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# Death Spiral Issues in Emerging Market: A Control Related Perspective<sup>†</sup>

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This version: September, 2012

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## Abstract

This paper studies the motive of issuing floating-priced convertibles or warrants, known as *death spirals*, in a country where the private benefit of control is high. Using a total of 199 death spiral issuances by public firms listed in the Korea Stock Exchange during 1998-2006, we find a number of pieces of empirical evidence that are less consistent with the conventional *last resort financing hypothesis*, but rather consistent with the *control enhancing or control transferring hypothesis*. First, abnormal returns subsequent to death spiral issuance is negative, but more so in poorly governed firms. Second, operating performance of chaebol issuers are not necessarily low at the time of the issue nor does it deteriorate over time, but they still prefer to issue death spirals over traditional fixed-priced hybrid securities. Third, we do not observe subsequent changes in the controlling shareholder in more than 60% of the issuers and these firms exhibit superior operating performance at the time of the issue compared to other death spiral or non-death spiral issuers. Fourth, this same set of firms do not experience a decrease in proportional ownership by the controlling party, while family members other than the controlling shareholder experience the most pronounced increases in the number of shares held. Finally, in approximately half of these firms, at least one member of the controlling party holds hybrid securities that can later be converted into voting shares.

*JEL Classifications:* G32, G34

*Keywords:* Death spirals, Convertibles, Warrants, Control enhancing mechanisms, Korea

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## 1. Introduction

Floating-priced convertibles, commonly known as *death spirals*, are convertible bonds with price contingent conversion ratios. Unlike the conventional convertibles where the conversion ratio or the number of shares entitled to is fixed at the time of the issue, conversion ratio in floating-priced convertibles changes as the market price fluctuates so that the holder is entitled to more shares as the share price falls. This feature provides the holders with an insurance against any future drop in stock prices and guarantees a fixed total value to the holder. Although initially introduced during late 1990's as a financial innovation to address adverse selection problems in the sense of Myers and Majluf (1984), it quickly disappeared from the market after initial flurry of issues (Brealey and Myers, 2006).

According to PlacementTracker, however, these securities came back in action. The amount of money raised by structured PIPEs - another name for death spirals - peaked in 2000 at USD 2.6 billion, dropped down to USD 80 million in 2003, and then hit its new record at USD 15.6 billion in 2007.<sup>1</sup> Moreover, recent deals involving troubled US financial institutions closely resemble death spirals. For example, Merrill Lynch's deal with Temasek of Singapore in December 2007 includes a reset clause stating that should Merrill Lynch afterwards raise money at a lower price, Temasek would be compensated retroactively by having its initial investment priced at this lower price.

Cross-sectionally, death spirals are found outside US as well. In Japan, it is known as moving strike convertible bonds (MSCBs) and came under scrutiny when Lehman Brothers provided JPY 80 billion through MSCB in internet firm Livedoor's takeover battle against top

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<sup>1</sup> PIPE stands for private investment in public equity. In US, floating-priced convertibles are issued through private placements (Hillion and Vermaelen, 2004), although there are public offerings of death spirals in other countries. Visit [www.sagientresearch.com/pt](http://www.sagientresearch.com/pt) for detailed statistics on structured PIPEs in US. After the 2008 global financial crisis, the structured PIPE issuance dropped significantly, down to USD 95 million in 2011.

broadcaster Fuji Television Network in 2005. In Korea, death spirals are known as convertible bonds or bonds with warrants with an option to re-fix the conversion or exercise price, which became an important external financing vehicle following the financial crisis of 1997.

According to the existing literature, firms issue death spirals when they have no other means of raising capital. Based on US data between 1994 and 1998, Hillion and Vermaelen (2004) confirm this conjecture, which they named as the *last resort financing hypothesis*. Specifically, they show that (i) the issuance of floating-priced convertibles is followed by significant negative abnormal returns, (ii) the value of the underlying assets, i.e., common stock plus convertibles, fall significantly during the year after the issuance, (iii) operating performance declines significantly relative to comparable non-issuing firms during the years following the issuance, and (iv) poorly performing firms are more likely to issue a floating-priced convertible. In a recent work, Brophy, Ouimet, and Sialm (2009) analyze the characteristics of firms that obtain financing from hedge funds and find similar results.

In this paper, we study the motive of issuing death spirals from a new angle. We investigate whether death spirals may be used to enhance the controlling shareholder's influence over the business group under his/her control or to transfer the control over the issuing firm to the controlling shareholder's heir (*control enhancing or control transferring hypothesis*). The following anecdote illustrates how this could actually occur in practice.

In July 1999, Doosan Corporation, a member firm of one of the large family-controlled business groups or *chaebols* in Korea, issued a bond with floating-priced warrants (USD 100 million).<sup>2</sup> It was an overseas public issuance, but it was prearranged so that the warrants were detached immediately after the issuance and mostly sold to the members of the controlling family.

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<sup>2</sup> This anecdote is introduced in two reports (2002, 2003) provided by the Center for Good Corporate Governance (CGCG), a local civil organization. At the time of the death spiral issuance, Doosan business group was the 12<sup>th</sup> largest *chaebol* in Korea.

The detached warrants were initially purchased by both the third and the fourth generation family members, but in September the third generation sold all of their warrants to the fourth generation family members. In October, the first downward adjustment of the exercise price took place. The outstanding principal amount was paid back in full only one year after the issuance in July 2000.

In subsequent years, share price dropped dramatically which led the exercise price to fall from the original level of KRW 50,100 in July 1999 to KRW 9,460 in October 2002. If the fourth generation family members had fully exercised their warrants in October 2002, they could have increased the family ownership of Doosan Corporation from 15.7% to 39.1%.<sup>3</sup> In October 2002, this scheme was uncovered by CGCG, which led the Financial Supervisory Service (FSS) to investigate on the matter. In February 2003, the controlling family announced that they would voluntarily void their entire holdings of Doosan Corporation warrants. The case of Doosan was not the only case uncovered during this period. People's Solidarity for Participatory Democracy (PSPD), a civil activist group in Korea, reported that at least 16 other companies have issued similar death spirals. Among these, there were four cases where the controlling family later voluntarily redeemed all of their warrant holdings.<sup>4</sup>

To empirically test the *control enhancing or control transferring hypothesis* as illustrated above, we focus on Korea which is widely known for its high level of private benefits of control.<sup>5</sup> Using a total of 199 death spiral issuances by public firms listed in the Korea Stock Exchange during 1998-2006, we find a number of pieces of empirical evidence that are less consistent with the conventional *last resort financing hypothesis*, but rather consistent with the *control enhancing or control transferring hypothesis*.

