Free Lunches for Insiders Under Investor Inertia and Limited Arbitrage[+]

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May 2015

Abstract

This paper examines how investor inertia might benefit the controlling families of business groups in a way that is distinct from explicit tunneling or diversion of resources. Based on a sample of new parent-subsidiary relationships created through spin-offs followed by stock-for-stock tender offers in Korean business groups, we find that family insiders actively tender their shares of the operating subsidiary in exchange for the new shares issued by the parent while outside investors remain largely passive, even though the new parent shares are likely to have been offered at a bargain. Controlling families on average gain 33% on their holdings or roughly USD 60 million relative to the pre-split value, two thirds of which consists of *voluntary* wealth transfers by inertial investors. Since new issues are more likely to be undervalued than overvalued, *limits* of arbitrage, rather than arbitrage, contributes to convergence in prices and controlling family's wealth gain. Our results suggest that insiders may actively exploit behavioral aspects of the stock market to maximize their personal benefits.

JEL Classifications: D03, G34
Keywords: Behavioral Corporate Finance, Inertia, Holding Companies, Spin-Offs, Tender Offers, Mispricing, Short Sale, Korea

[+] We would like to thank Bum Kim, Inmoo Lee, Ya Tang, and other seminar participants at 2013 Allied Korean Finance Associations Meeting, Chonan, 8th CAFM, 2013, Seoul, Korea, 2014 China International Conference in Finance, Chengdu, China, KAIST Graduate School of Finance and Accounting, Dankook University, SKK Graduate School of Business, and Seoul National University for helpful comments. Financial support from the Institute for Research in Finance and Economics of Seoul National University is gratefully acknowledged.
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1. Introduction

Recent development in behavioral finance suggests that investors' psychological biases may influence not only the cross-section of security returns but also certain corporate financial policies. Among a variety of behavioral patterns, researchers have recently noted that a specific form of investor behavior, namely *inertia* or tendency to stick with the default option, may have a significant influence on managerial decisions. For example, Baker, Coval, and Stein (2007) show that because investors are reluctant to resell stocks they receive in an acquisition, i.e. exhibit inertia, a stock-for-stock merger may be cheaper than issuing new shares in an SEO and using the proceeds to buy the target shares.[3] Investor inertia, or more generally inattention, has also been documented by DellaVigna and Pollet (2009) who show that earnings disclosures released on Fridays exhibit weaker market impact and larger post-announcement drift. These findings suggest that managers may actively take into account investors' potential behavioral biases when making financial decisions.[4]

In this stream of research, a typical approach is to assume irrational investors who generate mispricing and rational managers who exploit such mispricing to maximize the value of the firm as well as the benefit of the incumbent investors (Baker, Ruback, and Wurgler, 2007).[5] A key empirical challenge in this approach is that the degree of mispricing must somehow be estimated which is not at all trivial. In addition, there is no guarantee that managers would make decisions that favor incumbent investors over new investors under standard agency framework.

In this paper, we test how investor inertia may affect corporate financial policies under

[3] According to Baker, Coval, and Stein (2007), inertial behavior can arise from endowment effects, a tendency to procrastinate in decision making, and the cognitive fixed costs associated with reevaluating and re-optimizing an existing portfolio.

[4] Inertial behavior may not be necessarily irrational. For example, Kim, Maurer, and Mitchell (2015) show that investors may rationally choose to be inactive in portfolio adjustments when opportunity cost of using time is explicitly considered. Our notion of inertia does not exclude this possibility.

[5] An alternative approach is to assume irrational managers and efficient capital market.

a setting where we could circumvent both direct estimation of mispricing and potential confounding issues due to agency structure. Specifically, we examine how investor inertia may provide 'free lunches' for controlling families of business groups, a typical corporate structure often found outside U.S. Our focus is on a sample of business groups in Korea that went through a series of transactions that involve a spin-off followed by a stock-for-stock tender offer which ultimately results in a parent-subsidiary relationship between the two spun-off firms. Such group-level reorganization became popular following recent regulatory changes that facilitated business groups to switch from a complex inter-corporate circular shareholding or ''loop'' structure into a less pyramidal and more horizontal structure that involves a pure holding company at the apex.[6]

Holding companies are those firms whose sole function is to hold stocks in other companies. An important characteristic of holding companies in U.S. is that they typically own 100% of subsidiaries' equities.[7] Such structure is often established by creating a wholly-owned subsidiary and transferring business-related operating assets to the new subsidiary. Shareholders receive stocks of the holding company in proportion to their existing ownership, and only the holding company remains to be publicly traded. A major difference between holding companies in U.S. and Korea is that the latter typically own much less than 100% of the subsidiary shares so that subsidiaries themselves are often publicly traded.[8]

As in U.S., the most straight forward way to establish a holding company is to create a 100% subsidiary or do a carve-out where a part of subsidiary shares are sold to the public. However, since Korean business groups typically have dominant controlling families, they rarely favor this approach since it results in the same proportional ownership in the holding

[6] Kim, Kim, and Park (2012) provide a detailed account of the regulatory changes and holding companies in general in Korea.
[7] U.S. tax laws require at least 80% or more of stock ownership to be provided with tax-free dividends.
[8] Korean regulations require holding companies to hold at least 20% of subsidiaries that are publicly traded. For private subsidiaries, the required holding threshold increases to 40%.

company. Instead, holding companies are commonly created through a sequential process of a spin-off followed by a stock-for-stock tender offer by the (to be) holding company for the (to be) subsidiary's shares. Figure 1 provides a detailed description of the deal structure and the time line of the events related with the two transactions.

The initial spin-off gives the existing shareholders new shares of the two new firms in proportion to their original ownership after which both stocks are publicly traded. Thus, there is no parent-subsidiary relationship between the two spun-off firms initially.[9] For the holding company to obtain shares in the subsidiary, it implements a tender offer for subsidiary's shares where the payment would be made through new shares issued by the holding company based on a fixed exchange ratio to be determined at a later date according to a regulatory formula based on prevailing prices of the two spun-off firms. Even though the tender offer occurs at a much later date, investors expect that the two spun-off firms will eventually establish a parent-subsidiary relationship because the new (to be) parent company almost always bears the expression 'holdings' in its name at spin-off disclosures.

The main objective of the controlling families in this two-step reorganization is to increase their direct ownership stake in the holding company and effectively secure control by receiving as many new holding company shares as possible for a given number of subsidiary shares tendered. This implies that the higher the subsidiary's stock price *relative to* the holding company's price prior to the fixing of the exchange ratio, the family would end up with more new holding company shares once they tender their subsidiary shares.

If *all* shareholders of the subsidiary - including both the controlling families as well as the remaining minority shareholders - decide to tender their subsidiary shares for new holding company shares, then controlling families' proportional ownership in the holding company

[9] Immediately after the spin-off, the two companies do not have any inter-corporate shareholdings, so technically we cannot refer to them as holding companies and subsidiaries, yet, which is the reason we have inserted '(to be)'. In what follows, we omit '(to be)' if the meaning is clear.

would not change and remain at the pre-spin-off level. However, if *some* investors exhibit *inertial* behavior and do not tender their subsidiary shares, then controlling families may increase their direct proportional ownership in the holding company. Moreover, if the prices of the two stocks deviate more than those implied from the fundamental values during the tender offer process, there may well be transfer of wealth from the inertial investors to controlling families.[10] In fact, controlling families may well design this two-step procedure after explicitly taking into account potential inertia by minority shareholders.[11]

Using a sample of 39 business group-level transactions in Korea from 2000 to 2015 that consists of spin-offs followed by stock-for-stock tender offers which ultimately results in a parent-subsidiary relationship between the two spun-off firms, we document the following empirical patterns. First, stock prices of the (to be) holding companies continue to drop while those of the (to be) subsidiaries continue to rise between the spin-off event and the tender offer event. For example, mean holding period return between spin-off and tender offer announcement is -1.932% for holding companies and 33.301% for subsidiaries, which are both economically substantial. Moreover, the deviation between the two prices continues to widen as we near the exchange ratio fix date.

We next compare the degree of media exposure and the distribution of analyst recommendations between the two stocks that may be associated with the relative price movement. A comprehensive news search results indicate that the number of good news for the subsidiaries is more than twice as many as those for the holding companies between the spin-off and tender offer announcement. We also find that the proportion of strong buys and buys are much higher for the subsidiaries than for holding companies during the same period. These findings are consistent with the controlling families' incentive to acquire as many

[10] This setting is largely similar to a rights offering where some shareholders forfeit their rights to subscribe to new shares, even though the new issues are being offered at a deep discount.

[11] Certain law firms and accounting firms have marketed this two-step procedure to various business groups emphasizing the effect of investor inertia on the controlling family's ultimate ownership in the holding company.

holding company shares as possible through the tender offer by influencing the relative price between the two stocks.

Second, controlling families tender almost all of their shares held in the subsidiary in exchange for the new shares issued by the holding company, while outside minority investors mostly remain passive and do not tender their shares, even though the new shares are likely to have been offered at a bargain considering the controlling shareholder's incentives. This inertial behavior of the outside investors allows the controlling families to almost double their direct proportional ownership in the holding company.

Third, controlling families realize a wealth gain of 32.56% on average relative to the pre-split value of their holdings. Roughly an eighth of this gain occurs between the spin-off announcement and re-listing of the two stocks, which can be broadly attributed to pure spin-off effect or removal of any diversification discount. Another sixth of this gain occurs from re-listing date up to the exchange ratio fix date. This reflects price increase of subsidiaries which more than offsets price decrease of holding companies. Up until this point, however, both controlling shareholders and minority shareholders enjoy the same proportional gain as long as they hold on to both stocks. But from this date on, controlling families switch their subsidiary shares in exchange for holding company shares while minorities do not. This accounts for the remaining two thirds of the gain for the controlling shareholders, which reflects *voluntary* wealth transfers from the inertial outside investors.

Finally, we find that in 30 out of our 39 sample transactions, price differential between the two companies becomes smaller than those implied in the fixed exchange ratio of the tender offer. This implies that controlling families' decision to tender subsidiary shares at the fixed exchange ratio was indeed optimal since it provides them with more holding company shares for a given number of subsidiary shares tendered than they could have obtained in the open market. We also note that this convergence in prices reflects limits of arbitrage rather

than arbitrage since arbitrage involves shorting undervalued rather than overvalued issuers.

We highlight the unique feature of this study as follows. First, we contribute to the growing literature in behavioral corporate finance by providing additional piece of direct evidence that investors indeed exhibit inertial behavior or take the path of least resistance. Second, since we focus on *personal benefits* of the controlling shareholders rather than *firm value*, our analysis is relatively free from potential confounding agency issues embedded but not explicitly considered in conventional rational manager – irrational investor framework. Third, we utilize *relative* price differential between two publicly traded firms as a measure of potential misevaluation which allows us to circumvent direct estimation of the degree of mispricing. Finally, we contribute to the recent literature in international corporate governance by showing that there may be an unintended, but completely voluntary channel of wealth transfer from minority shareholders to controlling families that is distinct from *tunneling* or outright diversion of corporate resources.

The remainder of the paper is organized as follows. The next section describes our data sources and sample construction process. Section 3 documents the stock price patterns of the two spun-off firms from its re-listing date until the end of the tender offer process. Section 4 presents media exposure and analyst recommendations for the two firms during this period. Section 5 compares tendering decisions of the controlling families against those of the minority shareholders as well as consequent changes in the value of their holdings. Section 6 documents mispricing between the two stocks during the tender offer period which is not easily arbitraged away. In section 7, we discuss how investor inertia may influence the deal structure in a completely different way when controlling shareholders are not present. Section 8 provides a brief conclusion.

2**. Data and Sample**

We obtain our spin-off sample manually from Korea Investor's Network for Disclosure System (KIND) operated by the Korea Exchange (KRX), which is an electronic disclosure platform similar to EDGAR in U.S. We identify all spin-offs event took place between 2000 and 2015. We only use the cases that are directly related with creating a holding company and excluding those without subsequent stock-for-stock tender offers or those where offers are mad privately to selected parties. Our final sample consists of 39 spin-offs followed by corresponding stock-for-stock tender offers. Appendix A provides a detailed list of all our sample firms and exact calendar dates of relevant events.

