficient on *Remove Loop* is negative and statistically significant for both sub-samples. The point estimate is larger for the sample with lower constraints.

Overall, the results in Table 5 suggest that changes in internal capital markets are not driving our results. Conversely, the observation that our main result is magnified for firms with more cash on their balance sheets points towards an expropriation-based explanation of our main result.

4.2.3 Identifying Agency Issues

In this section, we validate whether an expropriation-based explanation fits our results. We examine this possibility by studying how the effect of loop removal varies with potential conflicts of interest between the family and minority shareholders. We proxy for conflicts of interest using *Separation*. As in the previous analyses, we partition firms using the cross-sectional median of the proxy. Firms with *Separation* higher (lower) than the median for the particular year are assumed to have higher (lower) conflicts of interest.

Table 6 reports results of this analysis. Column 1 reports results of estimating Equation 4 for the subsample with lower than the median values of *Separation* while Column 2 reports results for the sample with values higher than the median. The coefficient on *Remove Loop* is negative and statistically significant (at the 1% level) for the subsample likely to have high conflicts of interest, while it is not statistically distinguishable from zero for the subsample with potentially lower conflicts of interest. In other words, only loop firms with potential conflicts of interest seem to experience relatively lower valuations compared to similar group firms following the removal of loops.

4.2.4 Evidence of Expropriation

In this section, we test if the controlling family used the transactions undertaken to unwind loops to facilitate wealth transfer from loop firms with higher conflicts of interest to other group firms. We attempt to test this explanation by first examining evidence of tunneling following the removal of loops. An extensive literature (Bertrand et al., 2002, e.g.,) has documented tunneling in business groups, including Korean *chaebols*. We use two measures to capture tunneling – related party sales and profitability. More specifically, we examine the behavior of *Forward RPT to Assets*, *Forward RPT to Sales*, and *Forward ROA* following the removal of loops. Hwang and Kim (2016) document that related party sales are used as a means of financial support between firms in Korean *chaebols* while Almeida et al. (2011) and Bertrand et al. (2002) use profitability to examine tunneling. The specification using *Forward ROA* also tests whether the removal of loops was associated with the loop firms undertaking sub-optimal acquisitions or transactions to the extent they affect profitability in the following year. The empirical model for these tests remains the same as in Column 3 of Table 2 except the choice of outcome variables.

Columns 1 and 2 of Table 7 reports results examining related party transactions scaled by assets and sales, respectively. The coefficient on *Remove Loop* is statistically indistinguishable from zero in both columns suggesting that group firms did not undertake measurably higher or lower amounts of related party transactions following removal of loops. Echoing our results in Table 4, the coefficients on *Add Loop* are positive and statistically significant. The economic magnitude of the coefficient is meaningful, representing around 50% of the average value of the outcome variables in our sample. Columns 3 and 4 report results using *Forward ROA* as the outcome variable in our preferred empirical specification. The results in the two columns vary only in the omission of *ROA* as a control variable in Column 3. The coefficients on *Remove Loop* are again not statistically different from zero in both columns. The coefficients on *Add Loop* are negative but not statistically significant in both columns.

Column 5 examines the possibility that sub-optimal sales or purchases of their shares by group

firms, with conflicts of interest, during the unwinding of loops drives our results. We test this indirectly by omitting all firms that experienced a greater than 5% change in their treasury shares from our sample. We replicate the specification used in Column 3 of Table 2 using this truncated sample and find nearly identical results. The coefficient on *Remove Loop* is -0.102 and statistically significant at the 1% level.

Overall, the results in Table 7 suggest that expropriations by the controlling family during the transition do not explain our results. Taken together with the results in Table 4 they also provide some evidence that agency issues increased following the addition of a firm to a loop, but did not change measurably following the removal of a firm from a loop.

4.3. Variation with Loop Complexity

Thus far, our empirical results suggest that identifying conflicts of interest in loop firms rather than actual expropriation explains the valuation consequences of removing loops. This section attempts to validate this explanation by examining variables more likely to be associated with gradual changes in ownership transparency. Our empirical design follows that of Table 2, but here the explanatory variables of interest we examine are *Add loop-size*, *Remove loop-size*, and *Loop dependency*. As explained in Section 2., the first two explanatory variables capture expansion or reduction in the size of a loop a firm is a part of, while *Loop dependency* attempts to capture a part of the effect of a loop on the disassociation between direct and effective ownership.