First, abnormal returns subsequent to death spiral issuances are negative, but more so in

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<sup>3</sup> Family control, including the shares owned by Doosan affiliated firms, could have increased from 59.72% to 70.9%.

<sup>4</sup> See PSPD (2003).

<sup>5</sup> Nenova (2003) shows that the value of control-block votes in Korea is among the highest around the world.

poorly governed firms, in which the private benefits of control are high (for example, chaebols or family-controlled large business groups). According to the *control enhancing or control transferring hypothesis*, the controlling shareholder of such firm typically has a strong motive to preserve and secure his control and thus may use death spirals for such purpose. Since lower exercise price (due to stock price drop) allows the controlling shareholders to obtain or transfer a larger ownership stake, issuance of death spirals by these poorly governed firms may be interpreted as a signal of overvaluation in the sense of Myers and Majluf (1984).

Second, death spirals are not necessarily issued by firms with poor performance. A number of operating performance measures are all significantly positive in the year before the death spiral issue, which provides a striking contrast to the results reported in Hillion and Vermaelen (2004) based on US issuers. More importantly, we find that chaebol firms' operating performance exhibits a pattern opposite from those of stock returns. Specifically, chaebol issuers show persistently better operating performance relative to non-chaebol issuers, even though their post-issuance abnormal returns are more negative than non-chaebol issuers.

Third, in more than 60% of the issuers, controlling shareholders remain in tact until the expiration date or 3 years after the issue. This could either be due to marginal firms effectively coming out of difficulties through successful death spiral issues - consistent with the *last resort financing hypothesis* - or healthy firms issuing death spirals to *enhance or transfer control*. To distinguish between the two possibilities, we compare the operating performance of death spiral issuers with no subsequent changes in control against other death spiral and non-death spiral issuers and find that the former group exhibits superior operating performance at the time of issue compared to the latter two groups. This suggests that at least in 60% of the issuers, last resort financing does not seem to be the primary reason for issuing death spirals.

Fourth, for the same subset of firms where control remains intact, we examine the

proportional ownership and number of shares held by the controlling party subsequent to the death spiral issue.<sup>6</sup> Under last resort financing hypothesis, we should observe a decrease in proportional ownership due to heavy dilution incurred by conversion or exercise of outside death spiral holders, but no changes in the number of shares since insiders are financially constrained. To the contrary, we find that these firms do not experience a decrease in proportional ownership by the controlling party as a whole. Rather, family members other than the controlling shareholder experience the most pronounced increases in the number of shares held subsequent to the issue. This suggests that the controlling party were not financially constrained at the time of the issue, again inconsistent with the last resort financing hypothesis.

Finally, as a partially direct test of control related hypothesis, we examine whether controlling party holds on to hybrid securities that can later be converted into voting shares.<sup>7</sup> Our findings indicate that in approximately half of the firms with no control changes, at least one member of the controlling party holds on to some hybrid securities.<sup>8</sup>

To the extent that the operating performance of those firms that experienced a change in control are quite poor, we do not preclude the possibility that a certain subset of death spiral issuers may be issuing them for last resort financing purposes, as suggested in Hillion and Vermaelen (2004). However, since vast majority of death spiral issuers do not experience a change in control, and these firms' characteristics and behaviors are not consistent with last resort financing, we remain reluctant in not rejecting the last resort financing hypothesis for the Korean market. At a minimum, this paper suggests and identifies a new perspective behind death spirals issues that may be more pertinent in emerging markets.

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<sup>6</sup> This analysis is only feasible for this subset of firms, since once there is a change in the controlling shareholder, we are not able to track down the ownership of the original controlling party.

<sup>7</sup> By hybrid securities, we are referring to convertible bonds (CBs) and bonds with warrant (BW) throughout the paper, regardless of whether they are floating-priced or not.

<sup>8</sup> Unfortunately, available holdings data do not allow us to distinguish between a death spiral and a non-death spiral.



The paper is organized as follows. Section 2 provides a brief overview of death spirals in Korea. Section 3 outlines our hypotheses and section 4 explains the data and the sample. Section 5 provides the empirical results and Section 6 concludes.

## **2. Death Spirals in Korea**

Since the first convertible bond issuance by Samsung Electronics in 1985, hybrid securities – mostly convertible bonds (CB) and bonds with warrants (BW) – became one of the key external financing vehicles for Korean firms. In the earlier years, firms issued hybrid securities with fixed conversion or exercise prices. But since the financial crisis of 1997, firms started to issue hybrids with floating conversion or exercise prices. Table 1 reports that death spirals account for 28% (30%) of all hybrid securities issuances during 1998-2006, in terms of amount issued (number of issuances). In more recent years, however, death spirals are becoming the norm. During 2004-2006, death spirals dominate not only in numbers (83%) but also in terms of amount issued (60%).

Before we discuss our detailed hypotheses in the next section, we summarize here some of the unique features of the Korean death spirals. First, the universe of death spirals consists not only of floating-priced convertibles, but also of bonds with floating-priced warrants. Unlike in the US, bonds with warrants have been one of the key hybrid securities next to convertible bonds in Korea. This is partly due to the fact that Korean commercial code does not allow firms to issue warrants separately from a bond issuance. Reflecting the prevalence of bonds with fixed-priced warrants, those with floating-priced warrants are also widely issued. Table 1 shows that, during 1998-2006, bonds with floating-priced warrants account for approximately 43% (18%) of total death spiral issuances in terms of numbers (amount raised). Floating-priced convertible preferred stocks, another form of death spiral that exists in the US, however, do not seem to have been issued

by Korean firms.