We obtain stock price information, market capitalization and other financial variables from FnDataGuide, which is one of the largest data vendors in Korea. Detailed information on spin-offs, stock-for-stock tender offer announcement dates, number of tendered shares and subscription results are manually obtained from disclosures available through KIND. KIND provides the time stamp of each announcement or disclosure, which allows us to identify the exact event dates for both spin-offs and tender offers.[12] We also obtain analyst recommendation information from FnDataGuide.

We implement a comprehensive manual web search to identify various types of news reported for the two spun-off firms, which are classified into good, neutral or bad based on textual analysis of the content. If multiple media sources report information about a firm that is largely similar in content, we treat this as a single piece of news.

We obtain daily short-selling information from a proprietary data set provided by KRX from August 2005 to December 2015. The main advantage of this data set is that we could distinguish investors by three types; domestic individual investors, domestic institutional

[12] If the spin-off or tender offer is announced before or during the trading hour, that day is assigned as the event date. But if the firm makes the announcement after the trading hour, then the next trading day is assigned as the event date.

investors and foreign investors.[13]

Table 1 presents the mean and median characteristics of sample firms both before and after the spin-off. Panel A reports the numbers for the pre-spin-off stage while panel B reports corresponding numbers once the spin-off is complete. In panel B, 'H' denotes spun-off firms that are planned to become the parent holding company at a later date while 'S' denotes spun-off firms that are planned to become the subsidiary of this holding company. In the third and 6th column of panel B, we report the numbers for a hypothetical combined entity by aggregating characteristics of both 'H' and 'S'.[14]

The results indicate that average total assets before and after the spin-offs are largely similar, reflecting that spin-offs simply divide existing book assets and reallocates them into two firms. We also note that 'S' firms are typically reallocated with more assets and book equity since they continue to carry most of the operating assets. However, the proportion of total assets reallocated to 'S' is greater than those of book equity on average, which results in higher book leverage for 'S' firms.

An interesting result is that market capitalization of 'S' relative to those of 'H' is much larger than those implied by the differences in book equity. For example, average market cap of 'S' relative to 'H' is almost 2.8 times, while those implied by differences in book equity is roughly 1.7 times. This implies that market participants expect more growth opportunities to be embedded in 'S' rather than 'H', reflecting the fact that most operations and business activities are reallocated to 'S'. There also seems to be noticeable increase in the combined market value following spin-offs, which could potentially reflect alleviation of diversification

[13] Following the global financial crisis in 2008, Financial Supervisory Services (FSS) prohibited short-selling activity from October 1, 2008 to May 31, 2009 for all firms that are listed on KRX. The exceptions are short sales related with index arbitrage, hedging or providing liquidity for Equity Linked Warrants (ELWs).

[14] In some cases, 'H' already has shares in 'S' immediately following the spin-offs. This is because treasury shares held prior to the spin-off are treated as assets rather than offsetting account for equities. Such practice is highly controversial among local civil organizations and regulators. In calculating combined market capitalization, we make sure to subtract off the value of 'S' shares held by 'H' , if any, to avoid double counting.

discount as argued by proponents of spin-offs, but the difference in average market cap before and after the spin-off is not statistically significant.

3. Stock Price Patterns of Spun-Off Firms

The number of holding company shares to be obtained in the tender offer critically depends on the prevailing relative prices of the two spun-off firms. As such, we first examine stock price patterns of our sample firms throughout the spin-off and subsequent tender offer process. Prior to the spin-off, we only observe one stock price per each of our sample observation. Once the spin-off is complete and the two spun-off firms are relisted, we observe two stock prices, one for the (to be) parent holding company, and the other for the (to be) subsidiary.[15]

Since there is a period of no-trade around the actual spin-off, 36 days on average, KRX provides reference prices for the two newly listed shares on the re-listing date before trading starts. Without any distortions, the references prices for both firms should mechanically reflect the pre-split last closing price. However, since the denominator for the reference price, the number of shares allocated to each firm respectively, is based on relative book equity as of the spin-off *announcement*, while the numerator, value of pre-split market cap distributed to each firm respectively, is based on relative book equity as of the *actual* spin-off date, the reference prices for the two firms could deviate from the pre-split closing price.[16] The opening price is set between 90% to 200% of the reference price based on orders submitted during the 60 minutes of call auction market immediately prior to the market opening. This opening price is likely to reflect the investors' expectations about the growth opportunities of

[15] As outlined in figure 1, it takes 86 days on average from spin-off announcement to a trading halt to prepare for the spin-off. It takes another 8 days to actually implement the spin-off so that the original company becomes two separate legal entities. It takes another 28 days for the two separate companies to re-list on the stock exchange and start trading again.

[16] Sometimes, the value of treasury shares are added to the (to be) holding company in distributing market cap across the two firms, which further adds to the deviation from the pre-split price.

the two spun-off firms.

Once the two stocks are re-listed, they continue to trade separately within a daily price limit of ±15% of the opening price, which is a general rule that applies to all stocks listed in KRX.[17] Roughly 4 months later, (to be) holding company announces a stock-for-stock tender offer for (to be) subsidiary shares to establish a parent-subsidiary equity relationship between the two firms. Soon after the tender offer announcement, the exchange ratio between subsidiary shares to be tendered and new shares to be issued by the parent is determined. Based on this fixed exchange ratio, subsidiary's shareholders, including the controlling families, decide whether to tender and subscribe. Once the subscription period ends, new shares are issued shortly after which trade with the existing holding company shares on the exchange.

Table 1 also presents stock price patterns of the original firm and the two spun-off firms around the spin-off announcement and re-listing. The results indicate that spin-off decision itself does not generate much significant market reactions, even though investors are generally aware that spin-offs are the first step in setting up a holding company. For example, mean CARs around the spin-off announcements are not statistically significant for a variety of event windows.

However, once the two firms re-list after the completion of the spin-off as reported in panel B of table 1, average cumulative abnormal return for ‘H’ firms is significantly negative, the magnitude of which is substantial. For example, a two day CAR for ‘H’ firms is as low as -9.1% on average. Part of this large negative reaction could potentially reflect delayed market reactions since the opening prices of both ‘H’ and ‘S’ as well as their daily changes in prices are restricted within a certain regulatory boundary when they re-list after the spin-off completion. Since the controlling families can obtain more ‘H’ shares through stock-for-stock

[17] In 15 June, 2016, the KRX expand a daily price limit of ±15% to ±30%.

tender offers the lower the ‘H’s price relative to ‘S’, the negative returns for ‘H’ is consistent with the controlling family’s incentive to secure more ‘H’ shares for a given number of ‘S’ shares tendered.

Table 2 presents cumulative abnormal returns of the two firms around the subsequent second stage stock-for-stock tender offer announcement by ‘H’ for ‘S’s stock. Panel A reports those around tender offer announcements while panel B reports those around actual issues of the new shares. The results from panel A of table 2 indicate that ‘H’ shares continue to exhibit significantly negative abnormal returns upon the announcement of the tender offer, which is again consistent with the controlling family’s incentive to acquire as much ‘H’ shares as possible through the tender offer. It is somewhat surprising that the market reaction is quite strong over the three trading days, since this tender offer should have been expected at least to some extent once the spin-off is complete. We do not observe any significant leakages or reversals following the tender offer announcement as can be seen from CAR(-5,-1) and CAR(0,+5). We also do not observe any significant returns around the actual issue in panel B of table 2.

The above analyses suggest that ‘H’ shares experience a price drop around the re-listing of the two stocks and also around the announcement of a subsequent stock-for-stock tender offer for ‘S’s shares. However, since the analysis is centered *around* a specific event, it doesn’t provide information on stock price patterns *between* two different events. Table 3 specifically addresses this by providing buy-and-hold returns between various dates from re-listing to the completion of the tender offer. We convert holding period returns into average daily returns since the lengths of calendar time between any two event dates are different for each observation in our sample.

The results from the first line of table 3 indicate that ‘H’ shares experience an average daily return of -0.249% while ‘S’ shares exhibit 0.316% from the re-listing date to the tender

offer announcement (132 days on average), the difference of which is statistically significant. This result suggests that ever since re-listing, 'H' prices continue to drop while 'S' prices continue to rise. Once we drop the first day return on the re-listing date from the analysis as reported in the second row, the magnitude of the drop and the rise is reduced, but the pattern and the statistical significance remains.

Figure 2 presents a graphical representation of this result. In this figure, we plot the cumulative returns of both 'H' and 'S' starting from the re-listing date. We observe that 'H' exhibits a cumulative return of around -10% during the 60 trading days while 'S' exhibits between 15 to 20% return during the same period. The reported pattern for 'S' reveals that price increase occurs rather gradually so that they were not captured in the event study analysis in table 2. These results are again consistent with the controlling families' incentive to acquire as much 'H' shares as possible by tendering a given number of 'S' shares through the subsequent tender offer.

In figure 3, we examine how prices of 'H' and 'S' change around the date when the exchange ratio in the tender offer is fixed. The reference price for the subsidiary (i.e. numerator used to calculate the fixed exchange ratio) and for the holding company (i.e. denominator used to calculate the fixed exchange ratio) is based on a pre-determined regulatory formula.[18] In panel A, we simulate hypothetical fixed exchange ratios by moving back the board decision date to launch a tender offer one day at a time and recalculating the fixed exchange ratio for each day. The results indicate that simulated fixed exchange ratio

[18] Specifically, reference price for both the subsidiary and the holding company is based on the following three prices; (1) volume weighted average closing price for the past one month, (2) volume weighted average closing price for the past one week (3) the most recent closing price. For the subsidiary, the reference price is the arithmetic average of the three prices as of the day before the board's decision to launch the tender offer. If this is higher than the most recent closing price, then the latter becomes the reference price. The reference price for the holding company is the highest price among the three prices as of the 5th trading day before the subscription starts which is indeterminate as of the tender offer decision. Issuing firms may apply additional discount or premium to the holding company's reference price. Since 2010, holding company reference price is determined as the volume weighted average closing price between 3rd and 5th day before the subscription starts, without any discounts or premiums. If this is lower than the par value, then par value becomes the reference price.

exhibits an increasing trend leading up to the exchange ratio fix date.

In panel B, we report the cumulative returns of both 'H' and 'S', 30 trading days both before and after the exchange ratio fix date. The results indicate that the prices of the two firms continue to diverge. Once the exchange ratio is fixed, however, the divergence no longer seems to get wider. In fact, the deviation between the two prices starts to converge 12 days after the exchange ratio fix date.

In panel C, we report the average prices of both the holding company and the subsidiary subsequent to the exchange ratio fix date. The prices are normalized to 100 as of the exchange ratio fix date. Once the exchange ratio is fixed, however, we observe that stock price increase is higher for 'H' stocks than for 'S' stocks.

These results imply that either controlling shareholders are able to time the market and choose the date when the exchange ratio is maximized or they may try to influence relative prices of the two stocks to maximize the exchange ratio. In fact, analyst reports actually recommend buying subsidiary shares up until the exchange ratio fix date, and then switching to holding company shares once the exchange ratio is fixed, based on such incentives of the controlling families during this process.[19]

4. Media Exposure and Analyst Recommendations

It would be extremely difficult in practice to clearly prove that the controlling families intentionally pushed 'H's ('S's) price below (above) the fundamental values just before the exchange ratio is fixed. Otherwise, they would be indicted with criminal charges for market manipulation. Thus, our aim is to provide evidence that is consistent with the temporary price deviation, but with a caveat that our evidence is not complete. Specifically, we focus on the

[19] For example, see 2012 Second Half Outlook Report from KDB Daewoo Securities, by analyst Jung, Daero (2012.6.27, in Korean). He explicitly refers to this investment strategy as the one that 'shares the interests of the controlling shareholders'.

contents of the news reported in the public media from the re-listing date up to the tender offer announcement.

Since we examine relative prices of the two stocks, we do not have to estimate a normal benchmark level of news released for each stock, but simply compare the amount of news released for each of the two stocks, which is one of the key advantages of our approach. We hypothesize that the more good (bad) news for the subsidiary (holding company), the more the price deviation between the two firms relative to the fundamentals.