Table 8 reports the results of our empirical tests. Column 1 estimates Equation 4 using our original sample, *Add loop-size* and *Remove loop-size* as explanatory variables, and the set of controls used in all our empirical analyses. We find a negative and statistically significant (at the 5% level) coefficient of -0.023 on *Reduce loop-size*. This suggests that larger reductions in the size of a loop resulted in greater relative decreases in the value of loop firms. Column 2 uses the same sample but uses *Loop dependency* as the explanatory variable. We find a negative and statistically significant (at the 1% level) of -0.030 on *Loop dependency*. This suggests that if a loop introduced a

1 percentage point difference between direct and effective ownership in a loop firm, removal of that disassociation resulted in Q being lower by 0.03 or approximately 3%. In Column 3, we use the same specification, but narrow our sample to include only firms which were added to or removed from loops or firms which were still a part of loops. This sample effectively captures the population of firms where we can observe any changes in *Loop dependency*. As explained in Section 2., *Loop dependency* is necessarily zero for all other firms in our sample. Again, we find a negative and statistically significant (at the 1% level) coefficient of -0.028 on *Loop dependency*. Collectively, these results suggest that greater reductions in the obfuscation of ownership of a group firm were associated with a larger decrease in value relative to other business group firms.

5. Conclusion

This paper sheds new light on the consequences of the evolution of business groups by studying a salient governance phenomenon—the transition of Korean *chaebols* to more transparent organizational structures. We provide evidence that the transition to pyramidal structures through the removal of ownership loops had significant value implications even though they did not have any discernible effects on the ability or willingness of controlling families to expropriate from minority shareholders or firms’ access to internal capital markets. Firms removed from loops experienced a decline in valuations relative to other group firms (that were never a part of ownership loops), and this effect was due in part to the transparency of ownership rights. Our evidence suggest that the ownership transparency allows for a revelation of the differences in group firms’ conflict of interests, which lead investors to price group firms differently.

We leave many questions open for future research. While we document robust evidence of a relative decline in value, we do not attempt to infer value implications at a group level. Our findings are consistent with the relative declines in value reflecting an improvement in the value of firms that were not parts of ownership loops, who benefit from the improved transparency of ownership across group firms. Thus, the group-level effects of this transition remain an open area for investigation.

Moreover, while our findings analyze the short-horizon effects of a reasonably nascent phenomenon, the long-term effects of these structural changes in *chaebol* firms remain to be seen. Such analyses could have important policy implications particularly relevant for economies where complex cross-shareholdings are prevalent. We look forward to further research in this area.

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Appendix A Description of Variables

This table defines accounting and financial variables used in our analyses. The construction of variables based on the ownership data obtained from the Korea Fair Trade Commission Business Group Portal (<https://www.egroup.go.kr/egps/wi/stat/spo/psitnCompnyStockHldList.do>) is described in Section 2. Data on related party transactions are obtained from the Korean Listed Companies Association. All financial data are obtained from the Thomson Reuters Datastream database: Datastream variable codes are specified in brackets in the Computation column. *Forward* variables refer to the year-ahead value while *Lagged* refers to that from the prior year.

Variable	Description	Computation
<i>Cash-to-Assets</i>	Ratio of cash and short-term investments to total assets	Cash & Short-Term Investments [WC02001] / Total Assets [WC02999]
<i>Debt-to-CF</i>	Ratio of long-term debt to cash-flows	Long Term Debt [WC03251] / (Net Income [WC01551] + Depreciation [WC01148])
<i>Log leverage</i>	Natural logarithm of the ratio of long-term debt to total assets financial leverage	$\ln(1 + \text{Long Term Debt [WC03251]} / \text{Total Assets [WC02999]})$
<i>Log market-cap</i>	Natural logarithm of market capitalization	$\ln(\text{Market Value [MV]})$
<i>ROA</i>	Return on assets	Operating Income [WC01250] / Lagged Total Assets [WC02999]
<i>Returns</i>	Net stock returns measured over the 12 months prior to fiscal-end	$(\text{Return Index at time } t [RI_t]) / \text{Return Index at time } (t-1) [RI_{t-365}] - 1$
<i>RPT to Assets</i>	Ratio of income from related party transactions to lagged total assets	RPT Income / Lagged Total Assets [WC02999]
<i>RPT to Sales</i>	Ratio of income from related party transactions to lagged sales	RPT Income / Lagged Sales [WC01001]
<i>Q</i>	Tobin's Q	$(\text{Total Assets [WC02999]} + \text{Market Value [MV]} - \text{Common Equity [WC03501]}) / \text{Total Assets [WC02999]}$