Second, unlike the death spirals in the US which allow conversion prices (or exercise prices in case of bonds with floating-priced warrants) to adjust upwards in case prices go up, Korean death spirals typically do not allow such upward adjustments. This implies there can only be a “downward” spiral of conversion (or exercise) prices in Korea. A typical adjustment rule would state that the conversion (or exercise) price is adjusted on the 15<sup>th</sup> day of each calendar month to be equal to either (i) the previous month’s conversion (or exercise) price or (ii) the arithmetic average of the closing prices during the past 5 trading days, whichever is “smaller.” So, if share price initially falls after the death spiral issuance, this would trigger the downward reset of the conversion price. However, even if the price rebounds afterwards, the conversion (or exercise) price remains at below the market price since conversion price cannot be adjusted upwards.

This feature of the Korean death spirals effectively rules out applicability of *undervaluation hypothesis*, another alternative considered in Hillion and Vermaelen (2004), where floating-priced convertibles may be preferred over fixed-priced ones when managers believe that the share price is undervalued. Under fixed conversion (or exercise) price system, wealth may be transferred from existing shareholders to convertible holders since the latter can take advantage of the conversion price that is lower than the share’s fair value. Floating-priced convertibles could prevent such dilution since conversion would occur at an upward adjusted price as information spreads in the market. This cannot be expected in Korea since upward adjustment of conversion (or exercise) price is prohibited.

On the other hand, this feature does not preclude an investment strategy popular among US hedge funds where an investor purchases a death spiral, short sells the underlying shares triggering a downward price pressure, and later covers the short position by converting death spirals into a larger number of shares. Popular press reports that similar investment strategies did take place in

Korea. In this regard, we do not preclude *faculty contract design hypothesis* proposed by Hillion and Vermaelen (2004), which states that share price would decline after the death spiral issuance because the contract itself inherently elicits a repeated sequence of short selling, conversion, and dilution. Especially with upward adjustment of conversion price effectively blocked as in Korea, any random downward move of share price can lead to a conversion (or exercise) price drop, which would trigger a downward spiral.

Third, Korean death spirals do not allow any conversion (or exercise) discount upon issuance. That is, the conversion (or exercise) price must be equal to some reference price based on prevailing market price.<sup>9</sup> This is quite different from US death spirals that allow such a discount from a reference price.<sup>10</sup> According to Hillion and Vermaelen (2004), this conversion discount is on average 15.5% in the US. To the contrary, Korean death spirals in our sample exhibit an average conversion premium of 21% relative to the previous day closing price. In a sense, discount from a reference price can be thought of as a contractual feature that complements upward adjustment of the conversion price. Since death spiral holder receives smaller number of shares as stock prices go up, appropriate discount from the prevailing market price would be necessary to induce investors. US death spirals exhibit both of these features while Korean death spirals have neither.<sup>11</sup>

### **3. Research Design and Hypotheses Development**

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<sup>9</sup> There are three reference prices: (1) arithmetic average of most recent 1 month closing price average, 1 week closing price average and 1 day closing price, (2) most recent 1 day closing price (3) closing price 3 days before the subscription application. Before Dec. 2005, the conversion price must be set above the highest price among these three. Since then, issuers were allowed to choose the lowest among these three for public issues.

<sup>10</sup> In an efficient market, the value of this discount would be reflected in a higher fair value of the death spiral.

<sup>11</sup> A few local studies have examined hybrid securities in general issued by Korean firms (e.g. Jung (2003), Park and Baek (2003), and Kang, Park, and Baek (2007)), but without any specific attention to floating-priced feature of death spirals.

The most straight forward way to verify *control enhancing or control transferring hypothesis* would be to show that controlling shareholders or the family members hold on to these death spirals either through initial subscription or by purchasing them from other investors. However, the key empirical challenge to this approach is that the disclosures of insiders' holdings do not allow us to distinguish between a death spiral and a non-death spiral. That is, we can only identify up to general type of securities, i.e. commons stocks, preferred stocks, convertibles, or BWs. Instead, we develop a number of predictions that are consistent with the *control enhancing or transferring hypothesis*, but not with the *last resort financing hypothesis*.

Although we acknowledge the possibility of a *faulty contract design*, we do not explicitly test whether contractual features of death spirals exacerbate the stock price decline upon issuance, mostly because Korean death spiral contracts are highly standardized so that there is not enough cross-sectional variation to exploit. Rather, we propose *control enhancing or transferring hypothesis* as one possible explanation why managers would approve the issuance of death spirals despite its inherently faulty contract design. As elaborated in the previous section, there is no need to test the *undervaluation hypothesis* in the Korean context.

#### A. Stock Price Movement following the Death Spiral Issue Announcement

We begin with the test that investigates whether the issuance of death spirals are followed by significant negative abnormal returns, which is a necessary condition for both hypotheses. Under the *last resort financing hypothesis*, firms issue floating-priced convertibles over conventional fixed-priced alternatives when share prices are believed to be overvalued by outside investors at

issuance.<sup>12</sup> Following the issue, conversion price may be adjusted downwards as initially overvalued stock price declines over time. Outside investors would willingly acquire these floating-priced convertibles since they provide a protection against the risk of overpayment. Conventional fixed-priced convertibles, however, do not provide such protection against a potential stock price drop. Thus, according to the *last resort financing hypothesis*, issuance of a death spiral signals overvaluation, which results in share price drop following the issuance.

Under the *control enhancing or control transferring hypothesis*, share prices drop because the death spirals themselves are ill-designed. The difference from the *faulty contract design hypothesis* is that, it provides an explanation why a firm would issue a death spiral despite its faulty design.<sup>13</sup> Under this hypothesis, the controlling shareholder allows the issuance of death spirals because they help the affiliated firms or their heirs to convert bonds (or exercise warrants) at a cheaper price and thus obtain more voting rights.