We implement an extensive manual news search for both the subsidiaries and the holding companies. Once we locate a piece of news, we first identify whether it reflects a genuine piece of news or it simply repeats what is reported in another media source. If there are multiple media sources that report the same news content, we treat this as a single piece of news. [20] We then classify them into one of the three categories based on its content; bad, neutral, or good. The results reported in the first line of table 4 suggest that there are about 10.7 (8.1) news articles with distinct information for the subsidiary (holding company) on average from the re-listing date to the tender offer announcement.

Once we partition them based on the content, however, we observe that the number of good news is much higher for the subsidiary than for the holdings company. For example, the average number of good news reported for the subsidiary is 8.9 from re-listing date to tender offer announcement which is more than twice as large as those reported for the holding company during the same period. The difference between the two numbers is statistically significant. This result suggests that stronger price movement for the subsidiary relative to the holding company following the re-listing is partly due to the disproportionate release of different types of news. Since corporate news are mostly based on press-releases or disclosures, it is highly likely that the controlling families are influencing the timing and

[20] For this analysis, we resort to a relatively shorter sample period (2000-2013) since data assembly requires substantial manual search process.

contents of the news released for the two companies in a way consistent with their incentives.

To augment our previous news analysis, we next examine the distribution of analysts' stock recommendations for both holding companies and subsidiaries during the same interval in table 5. Panel A reports the number of recommendations issued for each recommendation level, while panel B reports average recommendation level where a strong buy is coded as 5 and a strong sell is coded as 1. Similar to the media exposure analysis, we find that the proportion of buys and strong buys is much higher in subsidiaries than for holding companies. Similarly, the average recommendation level is higher (i.e. closer to buys and strong buys) for subsidiaries than for holding companies. Although we do not aim to establish any strict causality, these findings are consistent with the view that more favorable news are being released for subsidiaries than for holding companies prior to the exchange ratio fix date.

5. Tendering Decisions and Wealth Changes

If controlling families could indeed somehow influence the relative prices of the two firms - through news releases or other channels - so that they may temporarily diverge from the fundamental values, they could achieve a wealth gain by actively tendering their shares, on condition that at least some outsiders do not tender. The intuition is that the tender offer could be a bargain if 'H's price relative to 'S' implied in the fixed exchange ratio is lower, at least temporarily, than those implied by the fundamental values.

This is similar to a rights offering where the new shares are offered at a deep discount. If all existing shareholders subscribe to new shares offered at a discount, there is no wealth transfer among shareholders. Although per share price may drop, overall value of each shareholder is not affected based on simple Miller and Modigliani argument. However, if some shareholders do not subscribe to the new shares offered at a discount, their existing share value would decrease due to dilution. Since some new shares are forfeited, the dilution

for the subscribing shareholders would not be as severe as in the full subscription case. As a result, a wealth transfer occurs from non-subscribing shareholders to subscribing shareholders.[21] We state this intuition as follows;

Proposition 1: Let k be the minority subscription ratio and ΔW be the changes in the controlling family's wealth following the tendering decision. Suppose 'H's price is lower than those implied by the fundamentals when exchange ratio is fixed and that the controlling family fully subscribes.[22] Then, $\frac{\partial \Delta W}{\partial k} < 0$, where $\Delta W|_{\mathrm{k=0}} > 0$ and $\Delta W|_{\mathrm{k=1}} = 0$.

Proposition 1 states that if 'H' and 'S' prices deviate by more than those implied in the fundamentals when exchange ratio is determined, controlling families' wealth change is a function of minority shareholders' inertia. If minority shareholders fully subscribe to take advantage of the low 'H' price, then there is no gain in value for the controlling families. However, if minority shareholders extrapolate the recent price run-ups of the subsidiaries and do not bother to tender subsidiary shares, then controlling families' wealth may increase at the expense of minority shareholders. Note, however, that this wealth transfer is clearly voluntary, which distinguishes it from traditional tunneling or expropriation.

We next examine how controlling families and outside investors tender their holdings of the subsidiary shares in exchange for the new shares issued by the parent holding company, and in turn how such decisions ultimately affect the value of their holdings in the two firms. Panel A of table 6 provides summary statistics of the stock-for-stock tender offer by 'H' for shares of 'S'. The mean and median number of 'S' shares sought by 'H' amounts up to

[21] Brealey and Myers (2000) introduce a rights offering case by American Electric Power Company in 1977 where 10% of the existing shareholders forfeited their rights to subscribe even though the new shares were being offered at a 10% discount relative to the prevailing market price. They refer to these investors as *incognoscenti* or vacationers (p. 426).

[22] This also holds when 'S' is relatively overvalued than 'H' compared to fundamental values. Appendix B provides a formal proof.

roughly 30% of the total shares outstanding. This partly reflects 'H's effort to satisfy the regulatory requirement that the holding company must hold at least 20% (40%) stake in public (private) subsidiaries. Still, the percentage ownership sought is much less than 100%, potentially reflecting the controlling families' intention to maintain a certain level of cash flow-control disparity. If the number of tendered shares exceeds the number of sought shares, then the new shares would be allocated on a pro rata basis.[23]

The second line reports the distribution of fixed exchange ratios, the number of new 'H' shares that would be issued in exchange for one old share of 'S' tendered. The mean (median) exchange ratio is 2.55 (2.09), indicating that per share price of 'S' is more than twice as large as 'H' when the exchange ratio is determined. This is precisely due to the fact that 'H' price has continuously decreased since the completion of the spin-off as documented in the previous section.

Panel A of table 6 also reports the distribution of overall subscription ratio defined as total tendered shares scaled by total sought shares. For each investor type, we also report the distribution of the number of shares tendered scaled by the number of shares held prior to the tender. The results indicate that both the mean and the median overall subscription ratio amounts up to roughly 88%. Since total sought shares are roughly 30% on average, this suggests that only about 26% of the outstanding shares are tendered and that vast majority of the shareholders simply do not tender.

Once we partition the sample by each investor type, however, we observe a sharp contrast in tendering tendencies between the controlling family and other minority investors. For example, the median ratio of tendered shares among the family shareholders amounts up to 98%, indicating that the family members tender almost all of their holdings in 'S' in exchange for the new shares to be issued by 'H'. To the contrary, corresponding number for

[23] There are only three cases in our sample where the actual subscription exceeds the number of sought shares.

minority outside shareholders is only 3.1%, implying that almost all outside investors remain passive and do not bother to tender their shares.[24]

These stark differences in the subscription rates between insiders and outsiders would first increase families' direct ownership in 'H', decrease families' direct ownership in 'S', and increase 'H's direct ownership in 'S'. We report these changes in ownership structure in panel B of table 6. The first three lines show how the family's direct ownership in 'H' changes following the tender offer while the next three lines provide the corresponding information for the changes in the family's direct holdings in 'S'. The last two lines report increases in 'H's direct holdings in 'S' obtained through the tender offer.

The results indicate that the median holdings by the family in 'H' increase from 25% to 47% following the tender offer. In contrast, their median holdings in 'S' drop from 25% down to almost 0%. In terms of changes in the number of shares held, this drop implies a -99% drop. As a result of this tender, 'H' is able to increase its median holding in 'S' from 7% to 36%, which satisfies the regulatory requirement that holding companies must hold at least 20% of public subsidiary's ownership.[25]

If all shareholders tender their shares, then 'H' would obtain the desired level of ownership in 'S' as indicated in the total number of shares sought. Since this implies an oversubscription, the new issues would be allocated to all tendering shareholders on a pro rata basis and not all shares tendered by the controlling families would be exchanged for new shares issued by the holding company. This would imply that proportional ownership in 'H' held by insiders and outsiders would not change. However, because at least some outsiders remain passive and do not actively participate in the tender offer, the controlling family is

[24] Outsider held shares are obtained by subtracting off treasury shares and shares held by the controlling family and affiliated firms including the holding company and other non-profit entities (e.g. foundations).

[25] The non-zero median holdings by 'H' in 'S' even before the tender offer reflects both open market purchases since the spin-off and treasury shares reallocated to ‘H’ during the spin-off. There is an intense regulatory controversy on whether treasury shares held before the spin-off could actually be treated as assets and thus be reallocated to ‘H’.

able to secure a much larger direct ownership in 'H'.

In table 7, we examine whether families are able to increase not only the direct holdings in ‘H’ by tendering ‘S’ shares, but also the overall value of their combined portfolio in ‘H’ and ‘S’. If the exchange ratio is fixed to maximize the number of ‘H’ shares for a given number of ‘S’ shares, the tender offer is likely to be a bargain as stated in proposition 1. Panel A provides estimates of the levels of controlling families’ wealth at various points during the two-step organizational change. Panel B presents changes in wealth both in dollar amounts and in percentages between those various points. Percentage changes are measured against the initial value of their holdings prior to the spin-off for an easier comparison.

The results indicate that controlling families exhibit an increase in wealth on average throughout the spin-off and tender offer. From spin-off to re-listing, the combined value increases by roughly 4.6%. From re-listing to exchange ratio fix date, there is an additional gain of roughly 6% (≅ 10.19% - 4.63%). These increases in value may potentially reflect partial relief of diversification or conglomerate discount, which accrue to both controlling families and outside investors.

Once the exchange ratio is fixed, however, controlling shareholders mostly tender their ‘S’ shares while minority shareholders do not. As a result, post-tender offer combined value of the controlling family will largely depend on ‘H’s value while those of the minorities would depend on both ‘H’ and ‘S’. Thus, any wealth change beyond the exchange ratio fix date can largely be attributed to voluntary wealth transfers due to minority investors’ inertia. Specifically, the wealth gain for the controlling families from exchange ratio fix date to new ‘H’ share issue date is 20.5% relative to the pre-split value on average. These results suggest that controlling shareholders on average gain 33% in value throughout the two-step procedure involving a series of transactions, two thirds of which is contributed by minority shareholders who voluntarily did not tender their ‘S’ shares.

In table 8, we decompose the changes in wealth into four components; those due to changes in (1) holding company's price, (2) number of shares held in the holding company, (3) subsidiary's price, and (4) number of shares held in the subsidiary. Appendix C provides the details of the wealth gain decomposition.

Panel A reports the decomposition of changes in wealth between the re-listing date to the new 'H' share issue date. The results based on both mean and median suggest that increases in the controlling families' wealth is mostly due to increases in the number of shares held in 'H' obtained by tendering 'S' shares. Even though the family loses value through price decrease for the holdings company, the magnitude is trivial. Since the families tender most of their 'S' shares, they also lose value from decreases in 'S' holdings. But since they still hold on to some 'S' shares, price increases in 'S' also contribute to their value increase.

In panels B and C, we provide decomposition results for two intermediate periods; from re-listing to exchange ratio fix date, and from exchange ratio fix date to new shares issue date, respectively. Since there are no changes in shares between re-listing to exchange ratio fix date, wealth decomposition in panel B only consists of changes in prices. The results from panel B indicate that although the controlling family loses from decreases in holding company prices up to the exchange ratio fix date, price increases in the subsidiary dominates which ultimately results in a wealth gain during this period.

In panel C, we observe that even changes in the price of the holding company contribute positively to the wealth gain once exchange ratio is fixed. This implies that holding company share prices recover once the exchange ratio is fixed and that controlling families additionally gain by switching to 'H' shares before its recovery.

Overall, the results in this section provide evidence that minority shareholders' decision not to tender their shares, potentially due to behavioral biases like inertia or extrapolation,

affects not only the controlling shareholders' direct ownership in 'H', but the value of their combined holdings. This suggests that insiders are actively considering potential behavioral biases of outside investors and are effectively taking advantage of such behaviors. In fact, there is anecdotal evidence that a group of accounting firms and law firms designed this two-step 'reorganization' procedure and actively marketed such plans to business groups.

6. Price Correction through Limited Arbitrage

In a standard framework, arbitrage helps to restore fundamental value by selling overvalued assets and purchasing undervalued assets. For example, a standard merger arbitrage involves shorting the acquirer's stock, which is relatively more expensive than implied in the merger premium, and buying the target's stock, the short position of which is covered by receiving acquirer stock in exchange for the target stock at a later date.[26] Such activity would reduce the price of the acquirer relative to the target, maintaining the relative price ratio to be close to those implied in the merger premium. In Lamont and Thaler's sample of equity carve-outs, arbitrage involves shorting overvalued subsidiary stock and buying undervalued parent stock. Again, this would mitigate mispricing, the lack of which contributed to continued mispricing.