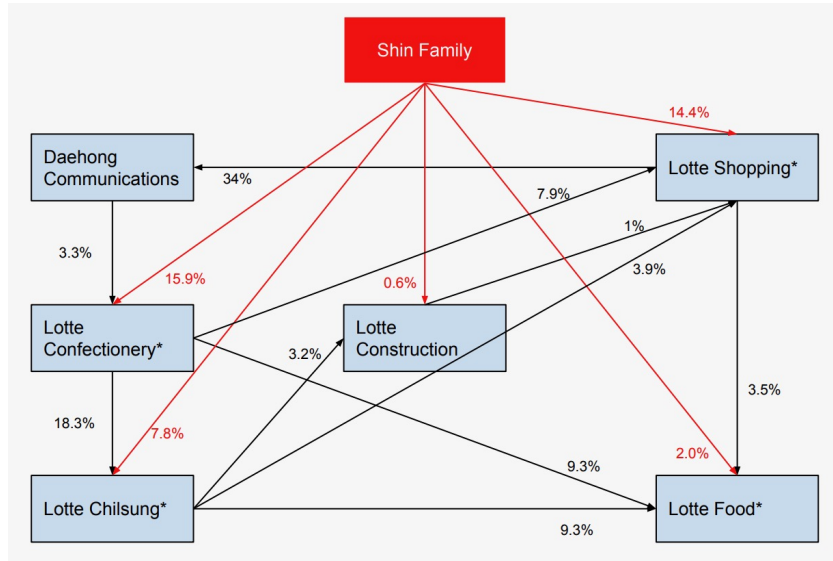


Fig. 1. A partial example of Lotte’s ownership structure in 2016

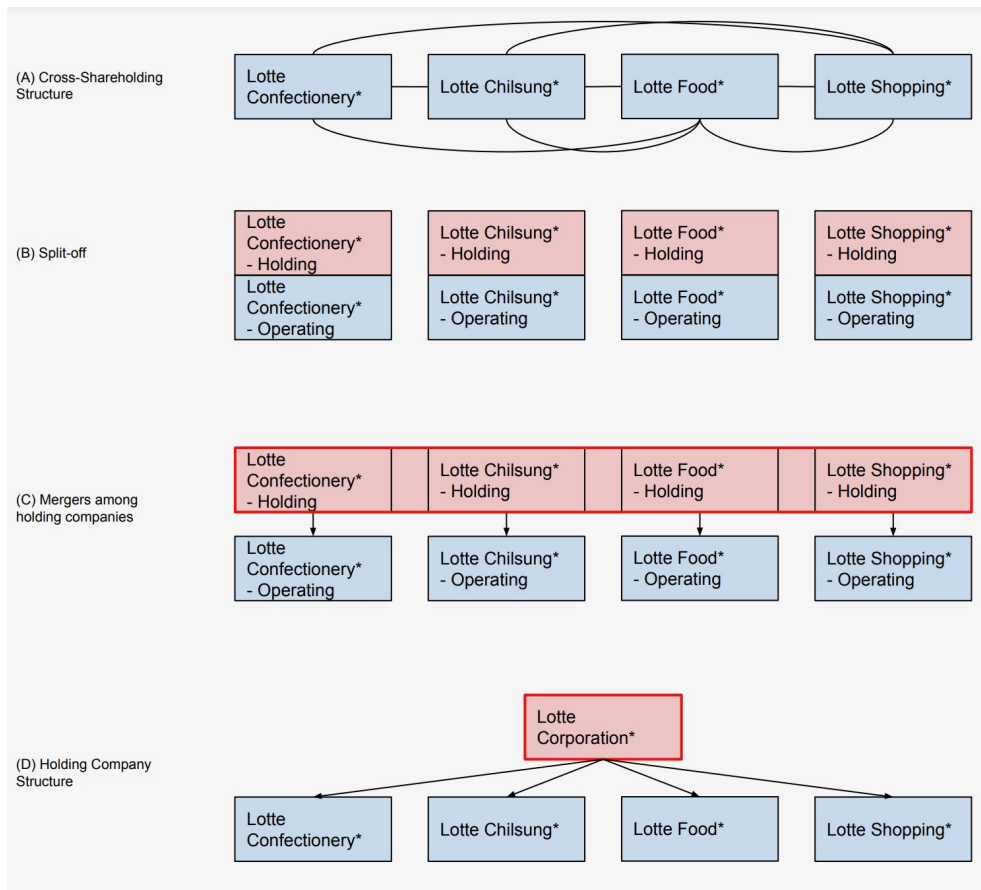


Fig. 2. An example of transition process at Lotte: Split-off and Merge

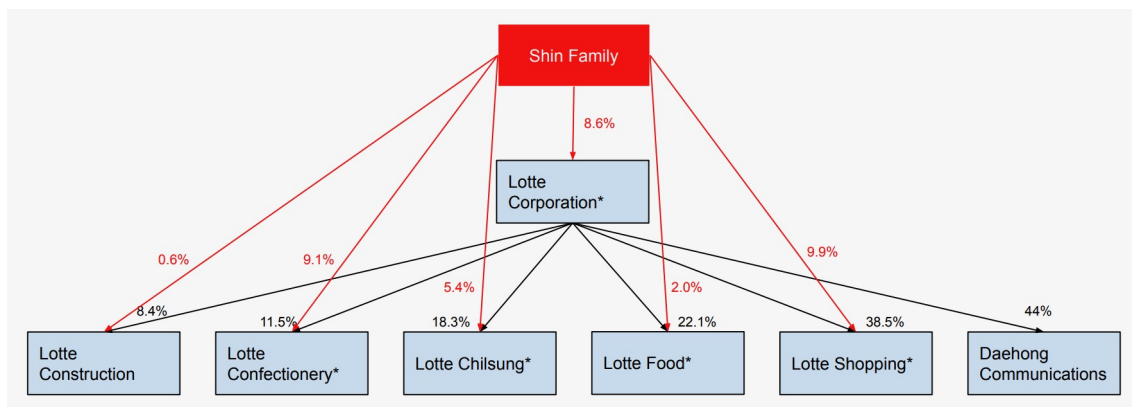


Fig. 3. A partial example of Lotte's ownership structure in 2017

Table 1. Summary Statistics of Firm Characteristics and Ownership Variables of Public Group Firms

Table 1 reports summary statistics on the firm characteristics and ownership variables of publicly listed *chaebol* firms in our sample from 2011 to 2019. All continuous variables, both financial and ownership-related are winsorized at the top and bottom 1% of the cross-sectional distribution. Accounting and financial variables are described in Appendix A. The variables on ownership structure are described in Section 2.

	<i>p25</i>	<i>p50</i>	<i>Mean</i>	<i>p75</i>	<i>p95</i>	<i>SD</i>	<i>Count</i>