Cross-sectionally, controlling shareholders in poorly governed firms who enjoy large private benefit of control would exhibit stronger incentive to enhance or transfer his/her control. There is a growing literature in international corporate governance which documents that the structure of diversified business groups in emerging markets may aggravate agency problems (Johnson, La Porta, Lopez-de-Silanes, Shleifer, 2000). To the extent that expropriation of minority shareholders may be more severe in these family-controlled business groups, we expect the stock market reaction to be more negative for these poorly governed firms.<sup>14</sup>

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<sup>12</sup> This hypothesis assumes two different types of investors. That is, current existing shareholders who believe the shares are fairly valued but are under liquidity constraints and outside potential investors who believe shares are overvalued.

<sup>13</sup> Controlling shareholders may trigger a downward spiral themselves by disseminating negative information or directly selling their shares, although we do not explore this issue further in this paper.

<sup>14</sup> Alternatively, since lower conversion (or exercise) price implies a larger increase in voting rights, issuance of death spirals by poorly governed firms may signal overvaluation in the sense of Myers and Majluf (1984), which also predicts more negative returns for poorly governed firms.

## B. Operating Performance of the Death Spiral Issuers

As elaborated above, negative stock returns subsequent to a death spiral issue does not provide a clear distinction between *last resort financing* and *control enhancing* hypotheses. To effectively distinguish between the two hypotheses, we next investigate whether death spiral issuers are firms with poor operating performance at the time of issuance. According to the *last resort financing hypothesis*, firms tend to issue death spirals when their poor accounting performance does not warrant them from issuing conventional securities. Even if shares are believed to be overvalued by outside investors at issuance, firms would still be able to issue straight debt as long as their operating performance stands at a reasonable level. But firms under severe financial distress with extremely poor accounting performance would have no choice but to issue death spirals. To the contrary, the *control enhancing or control transferring hypothesis* predicts that death spiral issuers are not necessarily poorly performing firms. This is mainly because controlling shareholder would have less incentive to enhance or transfer his/her control of a firm that is poorly performing.

We also investigate if the operating performance of death spiral issuers deteriorates over time. According to the *last resort financing hypothesis*, outside potential investors believe shares are overpriced while current shareholders do not, because the former expects future operating performance to deteriorate while the latter do not. The *control enhancing or control transferring hypothesis*, on the other hand, has no prediction regarding ex-post operating performance.<sup>15</sup> If we find that death spiral issuers are not necessarily poorly performing firms at the time of issuance or do not experience deterioration in their operating performance after the issuance, it would be an indication that firms may issue death spirals for reasons other than last resort financing.

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<sup>15</sup> If the controlling party divests its shares before the death spiral issue date to protect itself from dilution (insider trading or stock price manipulation), one may expect operating performance to deteriorate in subsequent years even under the control enhancing or the control transferring hypothesis. In this paper, however, we do not explore this possibility.

Cross-sectionally, non-poor performance would be more pronounced in poorly governed firms since their controlling shareholders have stronger incentives to issue death spirals to *enhance or transfer control*, even though they are not in any desperate need to raise additional capital. We also expect to observe similar non-poor performance in firms where control is preserved within the family even after a death spiral issuance, since these are precisely the ones that are more likely to have issued death spirals for *control enhancing or control transferring* motives. Furthermore, we directly test whether poorly governed firms such as chaebols actually prefer to issue floating-priced death spirals over conventional fixed-priced hybrid securities.

### C. Evolution of Corporate Ownership in Death Spiral Issuers

Our final set of empirical analyses focuses on how controlling party's ownership evolves after issuing a death spiral. Under the *last resort financing hypothesis*, death spirals are issued to *outside* investors who may convert them into a large number of new shares at low conversion prices, which would heavily dilute the existing shareholders' proportional ownership including the controlling party's. Thus, we expect to observe a *decrease* in proportional ownership of the controlling party under *last resort financing*. In the extreme case, incumbent controlling party may fail to retain control as a result of continued dilution.

On the other hand, *control enhancing or preserving hypothesis* predicts that incumbent controlling parties not only retain their control, but may even *increase* their proportional ownership through conversion (or exercise) of death spirals held by *insiders*. Members of the controlling party may also actively purchase existing shares in the market, or subscribe to new shares offered by the company, or hold hybrid securities that can later be converted into voting shares, all of which would contribute to increases in proportional ownership subsequent to a death spiral issue.

## 4. Data

### A. Sample Construction

We first extract a list of all publicly traded non-financial firms on Korea Stock Exchange (KSE) that issued hybrid securities (CBs or BWs) since 1998. This list is available from *TS2000*, a dataset compiled by the Korea Listed Companies Association (KLCA). The list contains the identity of the issuer as well as the detailed characteristics of each issue such as the type of security, total proceeds raised, conversion ratio, issue date, expiration date, etc. To accurately identify the exact announcement date of the original disclosure of the issue, we manually searched Korea Stock Market Daily, a daily publication issued by KSE, where all of the public disclosures are officially announced.<sup>16</sup> In the process, we also double checked whether the information contained in *TS2000* is consistent with the original disclosure.<sup>17</sup> We set our sample period to start in 1998 and end in 2006, mainly since death spirals became popular in Korea after the financial crisis in 1997. During our sample period, we identified a total of 657 hybrid security issues by 288 distinct firms, of which 199 issues by 126 distinct firms were death spirals.

### B. Other Data Sources

For accounting variables and year-end market variables, we use data provided in *TS2000*. For dividend and stock-split adjusted daily returns, we resort to a dataset from Korea Securities Research Institute (KSRI). We obtain ownership and insiders' holdings data manually from the annual reports and holdings filings available through Data Analysis, Retrieval, and Transfer

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<sup>16</sup> The difference between the actual issue date and the original announcement date can be as short as one trading day up to two months.

<sup>17</sup> In case where there was a discrepancy, we followed the original disclosure.



(DART) system which is an electronic disclosure platform similar to EDGAR in US.<sup>18</sup> Identity of controlling shareholders of each firm are provided in *KISLINE*. Information on foreign ownership is obtained from both *TS2000* and *KIS-VALUE*, a database administered by National Information & Credit Evaluation (NICE).