In a standard arm's length transaction, any buyer using stocks as her medium of payment would prefer to maximize the value of the their shares before the transaction to obtain as much value of the target as possible. However, in our setting, the transactions are far from being at arm's length. They are typically coordinated at the business group level, and the objective is to issue as many new shares as possible for a given number of subsidiary's share tendered. As such, the issuer may well be undervalued and the subsidiary may well be

[26] Upon the announcement of a merger, target prices increase less than those implied in the merger premium, which reflects the uncertainty that the deal may not go through so that the premium may not be realized. In a stock-for-stock deal, less price increase for the target implies a relatively more expensive acquirer price.

overvalued when the exchange ratio between the two is fixed.[27] Under this setting, arbitrage strategy involves shorting an undervalued (old) share of the issuer and buying an overvalued subsidiary share. Since something that is already relatively cheap (expensive) is being shorted (bought), arbitrage may facilitate than mitigate mispricing, at least temporarily.

For example, on November 15, 2007, S&T Group, a mid-sized family owned business group in Korea with group-level total sales of KRW 1.5 trillion (roughly USD 1.5 billion) declared to spin-off its core member firm S&TC into S&T Holdings which is to become the holding company and S&TC which is to become the operating subsidiary. About 9 months later, S&T Holdings announced a stock for stock tender offer for S&TC's shares in exchange for S&T Holdings' new shares. Following the announcement, the exchange ratio between the two shares in the tender offer was fixed at 5.81, based on the prevailing reference price of KRW 14,050 for S&T Holdings and KRW 81,700 for S&TC. A few days later, S&T Holdings price dropped down to KRW 13,800, but S&TC dropped even more to KRW 64,500.

Assuming that exchange ratio was determined at a favorable ratio for the subsidiary, larger price drop for the subsidiary would imply a convergence to fundamental value. But at the same time, this provides an arbitrage opportunity since investors may obtain more subsidiary shares at market prices. Specifically, investors can short 5 shares of S&T Holdings at the prevailing market price of KRW 13,800, and buy one share of S&TC at the prevailing market price of KRW 64,500 which leaves them with KRW 4,500 in cash. S&TC share is immediately tendered which will later be converted into 5.81 S&T Holdings shares. Investors can then cover the short position with the received S&T Holdings shares, which leaves them with KRW 4,500 in cash and 0.81 share of S&T Holdings. Such arbitrage activity would push the relative prices of the two stocks back to those implied in the fixed exchange ratio which implies a continued mispricing at least until the end of the subscription period.

[27] Since shareholders initially hold both stocks, this does not necessarily constitute a conflict of interests.

We refer to further price deviation as ‘wider’ cases, and convergence in prices as ‘narrower’ cases. Unlike standard setting, ‘narrower’ cases or convergence in prices is likely to reflect limits of arbitrage rather than arbitrage.

In Table 9, we report how many of our 39 cases represent ‘wider’ or ‘narrower’ price differentials throughout the subscription period. If there is no restriction to arbitrage, we should not observe ‘narrower’ cases, since relative prices would be pushed back to those implied in the fixed exchange ratio. However, if arbitrage is limited due to various institutional and behavioral factors, we may observe ‘narrower’ cases or convergence in prices.

The first column presents masked sample IDs and the second column presents the value of fixed exchange ratios. The next three columns report the distribution of the market exchange ratio subsequent to the date when tender offer exchange ratio is fixed until the last day of subscription. The next three columns present the number of days during which arbitrage transaction is possible (i.e. from exchange ratio fix date to the end of subscription period), and the number of 'narrower' days and 'wider' days based on daily closing prices during the arbitrage possible period, respectively. In the final column, we categorize each sample transaction as *narrower* if the number of narrower days is more than 3 or *wider* otherwise.

The results from Table 9 indicate that out of 39 sample transactions, 30 of them are actually narrower and only 9 of them are wider. Note that under no arbitrage, the null hypothesis is that we should not observe any narrower cases since they should be quickly pushed back. Instead, our result strongly suggests arbitrage is limited for quite some time, most likely due to shortage of shortable shares, which actually contributes to faster price convergence.

In Table 10, we examine whether there are more short sales of 'H' when the price

differential is narrower. We report the results for all short sales activities of 'H' as well as for each investor group. We observe that overall short sale of 'H' is higher when the market price differential is narrower. Specifically, the proportion of short sales amounts up to 7.744% for narrower cases while the corresponding number for wider cases is only 0.847. Moreover, the former is mostly being driven by institutional investors. Although these numbers seem small relative to short sales in U.S., institutional short sale of 5.674% on a given day is more than 20 times as large as their average short sales.[28] These results suggest that at least a subset of investors seems to be trying to take advantage of the mispricing in 'H' relative to 'S'.

Since limit of arbitrage reported above is more consistent with price convergence than further deviation, it has clear value implications for tendering shareholders. If the market price differential becomes narrower, i.e. converges to fundamentals, it provides tendering shareholders with a gain in value since their switch from ‘S’ to 'H' shares likely occurred when ‘S’ is overvalued and ‘H’ is undervalued. If all shareholders had tendered their shares when the market price differential gets narrower subsequently, then both the controlling family and outside shareholders would benefit from tendering. However, as reported in the previous subsection, most outside investors remain passive or exhibit inertia, while the controlling family tenders almost all shares they hold in 'S' in exchange for newly issued shares in 'H', which results in a voluntary wealth transfer.

7. Discussion

Before we conclude, we would like to introduce a disjoint set of holding companies operating in Korea, namely financial holding companies, which have been set up in a completely different procedure. We believe this discussion would provide additional piece of

[28] Daily short sale (number of shorted shares / number of shares traded) activity in Korea is only 3% on average even among the 50 most shorted stocks. Foreign investors account for most of the short selling (2.87%), while institutions (0.24%) and individuals (0.05%) do not engage in much active short selling.

evidence that managers actively take into account investors' tendency to stick with the default option and take the path of least resistance.

Korean banking regulations are largely modeled after Glass-Steagall Act, so that entities engaging in non-financial, industrial businesses cannot own more than 4% of a commercial bank's shares. As such, commercial banks have largely remained as widely-held stand-alone firms without direct influence of the family-controlled business groups. In 2001, initiatives were taken by the regulatory authorities to reorganize commercial banks and their affiliated financial firms (e.g. insurance, brokerages, credit card, etc.) under a financial holding company.

As of 2015, there are 9 financial holding companies, 7 of which control at least one commercial bank. In strict contrast to the industrial holding companies examined in our main analysis, all 7 widely-held commercial banks reorganized themselves by becoming a 100% subsidiary of the newly created holding company, which is largely similar to the transition process found in U.S. Specifically, shareholders of the original commercial banks would automatically receive shares of the newly created holding companies unless they exercised their appraisal rights and requested the banks to buy back their shares. It turns out that on average, only 1.64% of shareholders actually exercised their appraisal rights, implying that close to 99% of the shareholders remained passive and automatically became shareholders of the newly set up holding company.

If instead, the reorganization process had followed the aforementioned two-step procedure of spin-off followed by a stock-for-stock tender offer, it is highly likely that the tender offer would have failed since most shareholders would remain passive and not tender their shares.[29] This would ultimately have prevented creating a parent-subsidiary relationship between the two spun-off firms, which is crucial in setting up a holding company. We argue

[29] Note that there is no dominant controlling shareholder in these widely-held commercial banks.

that managers of widely-held commercial banks were fully aware of this possibility which precisely made them to structure the default option as receiving the shares of the newly created holding company.

Even more interestingly, there is one exception out of the 9 cases which did go through the two-step procedure. In strict contrast to the rest of the commercial banks which are all widely-held, there exists a dominant family controlling shareholder in this specific case, who has similar incentives as the controlling shareholders of industrial holding companies examined in our main analysis.[30] These findings additionally suggest that managers actively take into account potential investor inertia, conditional on their respective ownership structure, in designing corporate reorganization plans.

8. Conclusion

As outlined in Baker, Ruback, and Wurgler (2007), the impact of investor inertia and limited attention on corporate finance is an important and exciting research question. In this paper, we explore how controlling families of business groups may actively take potential investor inertia into account in maximizing their personal benefits.

Specifically, we focus on Korean business groups who set up a pure holding company through a series of transactions involving spin-offs followed by stock-for-stock tender offers. We provide several interesting empirical patterns. First, we find that the parent holding companies' prices drop while the subsidiaries' prices increase substantially subsequent to the spin-off. Such divergence in prices allows the tendering shareholders to obtain more new 'H' shares for a given number of 'S' shares tendered.

Second, outside investors exhibit a tendency to remain passive when provided with a

[30] In this specific case, an insurance company, not a commercial bank, is the main operating arm, so that ownership restriction for commercial bank does not apply and as such a dominant controlling shareholder may exist.

chance to tender their shares in the operating subsidiary ('S') in exchange for new shares in the holding company ('H'). As a result, the controlling family is able to double their direct ownership in the parent holding company.

Third, inertial investors not only transfer voting rights of the holding company to the controlling family, but also voluntarily transfer wealth by not participating in tender offers which are likely to have been priced at a bargain.

Finally, we find that in more than two thirds of our sample transactions, price of the two stocks converge once the exchange ratio is fixed, and this convergence reflects limits of arbitrage rather than arbitrage. Such limitations on arbitrage imply opportunity wealth gains for the controlling families since they obtain 'H' shares at a more favorable condition compared to the prevailing market price.

Overall, this paper suggests that insiders indeed actively consider potential investor inertia in making managerial decisions, especially for their own benefit. It also suggests that insiders may be evolutionizing in terms of how to maximize their personal benefits. Outright theft, frauds, or other non-market price transactions are now being regulated with more scrutiny than ever before. But, if minority shareholders exhibit behavioral biases, there is some chance that insiders might be able to take advantage of such situation to increase their personal benefits or ‘free lunches’.

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Table 1. Characteristics of Spin-Off Firms

This table presents summary statistics of sample firm characteristics both before and after the initial spin-off. Panel A presents characteristics from the most recent fiscal quarter before the spin-off announcement, while panel B reports those of (to be) holding companies and (to be) subsidiaries as reported in the spin-off filings. Firm Size is market capitalization in KRW billion. Total Assets and Shareholders' Equity are also reported in KRW billion. Leverage is total debt divided by total assets. B/M is book equity divided by market equity. Market variables are as of spin-off announcement date in panel A and re-listing date in panel B, respectively. Cumulative abnormal return (CAR), reported in %, is the buy-and-hold market-adjusted return over various event horizons. Day 0 is the spin-off announcement date in panel A and re-listing date in panel B, respectively. In panel B, H represents holding companies and S represents subsidiaries. We also adjust for possible double counting when we aggregate market values for the combined entity in panel B. The *t*-statistics (*p*-values) for testing the null of zero mean (median) or no differences in means (medians) between H and S are reported in parentheses. *t*-stats are based on cross-sectional standard errors and *p*-values are based on signed-rank tests. The sample period is from 2000 to 2015.