<i>Q</i>	0.89	1.00	1.18	1.24	2.33	0.64	1,842
<i>ROA</i>	0.01	0.04	0.04	0.07	0.16	0.06	1,902
<i>Log market-cap</i>	12.34	13.49	13.60	14.83	16.55	1.67	1,843
<i>Log leverage</i>	0.01	0.09	0.11	0.17	0.28	0.10	1,939
<i>Returns</i>	-0.26	-0.04	0.08	0.24	1.08	0.63	1,790
<i>RPT to assets</i>	0.02	0.06	0.19	0.20	0.95	0.31	1,576
<i>RPT to assets</i>	0.02	0.06	0.19	0.20	0.95	0.31	1,576
<i>Cash-to-Assets</i>	0.05	0.09	0.14	0.18	0.53	0.16	1,880
<i>Debt-to-CF</i>	0.00	1.22	2.78	4.06	15.99	13.35	1,801
<i>Family stake</i>	0.00	0.01	0.12	0.20	0.49	0.19	1,951
<i>Ultimate ownership</i>	0.08	0.17	0.22	0.32	0.57	0.18	1,951
<i>Control</i>	0.00	1.00	0.54	1.00	1.00	0.50	1,951
<i>VR</i>	0.08	0.33	0.32	0.49	0.73	0.24	1,951
<i>Centrality</i>	0.00	0.00	0.05	0.05	0.32	0.11	1,950
<i>Separation</i>	0.00	0.00	0.11	0.22	0.44	0.16	1,951
<i>Loop</i>	0.00	0.00	0.16	0.00	1.00	0.37	1,951