For firm-level corporate governance index, we resort to Korea Corporate Governance Index (KCGI) scores provided by the Korea Corporate Governance Service (KCGS), a nonprofit organization that surveys every year the governance practices of all the listed companies on the Korea Exchange (KRX). As of 2006, they had a total of 130 assessment items with a total score of 300 points. To identify chaebol or family-controlled large business group affiliation, we resort to annual press releases from the Korea Fair Trade Commission (KFTC) which designates large business groups based on group-level gross total assets whose member firms are subject to certain regulatory obligations.

## **5. Results**

### **A. Summary Statistics**

Panel A of table 1 reports the number of hybrid security issues over the sample period for both death spirals and non-death spirals. Death spirals are floating-priced convertible bonds (CBs) or bond with warrants (BWs) where the conversion price or the exercise price falls in case the stock price falls subsequent to the issue. We further classify death spirals and non-death spirals into three sub-categories; CBs vs. BWs, domestic vs. overseas issue, and public vs. private issue.

The numbers for all issues indicate that there was a clustering of issues in 1999. We

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<sup>18</sup> There are a variety of data vendors that provide ownership data for Korean firms. But, there are certain limits regarding the accuracy of these datasets, especially the detailed relationship between each individual shareholder and the controlling shareholder. Hence, we reassembled the ownership dataset manually using the original disclosures by the reporting firms.

conjecture that this is related with the efforts of the Korean firms to reorganize their capital structure in the aftermath of 1997 financial crisis. And most of the issues in 1999 were non-death spirals. Since 1999, the number of non-death spiral issues kept decreasing. In contrast, we observe more issues of death spirals in the recent years. In fact, death spirals issued in 2005 and 2006 account for more than half of all death spiral issues.

The composition of sub-categories indicates that the relative frequencies for BWs, overseas issues and public offers are higher in the death spiral group than in the non-death spiral group.<sup>19</sup> However, we note that death spirals issued overseas through public offerings can actually end up in the hands of the controlling family members, as illustrated in the introduction.

In panel B of table 1, we report the total proceeds from hybrid securities. We observe a similar pattern as in panel A, except that there is another clustering in 2001 from both death spiral issues and non-death spiral issues.<sup>20</sup>

## **B. Stock Price Movement following the Death Spiral Issue Announcement**

In table 2 and figure 1, we report the averages of the cumulative abnormal returns of the death spiral issuers surrounding the original disclosure announcement from day -10 through day +60. Event day is the original disclosure date of issue identified from Korea Stock Market Daily. We use both market-adjusted model and market model to estimate abnormal returns where the market returns are value weighted index returns compiled by the Korea Securities Research Institute (KSRI). Market model parameters are estimated using past 200 trading days from day -

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<sup>19</sup> In US, death spirals are typically issued through private placements.

<sup>20</sup> For death spirals, this clustering can be attributed to an extremely large issue of KRW 3.2 trillion by a single firm Hynix, a semiconductor manufacturer.

220 to -21 of the issue announcement.<sup>21</sup>

In table 2, we test the statistical significance based on two different procedures. First, we report the t-stats based on cross-sectional standard errors during the event period. The second t-stat is based on time-series standard deviations of portfolio returns during the estimation period (Brown and Warner, 1985).

The results from figure 1 and panel A of table 2 indicate that death spiral issuers experience a significant drop in stock prices following the issue announcement. For all death spiral issuers, the average drop is -13.29% based on market model, and -8.47% based on market adjusted model over a two month period.<sup>22</sup> This is consistent with Hillion and Vermaelen (2004), where they report abnormal returns between -30.1% to -54% over a 12 month period.<sup>23</sup> These results are consistent with both *last resort financing hypothesis* and *control enhancing or transferring hypothesis*, but not with *undervaluation hypothesis*. As mentioned earlier, *undervaluation hypothesis* is irrelevant in the Korean regulatory context since upward adjustment of conversion (or exercise) price is prohibited. In unreported results, we examine whether there are any differences in abnormal returns between CBs and BWs, domestic and overseas issues, and public and private issues, but the differences are generally not statistically significant.

In the second column of panel A in table 2, we report the results using only the first death spiral issue by each firm. And the results suggest that the magnitude of the price drop is smaller for the first issues, implying that the returns are more negative for the follow-up issues. This could be explained at least partially by investors becoming more aware of the consequences of the death

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<sup>21</sup> In case where there were more than two issues by the same issuer on the same date, we excluded them from this analysis if one of them was a death spiral but the other was not. If all of the issues made by the same issuer on the same date were death spirals, we treated them as one observation.

<sup>22</sup> We also tried various horizons, up to +30, +90, and +180 trading days and obtained similar results.

<sup>23</sup> Hillion and Vermaelen (2004) use monthly returns rather than daily returns since they cannot identify the exact announcement date. This is mainly because US disclosure rules allows firms to file *after* the actual issue so it is not clear when the issue decision was made public. Our dataset allows us to identify the exact date of the original disclosure from the Korea Stock Market Daily, so that we may use daily returns instead of resorting to monthly returns.

spirals (Hillion and Vermaelen, 2004).

We also examine long-term cumulative abnormal returns and buy-and-hold returns of death spiral issuers where we extend our event period to 12 months before and 12 months after the issue announcement date. In unreported results, we find that there is a run up in stock prices leading up to the announcement, which might reflect controlling shareholders' effort to issue death spirals when the shares are most overvalued. This run up, however, is more than wiped away during the 12 months following the announcement. These findings suggest that our baseline result of value destruction for death spiral issuers is robust to the length of the event period.

We next divide the sample into two groups based on firm-level corporate governance to test whether poor governance leads to more negative stock market reactions. We consider the following three proxies: (i) affiliation to family-controlled large business groups, also known as chaebols, (ii) foreign ownership, and (iii) Korea Corporate Governance Index (KCGI) scores. In family-controlled large business groups, controlling families often retain voting rights that significantly exceed their cash flow rights, and such control-ownership disparity provides them the incentive and the power to pursue various forms of private benefits of control and expropriate minority shareholders (La Porta et al., 1999). Such expropriation, however, would be mitigated if controlling families are subject to strong internal or external monitoring. High foreign ownership or high corporate governance index would imply stronger monitoring. The sample is split into two based on chaebol affiliation, the median value of foreign ownership, or the median score of KCGI, the results of which is reported in panel B of table 2. As in panel A, we first report the results for all death spiral issues (columns 1 through 3), and then report the results only for the first issues (columns 4 through 6).