	Mean			Median		
Panel A: Spin-off announcement date						
Firm Size	1,334.40			545.28		
Total Assets	2,444.02			625.64		
Shareholders' Equity	879.78			380.50		
Leverage	0.53			0.50		
B/M	0.50			0.66		
CAR(-5,+5)	0.629			0.290		
t-stat / *p*-value	(0.67)			(0.613)		
CAR(-5,-1)	1.742			0.680		
t-stat / *p*-value	(1.04)			(0.380)		
CAR(0,+5)	1.398			1.015		
t-stat / *p*-value	(1.30)			(0.220)		
CAR(-1,+1)	0.344			-0.280		
t-stat / *p*-value	(0.26)			(0.815)		
Panel B: Re-listing after spin-off						
	H	S	H+S	H	S	H+S
Firm Size	426.74	1,201.39	1,497.73	141.54	368.47	491.10
Total Assets	534.89	1,933.03	2,518.79	185.35	545.35	646.18
Shareholders' Equity	339.59	575.61	930.34	134.33	191.83	372.91
Leverage	0.20	0.66	0.44	0.19	0.56	0.43
B/M	1.31	0.70	0.97	1.15	0.50	0.66
First trading day return (%)	-5.363	0.630		-11.926	0.652	
t-stat / *p*-value	(-2.56)	(0.36)		(0.019)	(0.631)	
difference H-S	(-2.20)			(0.008)		
CAR(0,+1)	-9.100	-0.176		-12.503	-1.615	
t-stat / *p*-value	(-2.76)	(-0.07)		(0.006)	(0.602)	
difference H-S	(-2.20)			(0.015)		
CAR(0,+5)	-8.095	5.242		-10.795	0.607	
t-stat / *p*-value	(-1.67)	(1.31)		(0.113)	(0.546)	
difference H-S	(-2.13)			(0.039)		

Table 2. Cumulative Abnormal Returns around Tender Offers

This table reports cumulative abnormal returns around the subsequent stock-for-stock tender offers. In panel A, the event day is the date when holding company announces a stock-for-stock tender offer for subsidiary's shares. In panel B, the event day is the date when the new shares of the holding company is actually issued in exchange for tendered subsidiary shares. H represents holding companies and S represents subsidiaries, respectively. Firm Size is market capitalization on the tender offer announcement date in KRW billion. Cumulative abnormal return (CAR), reported in %, is the buy-and-hold market-adjusted return over various event horizons. The *t*-statistics (*p*-values) for testing the null of zero mean (median) or no differences in means (medians) between H and S are reported in parentheses. *t*-stats are based on cross-sectional standard errors and *p*-values are based on signed-rank tests. The sample period is from 2000 to 2015.

	Mean			Median		
	H	S	H+S	H	S	H+S
Panel A: H announces tender offer for S's shares						
Firm Size	384.82	1,195.19	1,454.44	152.92	452.93	533.72
CAR(0)	-2.100	-0.286		-2.090	-0.270	
t-stat / *p*-value	(-2.63)	(-0.44)		(0.001)	(0.837)	
difference H-S	(-1.77)			(0.018)		
CAR(-1,+1)	-4.066	-1.066		-3.870	-1.000	
t-stat / *p*-value	(-4.76)	(-1.76)		(0.000)	(0.137)	
difference H-S	(-2.86)			(0.004)		
CAR(-5,-1)	-0.457	1.060		-1.530	-0.180	
t-stat / *p*-value	(-0.39)	(0.82)		(0.463)	(0.691)	
difference H-S	(-0.88)			(0.456)		
CAR(0,+5)	-2.211	-0.778		-3.335	-1.540	
t-stat / *p*-value	(-1.66)	(-0.69)		(0.026)	(0.201)	
difference H-S	(-0.82)			(0.188)		
Panel B: New H shares issued						
Firm Size	789.05	1,334.35	1,723.73	249.41	377.62	484.87
CAR(0)	0.694	-0.128		-0.340	-0.050	
t-stat / *p*-value	(1.00)	(-0.32)		(0.765)	(0.984)	
difference H-S	(1.03)			(0.996)		
CAR(-1,+1)	0.208	0.324		0.230	-1.170	
t-stat / *p*-value	(0.21)	(0.34)		(0.644)	(0.891)	
difference H-S	(-0.08)			(0.674)		
CAR(-5,-1)	-0.751	0.306		0.220	-0.550	
t-stat / *p*-value	(-0.58)	(0.32)		(0.545)	(0.951)	
difference H-S	(-0.06)			(0.553)		
CAR(0,+5)	-0.938	-0.061		-2.900	-0.160	
t-stat / *p*-value	(-0.61)	(-0.05)		(0.357)	(0.880)	
difference H-S	(-0.44)			(0.398)		

Table 3. Holding Period Return throughout the Two-Step Reorganization

The table shows holding period return (HPR) and average daily return between various points in event time during the two-step reorganization process. Holding period return (HPR) is buy-and-hold return in % during the indicated period. Daily return is the average of daily returns in % during the corresponding period. Exchange ratio fix is the date when the number of holding company's new shares to be issued in exchange for one subsidiary share tendered is determined. H represents holding companies and S represents subsidiaries. The *t*-statistics (*p*-values) for testing the null of no differences in means (medians) between H and S are reported in parentheses. The sample period is from 2000 to 2015.

	HPR	Daily return	HPR	Daily return	HPR	Daily return
	Holding		Subsidiary		*t*-statistic of S-H	
			Mean			
Re-listing to tender announce	-1.932	-0.249	33.301	0.316	(1.48)	(2.94)
Re-listing to tender announce (excluding return on re-listing day)	0.942	-0.051	29.132	0.301	(1.40)	(2.33)
Tender announce to exchange ratio fix	-1.612	-0.075	-2.250	-0.115	(-0.27)	(-0.22)
Exchange ratio fix to new shares issue	3.756	0.110	-0.740	-0.024	(-1.03)	(-0.91)
			Median			
	Holding		Subsidiary		*p*-value of S-H	
Re-listing to tender announce	-16.900	-0.132	10.374	0.130	(0.032)	(0.017)
Re-listing to tender announce (excluding return on re-listing day)	-2.976	0.052	11.768	0.169	(0.098)	(0.079)
Tender announce to exchange ratio fix	-0.412	-0.025	-1.826	-0.197	(0.915)	(0.788)
Exchange ratio fix to new shares issue	1.245	0.102	-0.165	0.000	(0.462)	(0.349)

Table 4. Number of News Reported: Subsidiaries vs. Holding Companies

This table shows the number of news reported during the two-step reorganization process. We manually collect the news for both subsidiaries and holding companies and classified them into three categories, namely bad, neutral, and good, based on the content of the news. # of news is the average number of news per firm during each corresponding period. Exchange ratio fix is the date when the number of holding company's new shares to be issued in exchange for one subsidiary share tendered is determined. H represents holding companies and S represents subsidiaries. The *t*-statistics for testing the null of no differences in means between H and S are reported in parentheses. The sample period is from 2000 to 2013.

	Subsidiary (S)				Holding Company (H)				*t*-statistic of S-H		
	# of news	Bad	Neutral	Good	# of news	Bad	Neutral	Good	Bad	Neutral	Good
Re-listing to tender announce	10.69	2.67	2.06	8.89	8.14	2.94	4.57	3.82	(-0.29)	(-2.53)	(3.01)
Re-listing to exchange ratio fix	11.77	2.69	2.18	9.75	8.33	3.15	4.86	3.47	(-0.44)	(-2.48)	(3.57)
Exchange ratio fix to new shares issue	6.93	1.71	1.57	6.17	6.38	1.88	4.17	3.36	(-0.35)	(-2.29)	(1.70)

Table 5: Distribution of Analyst Recommendations

The table reports the descriptive statistics of analyst recommendations issued for our sample firms during the two-step reorganization process. Panel A provides the number of analyst recommendations by each recommendation level for subsidiaries and holding companies, respectively. Panel B provides averages of recommendation levels based on five-point scale from one (Sell) to five (Strong Buy). Exchange ratio fix is the date when the number of holding company's new shares to be issued in exchange for one subsidiary share tendered is determined. H represents holding companies and S represents subsidiaries. The *t*-statistics for testing the null of no differences in means between H and S are reported in the last column of panel B. The sample period is from 2000 to 2015.

Panel A : Number of analyst recommendation

	Strong Buy		Buy		Hold		Under Weighted		Sell	
	Subsidiary	Holding	Subsidiary	Holding	Subsidiary	Holding	Subsidiary	Holding	Subsidiary	Holding
Re-listing to tender announce	5.75	1.00	35.37	5.15	13.50	7.33	0.00	14.00	0.00	2.00
Re-listing to exchange ratio fix	7.25	1.00	40.30	6.07	13.28	6.71	0.00	15.00	0.00	2.00
Exchange ratio fix to new shares issue	2.00	0.00	12.00	6.67	4.20	2.33	3.00	4.00	0.00	0.00

Panel B: Recommendation level

	Average Rating		
	Subsidiary	Holding	*t*-value of S-H
Re-listing to tender announce	3.90	3.54	2.02
Re-listing to exchange ratio fix	3.89	3.57	1.90
Exchange ratio fix to new shares issue	3.88	3.73	0.93

Table 6. Tendering Decisions and Subsequent Ownership Changes

This table presents a summary of tendering decisions of different shareholder types and subsequent ownership changes. Panel A reports the results of tendering decisions and panel B reports changes in ownership structure as a result of the stock-for-stock tender offer. Fixed exchange ratio is the number of holding company's new shares to be issued in exchange for one subsidiary share tendered. Tender size is the dollar value of the tender result (in KRW billion) measured as the number of tendered shares multiplied by closing price of the tender offer announcement date. Subscription ratio (%) is total tendered shares divided by total sought shares. Family (affiliated) tender is tendered shares of controlling shareholders (affiliated firms). Outsider tender is tendered shares of minority shareholders. Family held (affiliated held) is the ownership of controlling shareholder (affiliated firms) in the subsidiary before the tender. Outsider held is the ownership of minority shareholders in the subsidiary before the tender. The first three lines of panel B present families' ownership changes in the holding company (H) while the next three lines report families' ownership changes in the subsidiary (S). The last three lines report holding company (H)'s ownership in the subsidiary (S). The sample period is from 2000 to 2015.

			Mean	Median	Min	Max
Panel A: Tender Decisions						
Share sought/share outstanding			32.64	30.34	2.86	80.69
Fixed exchange ratio			2.55	2.09	0.71	9.16
Tender size			292.46	113.50	7.11	1,834.00
Subsidiary	Subscription ratio		88.45	79.73	50.77	403.42
	Family tender/family held		80.51	97.55	2.20	100.00
	Affiliated tender/affiliated held		39.90	9.16	0.00	100.00
	Outsider tender/outsider held		7.11	3.17	0.00	31.12
Panel B: Family ownership change						
Family → Holding		Before (%)	24.88	24.71	0.99	65.91
		After (%)	48.14	47.31	2.25	89.26
		Increase in number of shares held (%)	431.40	273.10	54.60	2,143.88
Family → Subsidiary		Before (%)	24.75	24.71	0.99	65.91
		After (%)	5.16	0.39	0.00	26.10
		Increase in number of shares held (%)	-80.99	-99.07	-100.00	30.08
Holding → Subsidiary		Before (%)	10.90	7.66	0.00	42.09
		After (%)	36.63	35.30	17.20	67.09
		Increase in number of shares held (%)	813.18	205.10	15.53	11,376.84

Table 7. Wealth Changes of Controlling Families

The table shows wealth changes of controlling shareholders throughout the two-step reorganization process. Panel A presents the distribution of the value of controlling families' holdings (in KRW billion) before the spin-off date, on re-listing date, exchange ratio fixed date and new H shares issue date. Panel B reports distribution of the changes - both in dollar amounts and in percentages - in the value of their holdings between each respective points in event time. The wealth before spin-off is the closing price on the trading halt date (i.e. delisting date) times the number of shares held by controlling shareholder before the spin-off. The wealth on re-listing date is the sum of the two products obtained by multiplying the closing prices of the two stocks on the re-listing date to the number of shares held by controlling shareholder in two stocks after the spin-off, respectively. The wealth on exchange ratio fixed date is the sum of the two products obtained by multiplying the closing prices of the two stocks on the exchange ratio fixed date to the number of shares held by controlling shareholder in two stocks after the spin-off, respectively. Exchange ratio fix is the date when the number of holding company's new shares to be issued in exchange for one subsidiary share tendered is determined. The wealth on New H shares issue date is the sum of the two products obtained by multiplying the closing prices of the two stocks on the new H share issue date to the number of shares held by controlling shareholder in two stocks after the stock-for-stock tender offer, respectively. The *t*-statistics (*p*-values) for testing the null of no change in value in means (medians) are reported in parentheses in panel B. The sample period is from 2000 to 2015.