Table 2. Valuation Effects of Cross-shareholding Changes: Tobin's Q

Table 2 reports the estimates of linear regressions using *Forward Q* as the dependent variable. *Add Loop* is an indicator variable that evaluates to one for the firms added to a circular loop within a business group. *Remove Loop* is an indicator variable that evaluates to one for the firms removed from a circular loop within a business group. Column 1 reports a baseline specification with time and group fixed effects; Column 2 adds industry-fixed effects, where industry is defined by one-digit SIC industry code; Column 3 adds firm-level controls. Column 4 replaces industry-fixed effects with firm-fixed effects and adds group \times time fixed effects; Column 5 adds firm-level contemporaneous Q and lagged Q as controls. All firm-level control variables are defined in Appendix A. Standard errors, clustered at the firm level, are reported in parentheses. Significance levels are indicated by *, **, and *** for 10%, 5%, and 1% respectively.

	(1)	(2)	(3)	(4)	(5)
	<i>Forward Q</i>	<i>Forward Q</i>	<i>Forward Q</i>	<i>Forward Q</i>	<i>Forward Q</i>
<i>Add Loop</i>	-0.070 (0.06)	-0.071 (0.06)	-0.045 (0.07)	-0.035 (0.07)	0.030 (0.08)
<i>Remove Loop</i>	-0.115*** (0.04)	-0.097** (0.04)	-0.098*** (0.03)	-0.071** (0.04)	-0.078* (0.04)
<i>ROA</i>			1.715*** (0.59)	-0.136 (0.32)	-0.272 (0.22)
<i>Log market-cap</i>			-0.007 (0.02)	0.047 (0.03)	-0.019*** (0.01)
<i>Log leverage</i>			-0.103 (0.20)	0.156 (0.15)	0.096 (0.06)
<i>Returns</i>			0.093*** (0.03)	0.076*** (0.02)	0.022 (0.02)
<i>Ultimate ownership</i>			-0.473** (0.22)	0.676* (0.39)	-0.010 (0.06)
<i>Control</i>			0.000 (0.08)	-0.060 (0.09)	-0.011 (0.03)
<i>VR</i>			0.057 (0.20)	-0.101 (0.17)	0.007 (0.05)
<i>Q</i>					0.688*** (0.06)
<i>Lagged Q</i>					0.192*** (0.05)
Industry FE	No	Yes	Yes	No	No
Time FE	Yes	Yes	Yes	Yes	No
Firm FE	No	No	No	Yes	No
Group FE	Yes	Yes	Yes	Yes	No
Group \times Time FE	No	No	No	Yes	Yes
Observations	1,828	1,828	1,744	1,665	1,697
R-sq	0.3568	0.4105	0.4448	0.8360	0.8073

Table 3. Valuation Effects of Cross-shareholding Changes: Stock Returns

Table 3 reports the estimates of linear regressions using *Forward returns* as the dependent variable. *Add Loop* is an indicator variable that evaluates to one for the firms added to a circular loop within a business group. *Remove Loop* is an indicator variable that evaluates to one for the firms removed from a circular loop within a business group. Column 1 reports a baseline specification with time and group fixed effects; Column 2 adds industry-fixed effects, where industry is defined by one-digit SIC industry code; Column 3 adds firm-level controls. Column 4 adds firm-level contemporaneous returns as a control. All specifications include industry, time, and group fixed effects. Accounting and financial variables are defined in Appendix A. Variables related to group structure and ownership are defined in Section 2. Standard errors, clustered at the firm level, are reported in parentheses. Significance levels are indicated by *, **, and *** for 10%, 5%, and 1% respectively.