The results indicate that there is a clear contrast between relatively well governed firms and poorly governed firms in terms of stock market reactions. Specifically, cumulative abnormal

returns for poorly governed firms are all negative and statistically significant, while those for well governed firms are mostly insignificant or even positive in some cases. We formally test the differences between the poorly governed issuers and the well governed ones in columns 3 and 6 and find that the differences in mean CARs between the two groups are not only statistically significant but also economically substantial. Panels A and B in figure 1 graphically illustrates this point and shows that the negative abnormal return upon the issuance of death spiral is mostly being driven by chaebol firms depicted in bold line.

In table 3, we confirm our previous univariate findings in a multivariate setting by running cross-sectional regressions of CAR[-10, +60] on our three measures of governance (chaebol, high foreign ownership, and high KCGI dummies) and various other control variables, including leverage (ratio of debt to assets), return volatility (standard deviation of daily stock returns during the past 12 months before announcement date), age (number of years since IPO), Tobin's  $q$  (ratio of the sum of market value of common equity and the book value of debt to the book value of assets), interest coverage ratio (EBIT over interest expenses), ROA (net income over assets), industry dummies, and year dummies. Regressions (1) – (3) use all death spiral issues, while regressions (4) – (6) drops any subsequent issues by the same firm.

The coefficients on our three governance measures are all consistent with our earlier univariate analyses. Specifically, the coefficient on chaebol dummy is negative and statistically significant, while the coefficients on high foreign ownership and high KCGI dummies are both positive and statistically significant even after controlling for various firm-level factors that could potentially affect stock market reactions. For example, results from column (4) indicates that chaebol issuers's CAR[-10, +60]s are 25.1% points lower than those of non-chaebol issuers.<sup>24</sup>

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<sup>24</sup> As a robustness check, we also run cross-section regressions using short window CARs, where the dependent variable is CAR[-1, +1] and CAR[-5, +5]. Overall, the results are largely similar to our baseline findings in that

These cross-sectional results suggest that potential misuse of death spirals for the benefit of the controlling party could be more pronounced in firms more susceptible to agency problems.

### C. Operating Performance of the Death Spiral Issuers

Since negative stock returns documented in the previous subsection are consistent with both *last resort financing hypothesis* and *control enhancing or transferring hypothesis*, we now attempt to distinguish between the two by analyzing the operating performance of death spiral issuers before and after the issue. Hillion and Vermaelen (2004) report negative operating performance for their sample of US death spiral issuers and conclude that the evidence is mostly supportive of the *last resort financing hypothesis*.<sup>25</sup> If *last resort financing hypothesis* also holds in our sample, we expect to see substantially negative operating performance for the death spiral issuers.

Table 4 reports the results of this analysis.<sup>26</sup> In panel A, we present the median values of various measures of operating performance for the death spiral issuers.<sup>27</sup> In marked contrast with the Hillion and Vermaelen (2004) sample, the death spiral issuers in our sample do not exhibit poor operating performance prior to the issue. In fact, none of the point estimates of the performance measures are negative, and all variables, except for market to book and Tobin's  $q$ , are significantly

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chaebol membership is negatively correlated with event period abnormal returns while foreign ownership and corporate governance index level is positively correlated. However, the statistical significance for foreign ownership and governance index is a bit weaker in the short window analysis for some event windows.

<sup>25</sup> For example, they report median profit margin of -84.0% and median ROA of -47.1% for death spiral issuers as of one fiscal year end before the issue.

<sup>26</sup> In case where there were more than two issues by the same issuer within the same fiscal year, we excluded them from this analysis if one of them was a death spiral but the other was not. If all of the issues made by the same issuer during a given fiscal year were death spirals, we treated them as one observation.

<sup>27</sup> EBITDA is the sum of operating income and depreciation. Profit margin is net income divided by sales. ROA is net income divided by assets. CF (cash flow) ratio is operating income adjusted for non-operating income and expenses. INV is capital expenditures plus R&D. ADV is expenditures for advertisement. Market/Book is the ratio of the market value of equity to the book value of equity, where firms with negative book equity are excluded. Tobin's  $q$  is the ratio of market value of assets (sum of market value of common equity and the book value of debt) over book value of assets.

positive just prior to the issue of death spirals.<sup>28</sup> And these firms are spending significantly positive amount on capital expenditures, R&D, and advertisements during the 5 year window. These findings strongly suggest that death spiral issuers in the Korean market on average may be issuing them for reasons other than last source of financing.

Panels B and C of table 4 report the operating performance of chaebol and non-chaebol issuers, respectively, and panel D reports the differences between the two subsamples. The results from these panels indicate that chaebol issuers exhibit superior operating performance prior to the issue. For example, EBITDA/sales is 8.5% for chaebol issuers a year before the issuance, while it is only 2.1% for corresponding non-chaebol issuers. Moreover, operating performance of chaebol issuers show no sign of deterioration over time. For example, three years after the issuance, chaebol issuers exhibit a profit margin of 2.7%, which is 1.8% points higher than the level before the issuance. Non-chaebol firms, on the other hand, show a profit margin of -9.6%, which is 10% points lower than the level before the issuance.

Such non-negative operating performance for chaebol firms is hard to reconcile with *last resort financing hypothesis* since they do not seem to be in any desperate need to finance additional capital. It is also worth mentioning that market/book and Tobin's  $q$  of chaebol issuers are lower than those of non-chaebol issuers in table 4. This is consistent with our earlier argument that minority shareholders of chaebol issuers are subject to greater expropriation risks.

We next implement a similar cross-sectional univariate analysis of operating performance among three groups of firms; death spiral issuers with no changes in controlling shareholder (group A), death spiral issuers that experienced a change in controlling shareholder (group B), and non-

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<sup>28</sup> The number of firm-years used to calculate Market/Book and Tobin's  $q$  are slightly smaller than those reported in table 3 due to availability of market data.

death spiral issuers (group C).<sup>29</sup> Then, we compare groups A and B as well as A and C. Since firms where control remains intact within the family even after issuing a death spiral are the ones that are likely to have issued death spirals for *control enhancing or control transferring* purposes, we expect group A to exhibit better (similar) operating performance than group B (group C).