Panel A: Value of Controlling Families' Holdings				
	(1)	(2)	(3)	(4)
	Before Spin off	Re-listing	Exchange ratio fix	New H shares issue
Mean	230.17	234.04	248.94	291.11
Median	116.22	110.34	117.14	140.45
Min	18.37	14.07	13.97	15.46
Max	2,239.08	2,312.38	2,476.21	2,846.12
Panel B: Changes in the Value of Controlling Families' Holdings				
	Δ(2) - (1)	Δ (3) - (1)	Δ (4) - (1)	Δ (4) - (3)
Mean change (amount)	3.86	18.77	60.93	42.16
Mean change (%)	4.63	10.19	32.56	20.52
t-statistic	1.35	1.50	2.36	1.78
Median	2.79	5.03	16.01	8.80
p-value	0.428	0.260	0.011	0.003
Min	-25.76	-42.58	-65.87	-57.57
Max	80.68	185.38	438.01	421.34
Stdev	21.19	41.94	84.95	71.15
# of wealth increase cases	21	21	25	27

Table 8. Decomposition of Changes in Wealth of Controlling Families

This table presents a decomposition of changes in wealth (in KRW billion) reported in table 7. Changes in wealth for the controlling families are decomposed into the following four components; those due to changes in (1) holding company's price, (2) number of shares held in holding company, (3) changes in subsidiary's price, and (4) number of shares held in the subsidiary. Appendix C provides the details of the wealth gain decomposition. Panel A reports the distribution of the decomposition from re-listing to new share issue date. Panels B and C split the period in panel A into those before and after the exchange ratio fix date. The sample period is from 2000 to 2015.

	Holding		Subsidiary	
	Change in price	Change in shares	Change in price	Change in shares
Panel A: Re-listing to new H shares issue				
Mean	2.44	386.33	22.22	-80.99
Median	-0.66	268.80	9.29	-99.07
Min	-73.99	54.60	-56.29	-100.00
Max	137.86	2,143.88	620.00	30.08
Stdev.	42.61	407.20	104.71	29.06
Panel B: Re-listing to exchange ratio fix				
Mean	-1.63		24.73	
Median	-7.20		7.41	
Min	-72.55		-56.62	
Max	92.59		729.68	
Stdev.	35.31		119.56	
Panel C: Exchange ratio fix to New H shares issue				
Mean	4.17	386.33	-0.99	-80.99
Median	3.42	268.80	-0.35	-99.07
Min	-62.15	54.60	-36.20	-100.00
Max	51.69	2,143.88	25.83	30.08
Stdev.	21.31	407.20	15.68	29.06

Table 9. Arbitrage Opportunities During the Tender Offer Subscription Period

This table presents potential arbitrage opportunities during the tender offer subscription period. Fixed exchange ratio is the number of new holding company's shares to be issued in exchange for one subsidiary share tendered. Market exchange ratio is the market price differential between holding company and subsidiary during the subscription period, defined as daily closing price of subsidiary divided by closing price of holding company. Arbitrage possible period is the period from exchange ratio fixed date to the end of subscription period. Narrower (wider) days are the number of days when market exchange ratio is smaller (larger) than fixed exchange ratio. We categorize a tender offer as 'narrower' when the number of narrower days is more than 3. Otherwise, a tender offer is categorized as 'wider'. The sample period is from 2000 to 2015.

Pair	Fixed exchange ratio	Market exchange ratio from exchange ratio fixed date to the last day of subscription			Arbitrage possible period	Narrower days	Wider days	Price differential
		Mean	Min	Max				
1	4.39	3.99	3.54	4.51	19	18	1	Narrow
2	2.47	2.59	2.42	2.85	19	1	18	Wide
3	2.84	2.48	2.34	2.63	18	18	0	Narrow
4	3.81	3.98	3.68	4.21	17	2	15	Wide
5	2.09	2.47	2.33	2.64	19	0	19	Wide
6	0.93	0.84	0.76	0.92	19	19	0	Narrow
7	3.78	3.71	3.55	3.97	19	17	2	Narrow
8	0.94	1.03	0.95	1.10	17	0	17	Wide
9	0.76	0.77	0.72	0.84	18	10	8	Narrow
10	4.14	3.82	3.58	3.95	15	15	0	Narrow
11	1.50	1.72	1.47	1.90	18	1	17	Wide
12	3.69	3.60	3.41	3.75	17	15	2	Narrow
13	5.81	5.13	4.70	5.52	18	18	0	Narrow
14	1.41	1.42	1.23	1.68	18	8	10	Narrow
15	0.92	0.92	0.84	0.98	18	7	11	Narrow
16	1.75	2.09	1.69	2.39	19	3	16	Wide
17	1.59	1.67	1.60	1.76	16	0	16	Wide
18	0.80	0.81	0.77	0.84	16	4	12	Narrow
19	4.48	4.28	4.05	4.42	16	16	0	Narrow
20	1.99	2.03	1.90	2.16	18	9	9	Narrow
21	2.92	2.92	2.82	3.09	13	7	6	Narrow
22	4.91	4.78	4.56	4.93	19	18	1	Narrow
23	1.00	0.96	0.93	0.97	17	17	0	Narrow
24	2.62	2.63	2.41	2.72	16	5	11	Narrow
25	2.56	2.59	2.40	2.73	20	6	14	Narrow
26	1.16	1.14	1.10	1.18	17	15	2	Narrow
27	1.47	1.44	1.36	1.52	15	10	5	Narrow
28	9.16	10.19	8.78	11.43	19	1	18	Wide
29	0.75	0.71	0.68	0.73	16	16	0	Narrow
30	1.58	1.47	1.41	1.54	18	18	0	Narrow
31	0.71	0.71	0.68	0.79	15	11	4	Narrow
32	0.93	0.97	0.92	1.05	14	2	12	Wide
33	2.50	2.46	2.35	2.57	18	16	2	Narrow
34	1.08	1.03	1.01	1.06	16	16	0	Narrow
35	2.24	2.16	2.04	2.23	11	11	0	Narrow
36	5.22	4.10	3.88	4.27	16	16	0	Narrow
37	3.50	2.91	2.55	3.25	17	17	0	Narrow
38	3.43	3.05	2.79	3.35	16	16	0	Narrow
39	1.62	1.55	1.49	1.58	14	14	0	Narrow

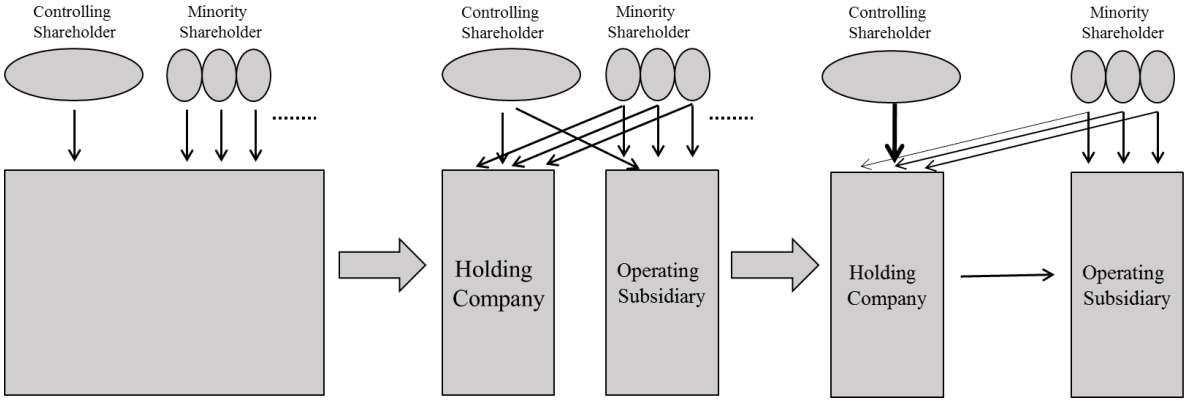
Table 10. Short Selling Activity by Different Types of Investors

The table shows short-selling activity by investor type and arbitrage feasibility. Each cell reports is the daily number of shorted shares divided by the daily number of traded shares (in %) for both holding companies and subsidiaries. We classify investors into three types: domestic individual investors, domestic institutional investors and foreign investors, denoted as individual, institution and foreigner, respectively. If the market exchange ratio is smaller than the fixed exchange ratio for more than 3 days during the possible arbitrage period, then we assign these tender-offers as 'narrower'. Otherwise, tender offers are assigned as 'wider'. Market exchange ratio is market price differential between holding company and subsidiary during the subscription period, defined as daily closing price of the subsidiary divided by the closing price of holding company. Fixed exchange ratio is the number of new holding company shares to be issued in exchange for one subsidiary share tendered. The *t*-statistics for testing the null of no differences in means between H and S as well as between 'narrower' and 'wider' are reported in parentheses. The sample period is from 2000 to 2015.

	Holding				Subsidiary				*t*-statistic of H-S			
	All	Individual	Institution	Foreigner	All	Individual	Institution	Foreigner	All	Individual	Institution	Foreigner
All	6.168	0.471	4.393	1.304	1.027	0.021	0.352	0.654	(4.12)	(2.05)	(3.73)	(1.89)
Narrower	7.744	0.589	5.674	1.481	1.027	0.019	0.419	0.589	(4.53)	(2.03)	(4.02)	(2.08)
Wider	0.847	0.071	0.069	0.707	1.026	0.027	0.127	0.872	(-0.42)	(0.87)	(-0.74)	(-0.45)
Narrower-Wider	6.897	0.518	5.605	0.774	0.001	-0.008	0.291	-0.283				
t-statistic of Narrower-Wider	(4.61)	(1.82)	(4.32)	(1.62)	(0.00)	(-0.32)	(1.50)	(-1.11)				

Figure 1 Spin-off and Subsequent Tender Offer Process
This figure describes how holding companies in Korea are typically set up by a two-step procedure of a spin-off followed by a stock-for-stock tender offer. Panel A, taken from Kim et al. (2012), presents the details of the shareholder structure and changes in holdings through the two-step procedure. The large ovals denote controlling shareholders, and the small ovals indicate minority shareholders. The boxes represent companies, and the arrows indicate direction of ownership. First, the business group selects a member firm to be converted into a holding company. Next, this firm goes through a spin-off. Finally, the new (to be) holding company implements a stock-for-stock tender offer for the operating subsidiary's shares where the means of payment is the newly issued shares of the new holding company. Panel B presents the time line of this sequential transaction. Spin off announce is the date the company announces a spin-off. Spin off is the actual spin-off date. Re-listing After spin off is the date when spun-off (to be) holding company and (to be) subsidiary starts to trade again. Exchange Ratio (X) fixed is the date when the number of new holding company's shares to be issued in exchange for one subsidiary share tendered is determined.

Panel A: Deal Structure



Panel B: Time Line

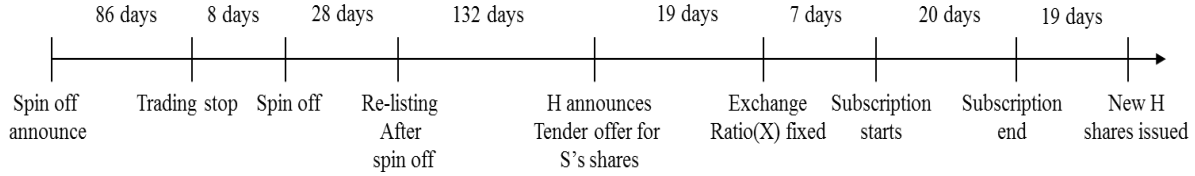


Figure 2. Cumulative Returns Since Re-listing of the Two Spun-Off Stocks
The figure plots the cross-sectional averages of cumulative abnormal returns (CARs) since the re-listing of the holding company and subsidiary. Cumulative abnormal return (CAR), reported in %, is the buy-and-hold market-adjusted return up to 60 trading days after the re-listing date. The dotted line represents subsidiary return while the dark line presents those of holding company. The sample period is from 2000 to 2015.