	(1)	(2)	(3)	(4)
	<i>Forward returns</i>	<i>Forward returns</i>	<i>Forward returns</i>	<i>Forward returns</i>
<i>Add Loop</i>	0.073 (0.17)	0.077 (0.17)	0.090 (0.17)	0.128 (0.17)
<i>Remove Loop</i>	-0.157*** (0.06)	-0.154*** (0.06)	-0.146** (0.06)	-0.127** (0.06)
<i>ROA</i>			0.103 (0.57)	0.379 (0.60)
<i>Log market-cap</i>			-0.052*** (0.01)	-0.053*** (0.01)
<i>Log leverage</i>			0.010 (0.19)	0.019 (0.20)
<i>Returns</i>				-0.071** (0.03)
<i>Ultimate ownership</i>			0.134 (0.14)	0.247* (0.14)
<i>Control</i>			-0.084 (0.06)	-0.080 (0.06)
<i>VR</i>			0.151 (0.15)	0.081 (0.16)
Industry FE	No	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Group FE	Yes	Yes	Yes	Yes
Observations	1,833	1,833	1,810	1,772
R-sq	0.0417	0.0413	0.0411	0.0449

Table 4. Control Effects of Cross-Shareholding Changes

Table 4 reports the estimates of linear regressions estimating the effect of loop addition or removal on a variety of control-related outcomes. *Add Loop* is an indicator variable that evaluates to one for the firms added to a circular loop within a business group. *Remove Loop* is an indicator variable that evaluates to one for the firms removed from a circular loop within a business group. The dependent variables in Columns 1 and 2, 3 and 4, and 5 and 6 are *Forward Control*, *Forward Separation VR*, and *Forward Centrality*, respectively. Columns 1, 3, and 5 include control variables; Columns 2, 4, and 6 add firm-level contemporaneous dependent variables as controls. All specifications include industry, time, and group fixed effects. Accounting and financial variables are defined in Appendix A. Variables related to group structure and ownership are defined in Section 2.. Standard errors, clustered at the firm level, are reported in parentheses. Significance levels are indicated by *, **, and *** for 10%, 5%, and 1% respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Forward Control</i>	<i>Forward Control</i>	<i>Forward Separation VR</i>	<i>Forward Separation VR</i>	<i>Forward Centrality</i>	<i>Forward Centrality</i>
<i>Add Loop</i>	0.221*** (0.07)	0.097*** (0.03)	0.040* (0.02)	0.012 (0.01)	0.044* (0.03)	0.048** (0.02)
<i>Remove Loop</i>	0.072 (0.05)	0.044 (0.03)	0.011 (0.01)	0.011 (0.01)	0.015 (0.01)	0.011 (0.01)
<i>ROA</i>	0.018 (0.25)	0.026 (0.11)	0.194** (0.08)	0.062* (0.04)	-0.339*** (0.11)	-0.260*** (0.08)
<i>Log market-cap</i>	-0.005 (0.02)	-0.004 (0.00)	-0.019*** (0.00)	-0.006*** (0.00)	0.019*** (0.01)	0.012** (0.01)
<i>Log leverage</i>	0.155 (0.22)	0.028 (0.07)	0.083 (0.08)	0.034 (0.03)	-0.211*** (0.07)	-0.185*** (0.06)
<i>Returns</i>	-0.007 (0.01)	0.005 (0.01)	-0.003 (0.00)	0.000 (0.00)	0.000 (0.00)	-0.001 (0.00)
<i>Ultimate ownership</i>		0.197*** (0.08)		-0.801*** (0.04)		0.563*** (0.08)
<i>Control</i>		0.748*** (0.04)		-0.005 (0.01)		-0.018 (0.02)
<i>VR</i>		-0.078 (0.07)		0.743*** (0.04)		-0.125*** (0.05)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Group FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,675	1,675	1,675	1,675	1,678	1,678
R-sq	0.5458	0.8003	0.3585	0.7614	0.1958	0.3720

Table 5. Valuation Effects: Variation by Financial Constraints

Table 5 reports the results of regressions estimating the valuation effects by financial constraints, using *Forward Q* as the dependent variable. *Add Loop* is an indicator variable that evaluates to one for the firms added to a circular loop within a business group. *Remove Loop* is an indicator variable that evaluates to one for the firms removed from a circular loop within a business group. For Columns 1 and 2, we partition the sample by *Cash-to-Assets* ratio, where we estimate with the sample with higher *Cash-to-Assets* ratio in Column 1 and with the sample with lower *Cash-to-Assets* ratio in Column 2. For Columns 3 and 4, we partition the sample by *Debt-to-CF* ratio, where we estimate with the sample with lower *Debt-to-CF* ratio in Column 3 and with the sample with higher *Debt-to-CF* ratio in Column 4. All specifications include industry, time, and group fixed effects. Accounting and financial variables are defined in Appendix A. Variables related to group structure and ownership are defined in Section 2.. Standard errors, clustered at the firm level, are reported in parentheses. Significance levels are indicated by *, **, and *** for 10%, 5%, and 1% respectively.