Table 5 reports the results of this analysis. First, we note that in more than 60% of death spiral issuers, controlling shareholders retain their positions. A priori, these firms could either be marginal firms that emerged from distress subsequent to a death spiral issue, or healthy firms that were not in distress from the first place. However, we observe a clear difference in operating performance between those that did not experience a change in control and those that did within death spiral issuers. Firms with no changes in controlling shareholder (group A) generally exhibit much better operating performance than those with changes in controlling shareholders (group B) prior to the death spiral issue. Group B's market to book or Tobin's  $q$  is higher than group A, but we conjecture that this may reflect either (cumulative) low book values following bad operating performance or simply overvaluation of these stocks.

According to the *last resort financing hypothesis*, firms with poor operating performance with overvalued share price are the ones that issue death spirals. Interestingly, group B in our sample which accounts for roughly 40% of the death spiral issuers seems to fit these two characteristics. To this extent, we do not preclude the possibility that certain subset of death spiral issuers in Korea could be motivated by last resort financing.

In addition, we do not observe much differences in operating performance between group A (death spiral issuers with no changes in control) and group C (non-death spiral issuers). The

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<sup>29</sup> We track changes in control up to the expiration date or 3 years after the issue if the expiration date is not specified. We chose 3 years since the average difference between the issue announcement and the expirations was around 3.6 years. Cases where issuers were merged or acquired by other entities that are not members of the controlling party are classified as group B. We first identify the names of the controlling shareholders in *KISLINE*. Whenever there is a change in the name of the controlling shareholder, we manually search the shareholder distribution section in annual reports to identify the specific transaction that led to the changes in the controlling party.



difference between group A and C is not significant for four variables: EBITDA/assets, EBITDA/sales, ADV/sales, and Market/Book. In fact, profit margin, ROA and CF/assets are significantly higher for group A. This implies that at least group A firms are strongly inconsistent with *last resort financing hypothesis*.

In summary, results from table 5 suggest that firms with no subsequent changes in controlling shareholder exhibit a superior operating performance at the time of death spiral issuance compared to firms with subsequent changes in controlling shareholder, confirming our conjecture that the former is more likely to have issued death spirals for control enhancing or control transferring motives.

In table 6, we further test whether the decision to include death spiral feature conditional on issuing a hybrid security is affected by operating performance in a multivariate context. Specifically, we run a logit model where the dependent variable equals one if the issue is a death spiral and zero if the issue is a conventional non-death spiral issue. Explanatory variables are measures of operating performance discussed in the univariate analysis in table 4 and interest coverage ratio defined as operating income divided by interest expense which is a typical measure of cash flow liquidity

We also include a number of control variables that have been recognized in the previous literature as potential factors that may affect the decision to issue death spirals. As discussed in Hillion and Vermaelen (2004), the floating-priced convertibles offer lower costs of financial distress relative to convertible debt with a fixed conversion price. Thus, firms with higher leverage are likely to issue death spirals to reduce potential costs of financial distress. Hillion and Vermaelen (2004) also find that floating-priced convertible issuers tend to be small, young and risky firms. Hence, we include the following additional control variables; ‘Size’ measured by log of total assets (in Korean Won thousands), ‘Age’ which is the number of years from the IPO until

one fiscal year before the announcement date, and 'Return Volatility' measured as the standard deviation of daily stock returns during the previous 12 months before the announcement date. We also include industry and year fixed effect dummies in all of our specifications.

The results from table 6 indicate that death spiral issuers are indeed smaller than non-death spiral issues. But, contrary to what Hillion and Vermaelen (2004) finds, death spiral issuers in our sample exhibit lower stock return volatility than non-death spiral issuers. This is consistent with our earlier finding that death spiral issuers are not necessarily firms with financial distress. One of the most striking results from table 6 is that none of the operating performance variables turn out to be a significant predictor of death spiral issues. The only explanatory variable that turns out to be significant is the interest coverage ratio, which proxies for liquidity of the firm indicating that firms that might have temporary liquidity issues could resort to death spirals.

Table 6 also investigates if our governance measures influence the likelihood of issuing death spirals. In panel A, we include the chaebol dummy, the high foreign ownership dummy (1 if foreign ownership greater than the median), and the interaction between the two. In panel B, we include the chaebol dummy, the high KCGI dummy (1 if KCGI score is greater than the median), and the interaction between the two. Chaebol dummies are always positive and statistically significant, indicating that chaebol firms, with low foreign ownership or low KCGI scores, are more likely to death spirals as opposed to non-death spirals. The interaction terms, on the other hand, are all negative and significant at the 10% significance level, indicating that foreign ownership and KCGI mitigates the chaebol firms' tendency to issue death spirals as opposed to non-death spirals. That is, aggravated agency problem occurs mostly through chaebol affiliation, but high foreign ownership or high corporate governance may offset such adverse incentives.

Overall, the results from tables 4, 5, and 6 strongly suggest that the death spiral issues in Korea are not mostly driven by marginal firms that are in desperate need for additional financing.

Rather, death spiral issuers, especially chaebols and those where control remains intact, exhibit sound operating performance. In fact, chaebols still prefer to issue a death spiral over a conventional fixed-priced hybrid security, despite their strong operating performance. These findings run counter to the *last resort financing hypothesis* supported by Hillion and Vermaelen (2004) using US data.

## **D. Evolution of Corporate Ownership in Death Spiral Issuers**

### **(1) Controlling Party's Ownership Changes**

In this subsection, we explore the control related motives in a more direct manner by examining the changes in ownership of the controlling shareholder as well as the related parties since the death spiral issue for various horizons. If the motivation behind the death spiral issue is last resort financing from outside investors, then we should observe decreases in proportional ownership of the controlling party, as the outside death spiral holders exercise their conversion rights increasing the number of shares outstanding and hence diluting the proportional ownership of the existing shareholders. In the extreme case, incumbent controlling party may lose control as a result of heavy dilution, after which we are no longer able to track their changes in holdings. Thus, the range of this analysis is restricted to those firms where the controlling shareholder remains intact. We examine the changes in ownership of the controlling shareholder as well as the related parties following the death spiral issue to test whether this prediction holds.