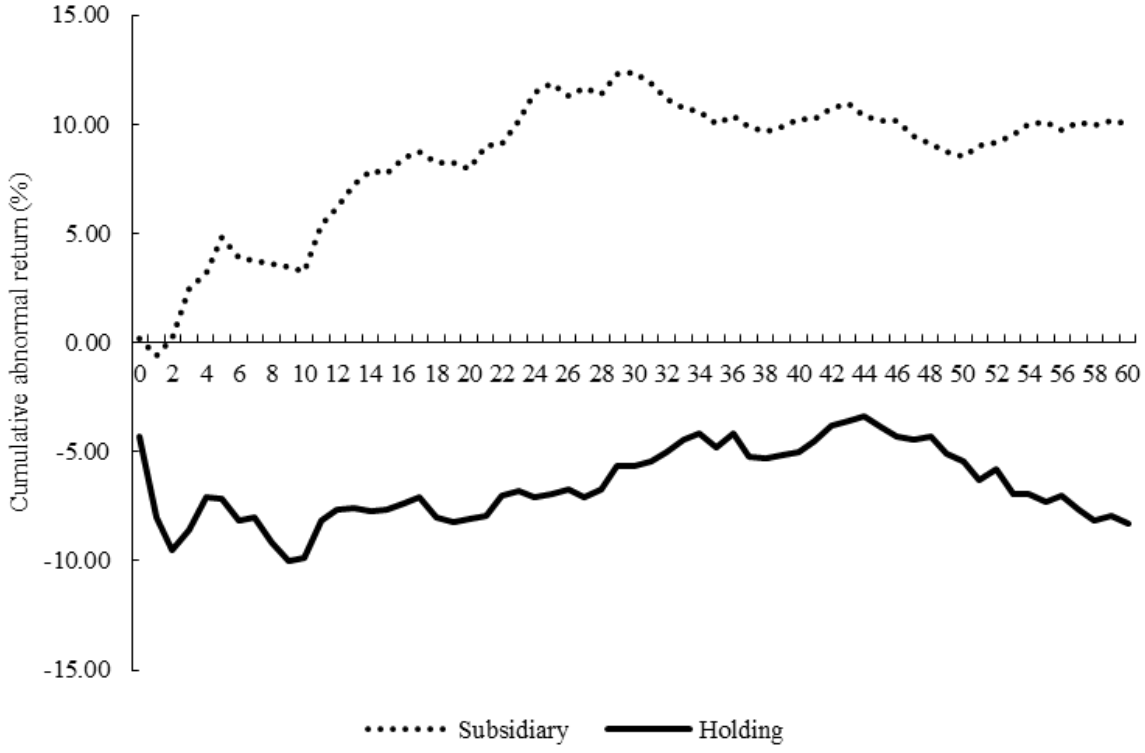


Figure 3. Price Changes around Exchange Ratio Fix Date

This figure reports the price changes of the two stocks around the date when exchange ratio in the tender offer is fixed. In panel A, we simulate hypothetical fixed exchange ratios by moving back the board decision date to launch a tender offer a day at a time and recalculate the fixed exchange ratio for each day. The reference price for the subsidiary (i.e. numerator used to calculate fixed exchange ratio) is determined by the arithmetic average of the following three prices; (1) volume weighted average closing price for the past one month, (2) volume weighted average closing price for the past one week (3) the most recent closing price, all of which are as of the day before the board's decision to launch the tender offer. If this average price is higher than the most recent closing price, then the most recent closing price becomes the reference price. The reference price for the holding company (i.e. denominator used to calculate fixed exchange ratio) is determined as the highest price among the following three prices; (1) volume weighted average closing price for the past one month, (2) volume weighted average closing price for the past one week (3) the most recent closing price, all of which are as of the 5th trading day before the subscription starts. Issuing firms may apply additional discount or premium to the holding company's reference price which is disclosed in the filings. From 2010 onward, holding company reference price is simply determined as the volume weighted average closing price between 3rd and 5th day before the subscription starts, without any discounts or premiums. If this average is lower than the par value, then par value becomes the reference price. In panel B, we report the averages of cumulative abnormal returns (CARs) around the exchange ratio fix date for holding companies and subsidiaries. Exchange ratio is the number of new shares to be issued by the holding company in exchange for one subsidiary share tendered. In panel C, we report the average prices of both the holding company and the subsidiary normalized to 100 as of the exchange ratio fix date. The dotted line represents subsidiary return while the dark line presents those of holding company in both panels B and C. The sample period is from 2000 to 2015.

Panel A: Simulated Fixed Exchange Ratio Prior to the Exchange Ratio Fix Date

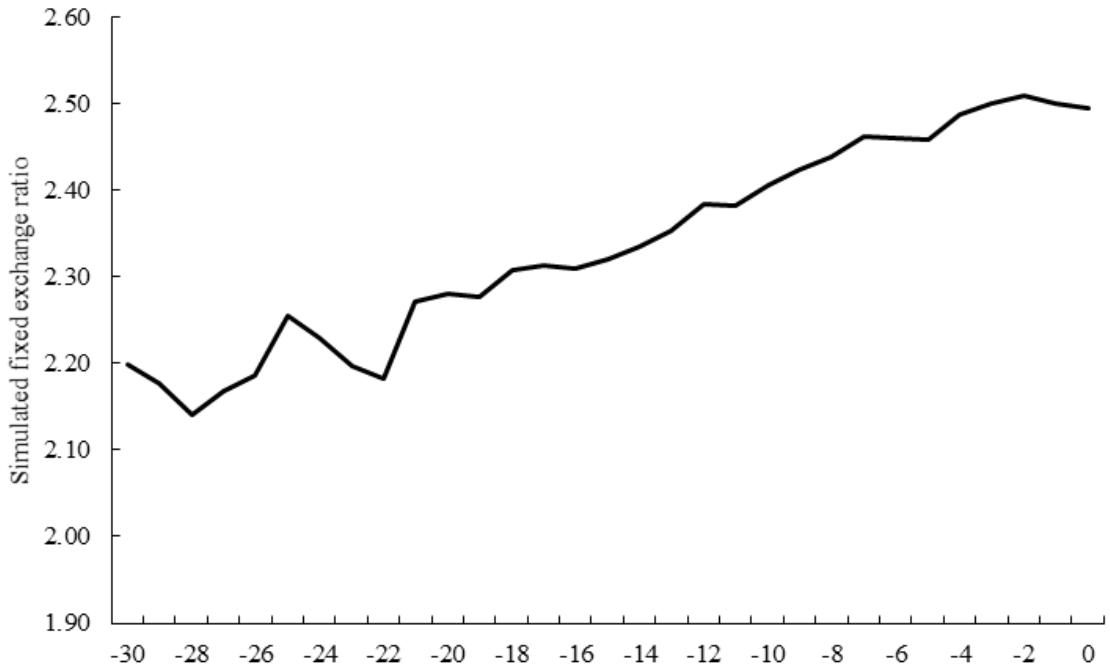


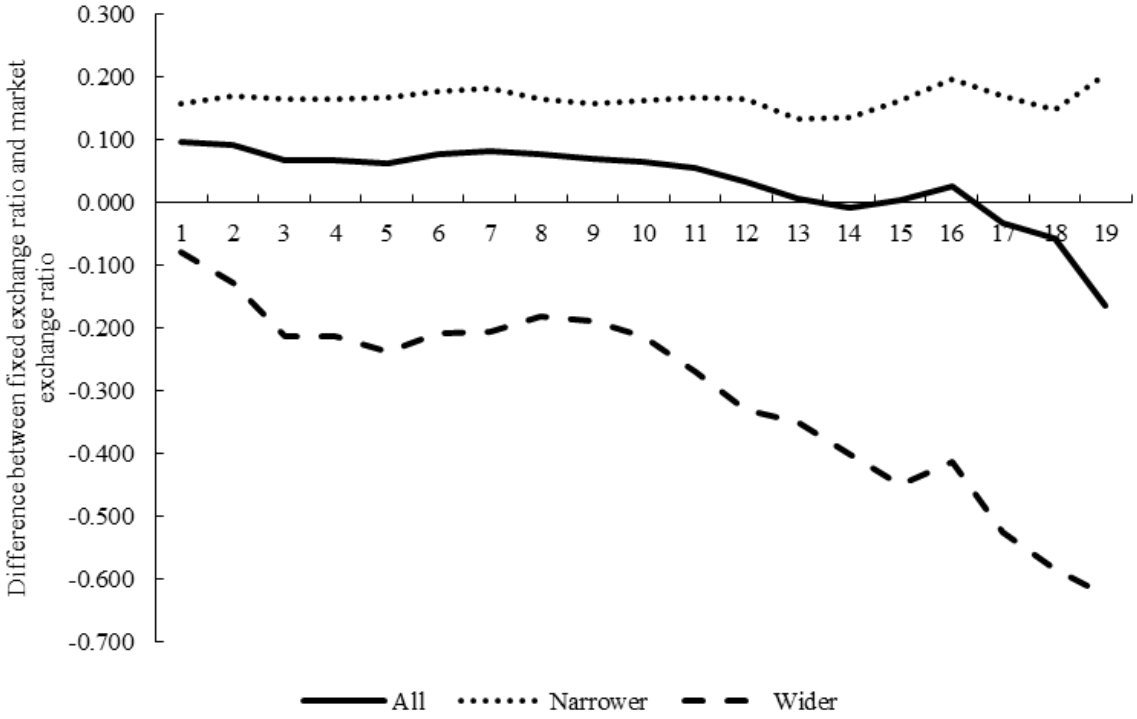
Figure 3- *continued*

Panel B: Cumulative abnormal returns (CARs) around the exchange ratio fix date

Panel C: Price Changes Subsequent to the Exchange Ratio Fix Date

Figure 4. Difference between Fixed Exchange Ratio and Market Exchange Ratio

This figure shows the difference between fixed exchange ratio and market exchange ratio from the exchange ratio fixed date to the last day of tender offer subscription. Fixed exchange ratio is the number of new holding company's shares to be issued in exchange for one subsidiary share tendered. Market exchange ratio is the market price differential between holding company and subsidiary company during the subscription period, defined as daily closing price of subsidiary company divided by closing price of holding company. If the market exchange ratio is smaller than the fixed exchange ratio for more than 3 days during the possible arbitrage period, then we assign these tender-offers as 'narrower'. Otherwise, tender offers are assigned as 'wider'. The sample period is from 2000 to 2015.