	<i>Cash-to-Assets</i>		<i>Debt-to-CF</i>	
	Low Constraint	High Constraint	Low Constraint	High Constraint
	(1) <i>Forward Q</i>	(2) <i>Forward Q</i>	(3) <i>Forward Q</i>	(4) <i>Forward Q</i>
<i>Add Loop</i>	-0.073 (0.14)	-0.009 (0.08)	-0.103 (0.14)	-0.014 (0.06)
<i>Remove Loop</i>	-0.180*** (0.06)	-0.028 (0.05)	-0.149** (0.06)	-0.096* (0.05)
<i>ROA</i>	1.255* (0.66)	1.932* (1.00)	1.335** (0.61)	2.872*** (1.08)
<i>Log market-cap</i>	-0.023 (0.03)	0.002 (0.02)	0.022 (0.03)	-0.024 (0.02)
<i>Log leverage</i>	-0.069 (0.36)	-0.012 (0.26)	0.378 (0.29)	-0.008 (0.30)
<i>Returns</i>	0.095*** (0.03)	0.091*** (0.03)	0.086** (0.04)	0.114*** (0.03)
<i>Ultimate ownership</i>	-0.436 (0.46)	-0.649*** (0.21)	-0.518 (0.33)	-0.189 (0.23)
<i>Control</i>	-0.153 (0.12)	0.122 (0.08)	0.028 (0.12)	0.012 (0.07)
<i>VR</i>	0.364 (0.42)	-0.009 (0.17)	0.137 (0.32)	-0.117 (0.16)
Industry FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Group FE	Yes	Yes	Yes	Yes
Observations	812	864	774	850
R-sq	0.5386	0.4197	0.5451	0.4089

Table 6. Valuation Effects: Variation by Conflicts of Interest

Table 6 reports the results of regressions estimating the valuation effects by the wedge between the controlling family's voting and cash flow rights, using *Forward Q* as the dependent variable. *Add Loop* is an indicator variable that evaluates to one for the firms added to a circular loop within a business group. *Remove Loop* is an indicator variable that evaluates to one for the firms removed from a circular loop within a business group. We partition the sample by *Separation*, where we estimate equation 4 with the sample with lower *Separatio* in Column 1 and with the sample with higher *Separation* in Column 2. All specifications include industry, time, and group fixed effects. Accounting and financial variables are defined in Appendix A. Variables related to group structure and ownership are defined in Section 2. Standard errors, clustered at the firm level, are reported in parentheses. Significance levels are indicated by *, **, and *** for 10%, 5%, and 1% respectively.

	<i>Separation</i>	
	Low Separation	High Separation
	(1) <i>Forward Q</i>	(2) <i>Forward Q</i>
<i>Add Loop</i>	0.052 (0.08)	-0.167 (0.14)
<i>Remove Loop</i>	-0.020 (0.05)	-0.143*** (0.05)
<i>ROA</i>	0.678 (0.50)	1.941** (0.95)
<i>Log market-cap</i>	0.014 (0.02)	-0.015 (0.03)
<i>Log leverage</i>	-0.020 (0.20)	0.001 (0.33)
<i>Returns</i>	0.054 (0.04)	0.129*** (0.04)
<i>Ultimate ownership</i>	2.072** (0.84)	-0.140 (0.45)
<i>Control</i>	-0.081 (0.09)	0.036 (0.13)
<i>VR</i>	-1.940*** (0.65)	-0.082 (0.40)
Industry FE	Yes	Yes
Time FE	Yes	Yes
Group FE	Yes	Yes
Observations	888	852
R-sq	0.5125	0.5177

Table 7. Expropriation Effects of Cross-Shareholding Changes

Table 7 reports the results of various regressions testing the expropriation effects of cross-shareholding changes. *Add Loop* is an indicator variable that evaluates to one for the firms added to a circular loop within a business group. *Remove Loop* is an indicator variable that evaluates to one for the firms removed from a circular loop within a business group. The dependent variables in Columns 1 and 2, 3 and 4, and 5 are *Forward RPT to Assets*, *Forward ROA*, and *Forward Q*, respectively. All specifications include industry, time, and group fixed effects. Accounting and financial variables are defined in Appendix A. Variables related to group structure and ownership are defined in Section 2.. Standard errors, clustered at the firm level, are reported in parentheses. Significance levels are indicated by *, **, and *** for 10%, 5%, and 1% respectively.