Appendix A. List of Sample Firms

Holding Company	Subsidiary	Spin off announce	Trading stop	Spin off	H announce tender offer	Exchnage ratio fixed	Subscription starts	Subscription end	New H shares issue
LG	LG Household & Healthcare	2000-11-15	2001-03-29	2001-04-03	2001-11-08	2001-11-19	2001-11-26	2001-12-14	2001-12-26
LG	LG Chem	2000-11-15	2001-03-29	2001-04-03	2001-11-08	2001-11-19	2001-11-26	2001-12-14	2001-12-26
Dae Woong	Daewoong Pharmaceutical	2002-07-23	2002-09-27	2002-10-02	2003-10-09	2003-10-29	2003-11-05	2003-11-24	2003-12-19
Nongshimholdings	NongShim	2003-03-24	2003-06-17	2003-07-01	2003-08-20	2003-09-09	2003-09-19	2003-10-08	2003-10-23
Daesang Holdings	Daesang	2005-05-02	2005-07-19	2005-08-01	2005-09-27	2005-10-18	2005-10-25	2005-11-14	2005-12-28
Pyung Hwa Holdings	Pyung Hwa Industrial	2006-02-06	2006-04-20	2006-05-01	2007-05-04	2007-05-31	2007-06-08	2007-06-28	2007-07-16
AMOREPACIFIC Group	Amorepacific	2006-03-15	2006-05-26	2006-06-01	2006-10-09	2006-11-14	2006-11-21	2006-12-11	2006-12-27
Woongjin Holdings	Woongjin Thinkbig	2007-02-15	2007-04-27	2007-05-01	2007-08-02	2007-09-03	2007-09-10	2007-10-01	2007-10-23
SK Holdings	SK Innovation	2007-04-11	2007-06-28	2007-07-01	2007-08-29	2007-09-21	2007-10-04	2007-10-23	2007-11-08
JW Holdings	JW Pharmaceutical	2007-04-02	2007-06-28	2007-07-01	2007-08-06	2007-09-14	2007-09-21	2007-10-11	2007-10-30
Hanjin Heavy Industries & Construction Holdings	Hanjin Heayy Industries & Construction	2007-05-15	2007-07-30	2007-08-01	2007-10-08	2007-11-02	2007-11-09	2007-11-28	2007-12-18
CJ	CJ CheilJedang	2007-06-12	2007-08-30	2007-09-01	2007-11-08	2007-11-29	2007-12-06	2007-12-26	2008-01-22
S&T Holdings	S&T	2007-11-14	2008-01-30	2008-02-01	2008-08-18	2008-09-08	2008-09-16	2008-10-06	2008-10-24
Dong Sung Holdings	Dong Sung Chemical	2008-02-11	2008-04-29	2008-05-01	2008-09-17	2008-10-10	2008-10-17	2008-11-05	2008-11-21
KISCO Holdings	KISCO	2008-06-18	2008-08-28	2008-09-01	2009-04-08	2009-04-13	2009-04-20	2009-05-11	2009-05-27
HansaeYes24 Holdings	Hansae	2008-08-07	2008-12-29	2009-01-01	2009-04-22	2009-05-14	2009-05-21	2009-06-10	2009-07-01
Eusu Holdings	HANJIN Shipping	2009-09-16	2009-11-27	2009-12-01	2010-02-04	2010-02-11	2010-02-17	2010-03-09	2010-04-01
CS Holdings	Chosun Welding Pohang	2009-10-14	2009-12-29	2010-01-01	2010-09-30	2010-10-08	2010-10-13	2010-11-01	2010-11-18
KC Green Holdings	KC Cottrell	2009-09-28	2009-12-29	2010-01-01	2010-05-14	2010-05-28	2010-06-03	2010-06-22	2010-07-09
Kolon Corporation	Kolon Industries	2009-10-15	2009-12-29	2009-12-31	2010-05-24	2010-06-01	2010-06-07	2010-06-28	2010-07-13
Hanmi Science	Hanmi Pharm.	2010-03-26	2010-06-29	2010-07-01	2010-09-02	2010-09-10	2010-09-15	2010-10-04	2010-10-21
IDIS Holdings	Intelligent Digital Integrated Security	2011-04-11	2011-05-30	2011-07-01	2012-03-22	2012-04-05	2012-04-10	2012-05-04	2012-05-22
Samyang Holdings Corporation	Samyang	2011-08-10	2011-10-26	2011-11-01	2012-06-01	2012-06-15	2012-06-20	2012-07-10	2012-07-25
AK Holdings	Aekyung Petrochemical	2012-04-24	2012-08-30	2012-09-01	2012-11-14	2012-11-27	2012-11-30	2012-12-20	2013-01-07
Hankook Tire WorldWide	Hankook Tire	2012-04-25	2012-07-31	2012-09-01	2013-05-20	2013-06-03	2013-06-07	2013-07-02	2013-07-18
DRB Holding Co., Ltd.	DRB Industrial	2012-05-31	2012-09-27	2012-10-01	2013-10-07	2013-10-22	2013-10-25	2013-11-14	2013-12-03
Humax Holdings	Humax	2009-07-07	2009-08-28	2009-10-01	2010-01-13	2010-01-25	2010-01-28	2010-02-16	2010-03-05
Neowiz Holdings	Neowiz Games	2007-02-01	2007-04-20	2007-04-24	2007-07-27	2007-09-19	2007-10-01	2007-10-22	2007-11-08
Asia Holdings	Asia Cement	2013-05-07	2013-09-27	2013-10-01	2014-09-22	2014-10-21	2014-10-24	2014-11-12	2014-11-27
Hanjin KAL	Korean Air Lines	2013-03-22	2013-07-30	2013-08-01	2014-09-24	2014-10-10	2014-10-15	2014-11-05	2014-11-20
Dong-A Socio Holdings	Dong-A ST	2012-10-23	2013-02-27	2013-03-01	2014-09-02	2014-10-02	2014-10-08	2014-10-27	2014-11-12
Chong Kun Dang	Chong Kun Dang	2013-07-01	2013-10-31	2013-11-02	2015-04-07	2015-04-20	2015-04-23	2015-05-12	2015-05-15

Holdings	Pharmaceutical								
Halla Holdings	Mando	2014-04-07	2014-08-28	2014-09-01	2014-11-06	2014-11-19	2014-11-24	2014-12-15	2014-12-29
Seoyon	Seoyon E-Hwa	2013-09-30	2014-06-27	2014-07-01	2014-11-07	2014-11-24	2014-11-27	2014-12-16	2015-01-05
Cosmax BTI	Cosmax	2013-10-23	2014-02-27	2014-03-01	2014-06-25	2014-07-25	2014-07-30	2014-08-09	2014-08-27
Bubang	Cuchen	2015-03-20	2015-07-30	2015-08-01	2015-10-07	2015-11-17	2015-11-20	2015-12-09	2015-12-23
Simmtech Holdings	Simmtech	2015-02-23	2015-06-29	2015-07-01	2015-09-14	2015-10-13	2015-10-16	2015-11-05	2015-11-23
Woory Industrial Holdings	Worry Industrial	2014-10-17	2015-03-30	2015-04-01	2015-06-10	2015-07-13	2015-07-06	2015-08-04	2015-08-20
DY	DY Power	2014-07-04	2014-11-27	2014-12-01	2015-08-20	2015-09-17	2015-09-22	2015-10-12	2015-10-23

Appendix B.

This appendix provides proofs of proposition 1. We show that the controlling family's wealth increases as minority shareholder's subscription decreases. We assume controlling families tender 100% of their own shares. Let;

α : controlling family's proportional ownership(assume 100% tender)

k : minority's subscription ratio

$V_0^H(V_0^S)$: value of Holding(Subsidiary) prior to the tender offer

$N_0^H(N_0^S)$: number of H(S)shares prior to tender offer

$P_0^H(P_0^S)$: price of H(S) prior to tender offer

P_x^H : temporarily pushed down price of H, so that $P_x^H < P_0^H$

x : exchange ratio, $\frac{P_0^S}{P_x^H} > \frac{P_0^S}{P_0^H}$

P_*^H : long term equilibrium price

$$P_*^H = \frac{V_0^H + [\alpha + (1-\alpha)\cdot k)]\cdot V_0^S}{N_0^H + [\alpha + (1-\alpha)\cdot k)]\cdot N_0^S \cdot x} < P_0^H$$

$$P_x^H < P_*^H < P_0^H$$

W_0: controlling shareholder's wealth before tender offer

W_*: controlling shareholder's wealth after tender offer

Then;

$W_0 = \alpha(V_0^H + V_0^S)$

$W_* = [\alpha N_0^H + \alpha N_0^S \cdot x]P_x^H$

$W_* = W_0$, if $k = 1$

$$\alpha_* = \frac{[\alpha N_0^H + \alpha N_0^S \cdot x]}{N_0^H + [\alpha + (1-\alpha)\cdot k)]\cdot N_0^S \cdot x}$$

$\alpha_* > \alpha$, if $k < 1$

$\alpha_* = \alpha$, if $k = 1$

$$\Delta W = W_* - W_0 = [\alpha N_0^H (P_x^H - P_0^H)] + \left[\alpha N_0^S \cdot P_0^S \left(\frac{P_*^H}{P_x^H} - 1\right)\right] \quad (1)$$

$$\text{if } k \to 0, \text{then } \Delta W > 0, \text{therefore we need to show that } \frac{\partial \Delta W}{\partial k} < 0$$

From equation (1), we know if we verify that $\frac{\partial P_*^H}{\partial k} < 0$, then $\frac{\partial \Delta W}{\partial k} < 0$ holds.

$$\frac{\partial P_*^H}{\partial k} = \frac{(1-\alpha)V_0^S[N_0^H + [\alpha + (1-\alpha)\cdot k)]\cdot N_0^S \cdot x] - [V_0^H + [\alpha + (1-\alpha)\cdot k)]\cdot V_0^S] \times (1-\alpha)N_0^S \cdot x}{\{N_0^H + [\alpha + (1-\alpha)\cdot k)]\cdot N_0^S \cdot x\}^2}$$

$$= \frac{(1-\alpha)V_0^S N_0^H - (1-\alpha)N_0^S V_0^H \cdot \frac{P_0^S}{P_x^H}}{\{N_0^H + [\alpha + (1-\alpha)\cdot k)]\cdot N_0^S \cdot x\}^2}$$

$$= \frac{(1-\alpha)V_0^S N_0^H - (1-\alpha)V_0^S N_0^H \cdot \frac{P_0^H}{P_x^H}}{\{N_0^H + [\alpha + (1-\alpha)\cdot k)]\cdot N_0^S \cdot x\}^2}$$

$$= \frac{(1-\alpha)V_0^S N_0^H \left[1 - \frac{P_0^H}{P_x^H}\right] < 0}{\{N_0^H + [\alpha + (1-\alpha)\cdot k)]\cdot N_0^S \cdot x\}^2}$$

From assumption we know, $P_x^H < P_0^H$, therefore $\frac{\partial P_*^H}{\partial k} < 0$ and $\frac{\partial \Delta W}{\partial k} < 0$

Other things equal, if controlling shareholder temporarily push up price of S, then $\frac{\partial \Delta W}{\partial k} < 0$ again holds. Let;

P_x^S : temporarily pushed up price of S, so that $P_x^S > P_0^S$

x : exchange ratio, $\frac{P_x^S}{P_0^H} > \frac{P_0^S}{P_0^H}$

$$\frac{\partial P_*^H}{\partial k} = \frac{(1-\alpha)V_0^S[N_0^H + [\alpha + (1-\alpha)\cdot k)]\cdot N_0^S \cdot x] - [V_0^H + [\alpha + (1-\alpha)\cdot k)]\cdot V_0^S] \times (1-\alpha)N_0^S \cdot x}{\{N_0^H + [\alpha + (1-\alpha)\cdot k)]\cdot N_0^S \cdot x\}^2}$$

$$= \frac{(1-\alpha)V_0^S N_0^H - (1-\alpha)N_0^S V_0^H \cdot \frac{P_x^S}{P_0^H}}{\{N_0^H + [\alpha + (1-\alpha)\cdot k)]\cdot N_0^S \cdot x\}^2}$$

$$= \frac{(1-\alpha)N_0^H[N_0^S P_0^S - N_0^S P_x^S] < 0}{\{N_0^H + [\alpha + (1-\alpha)\cdot k)]\cdot N_0^S \cdot x\}^2}$$

From assumption we know, $P_x^S < P_0^S$, therefore $\frac{\partial P_*^H}{\partial k} < 0$ and $\frac{\partial \Delta W}{\partial k} < 0$

Appendix C.

This appendix explains how we decompose the controlling family's wealth gains into four components. Specifically, the wealth changes may arise from price changes and changes in the number of shares held in both holding company and subsidiary. Let;

$N_0^H (N_0^S)$: number of H(S)shares prior to tender offer
$P_0^H (P_0^S)$: price of H(S) prior to tender offer
$N_1^H (N_1^S)$: number of H(S)shares after tender offer
$P_1^H (P_1^S)$: price of H(S) after tender offer
x: exchange ratio, $\frac{P_x^S}{P_x^H}$
N_T^S: number of S shares tendered by controlling shareholders
W_0: controlling shareholder's wealth before tender offer
W_1: controlling shareholder's wealth after tender offer

Then;

$$\begin{aligned}\Delta W &= W_1 - W_0 \\ &= P_1^H \times N_1^H + P_1^S \times N_1^S - (P_0^H \times N_0^H + P_0^S \times N_0^S) \\ &= P_1^H \times \left(N_0^H + N_T^S \times \frac{P_x^S}{P_x^H} \right) + P_1^S \times (N_0^S - N_T^S) - P_0^H \times N_0^H - P_0^S \times N_0^S \\ &= N_0^H \times (P_1^H - P_0^H) + P_1^H \times (N_1^H - N_0^H) + N_0^S \times (P_1^S - P_0^S) + P_1^S \times (N_0^S - N_1^S) \end{aligned} \quad (2)$$

where, $N_1^H = N_0^H + N_T^S \times \frac{P_x^S}{P_x^H}$ and $N_1^S = N_0^S - N_T^S$

and each term in equation (2) represents wealth changes due to changes in holding company's price, number of shares held in holding company, changes in subsidiary's price, and number of shares held in the subsidiary.