	(1)	(2)	(3)	(4)	(5)
	<i>Forward RPT to Assets</i>	<i>Forward RPT to Sales</i>	<i>Forward ROA</i>	<i>Forward ROA</i>	<i>Forward Q</i>
<i>Add Loop</i>	0.082** (0.04)	0.095*** (0.03)	-0.015 (0.01)	-0.007 (0.01)	-0.068 (0.07)
<i>Remove Loop</i>	0.013 (0.03)	0.008 (0.03)	-0.005 (0.01)	0.001 (0.01)	-0.102** (0.04)
<i>ROA</i>	0.685*** (0.24)	0.180 (0.18)		0.591*** (0.04)	1.885*** (0.72)
<i>Log market-cap</i>	-0.032** (0.02)	-0.005 (0.01)	0.008*** (0.00)	0.002 (0.00)	0.001 (0.02)
<i>Log leverage</i>	-0.668*** (0.21)	-0.406*** (0.15)	-0.050** (0.03)	0.004 (0.02)	-0.063 (0.22)
<i>Returns</i>	0.005 (0.01)	0.005 (0.01)	0.020*** (0.00)	0.009*** (0.00)	0.086*** (0.03)
<i>Ultimate ownership</i>	-0.277 (0.17)	-0.104 (0.12)	-0.034 (0.02)	-0.008 (0.01)	-0.541** (0.25)
<i>Control</i>	0.061 (0.04)	-0.015 (0.04)	-0.002 (0.01)	-0.001 (0.00)	0.010 (0.08)
<i>VR</i>	-0.093 (0.13)	0.018 (0.11)	0.021 (0.02)	0.011 (0.01)	0.040 (0.22)
Industry FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Group FE	Yes	Yes	Yes	Yes	Yes
Observations	1,291	1,291	1,744	1,739	1,447
R-sq	0.3966	0.2879	0.2432	0.4823	0.4757

Table 8. Valuation Effects: Variation by Loop Complexity

Table 8 reports the results of various regressions testing the effects of cross-shareholding changes on the family's control and ownership of a firm, using *Forward Q* as the dependent variable. In Columns 1 and 2, the main independent variables of interest are *Add loop-size*, which measures an unit increase, and *Remove loop-size*, which measures an unit decrease, in the size of a loop a firm is a part of. *Remove loop* is increasing in the reduction of the size of a loop. In Column 3, the main independent variable of interest is *Loop dependency*, which measures, all else equal, a loop's effect on the difference between effective ownership and direct ownership in a loop firm. All specifications include industry, time, and group fixed effects. Accounting and financial variables are defined in Appendix A. Variables related to group structure and ownership are defined in Section 2. Standard errors, clustered at the firm level, are reported in parentheses. Significance levels are indicated by *, **, and *** for 10%, 5%, and 1% respectively.

	(1)	(2)	(3)
	<i>Forward Q</i>	<i>Forward Q</i>	<i>Forward Q</i>
<i>Add loop-size</i>	-0.003 (0.02)		
<i>Reduce loop-size</i>	-0.023** (0.01)		
<i>Loop dependency</i>		-0.030*** (0.01)	-0.028** (0.01)
<i>ROA</i>	1.719*** (0.59)	1.928*** (0.59)	2.425*** (0.63)
<i>Log market-cap</i>	-0.007 (0.02)	-0.007 (0.02)	-0.024 (0.03)
<i>Log leverage</i>	-0.106 (0.20)	-0.016 (0.20)	0.318 (0.33)
<i>Returns</i>	0.091*** (0.03)	0.078*** (0.03)	0.060** (0.02)
<i>Ultimate ownership</i>	-0.474** (0.22)	-0.494** (0.23)	-0.214 (0.32)
<i>Control</i>	-0.001 (0.08)	0.030 (0.07)	0.177 (0.13)
<i>VR</i>	0.057 (0.20)	-0.007 (0.19)	-0.231 (0.31)
Industry FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Group FE	Yes	Yes	Yes
Observations	1,744	1,668	352
R-sq	0.4444	0.4574	0.3723