The results are reported in table 7. Beginning in year -1, panel A presents the comparison up to year +1, panel B up to year +3, and panel C up to the year of expiration date. The results indicate that there is a significant decrease in the ownership of the controlling shareholder him/herself throughout all panels. Other family members and the controlling party as a whole seem

to experience a slight drop in proportional ownership immediately following the death spiral issue, but over longer horizons, other family members recover their proportional ownership so that the overall control rights are unaffected. These results suggest that the controlling party may be utilizing the death spirals to change the control structure of their firms within the business group, while maintaining the same level of overall control rights in the issuing firm.

We next examine the changes in the number of shares held by the controlling party, after adjusting for the mechanical changes in outstanding number of shares.<sup>30</sup> If the death spiral issue is mainly due to last resort financing, then wealth constrained controlling party would not have enough resources to actively participate in subsequent equity or hybrid security offerings by the issuer in the primary market or purchase existing shares or hybrid securities from other investors in the secondary market to recover and maintain their original proportional ownership.

We report the results of this analysis in table 8. In panel A, we report the increases in the number of shares for the controlling party as a whole, and in panel B we report the numbers separately for different shareholder groups within the controlling party. In the first two columns of panel A, we include the increases in number of shares held due to mechanical changes in the total number of shares outstanding. In the last two columns of panel A and in all columns of panel B, we exclude such mechanical changes so that changes in holdings reflect only the following; subscription to rights offering, conversion or exercise of hybrid securities (CBs and BWs), or purchase of stocks from other shareholders. We outline the detailed procedure of these calculations in the appendix.

The results indicate that the number of shares held by the controlling party as a whole increases substantially even after we exclude all mechanical changes in the total number of shares

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<sup>30</sup> Mechanical changes in the number of shares include the following: stock splits and reverse splits, stock dividends, and reduction in paid in capital.

outstanding.<sup>31</sup> This implies that the controlling party actively purchased shares from other shareholders or participated in rights offerings or exercised their conversion rights to recover and maintain their original proportional ownership. Moreover, the results from panel B indicate that the increases in the number of shares are most pronounced for other family members. Overall, these results suggest that decision to issue death spirals may be directly related with preserving and/or transferring control of the business group to another family member.

As our final set of tests, we investigate whether any member of the controlling party holds hybrid securities that can later be converted into voting shares. Ideally, we would like to focus only on holdings of death spirals, but the disclosures on insider's holdings are not detailed enough to determine whether a given hybrid security has a death spiral feature or not. The only cases where we can clearly verify a hybrid security held by an insider is indeed a death spiral are found in firms that have issued only the death spirals (exclusive death spiral issuers). The hybrid securities we investigate include convertible bonds, bonds with warrants, and warrants detached from the original bonds with warrants.

Table 9 reports the number of firms where any member of the controlling party holds hybrid securities after the death spiral issuance. As in tables 7 and 8, the analysis is restricted to firms with no subsequent changes in control following a death spiral issue. Note that the number of firms with no changes in control drops over time by construction. In panel A, we include all firms that issued either a death spiral or a non-death spiral. In panel B, we include firms that issued only the death spirals.

The results in panel A show that the fraction of firms with controlling party holding hybrid securities after the death spiral issuance is approximately 30% during the first year of issuance, but

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<sup>31</sup> The numbers are actually slightly larger after excluding the mechanical changes mainly due to decreases in outstanding shares in reverse stock splits.

increases up to approximately 50% for a longer time horizon. Nevertheless, the results in panel A are somewhat inconclusive since the holdings may be for either death spirals or non-death spirals.

The results in panel B, however, indicate that even when we focus on firms where the hybrid securities held by the controlling party members are unilaterally death spirals, we obtain a similar pattern. Specifically, in approximately half of the sample firms, death spirals are held by members of the controlling party, although it would be difficult to implement a statistical test due to a small sample size. This is a strong piece of evidence that is consistent with the *control enhancing or control transferring hypothesis*, but not with the *last resort financing hypothesis*.

## **6. Conclusion**

In this paper, we study the motive of issuing floating-priced convertibles or warrants, known as *death spirals*, in an economy where private benefit of control is high. Using a total of 199 death spiral issuances by public firms listed in the Korea Stock Exchange from 1998 to 2006, we provide empirical results that are less consistent with the *last resort financing hypothesis*, but rather consistent with the *control enhancing or control transferring hypothesis*.

First, we find that death spirals are not necessarily issued by marginal firms with poor operating performance at the time of issuance. In fact, our results show that none of the point estimates of the performance measures are negative for death spiral issuers prior to the issue. For chaebol issuers, operating performance does not even show any sign of deterioration over time following the issue. In a multivariate analysis, we find that death spiral issuers are not different from conventional non-death spiral issuers in terms of their operating performance at the time of issuance, while chaebol issuers are more likely to prefer a death spiral to a conventional fixed-priced hybrid security. We also find that death spiral issuers where there was no subsequent change

in control exhibits superior operating performance at the time of death spiral issuance compared to those where there was a change in control.

Second, proportional ownership by the controlling party as a whole is not much diluted after the death spiral issuance. In fact, the number of shares held by the controlling party increases significantly, especially for other family members, after adjusting for the mechanical changes in the number of total shares outstanding. We also find that in approximately half of the firms where control remains intact, at least one member of the controlling party holds hybrid securities that can be later converted into firm's voting shares. Even within exclusive death spiral issuers, we obtain a similar result.

Although our sample consists of death spirals issued by firms in a single country, we believe the findings we document may be generalized to other emerging markets where the economy is dominated by family-controlled business groups. As long as the controlling shareholder has a motive to enhance his/her control over the group or has a motive to transfer control over to his/her heir due to the high level of private benefits of control, there is a potential that "financial innovations" such as death spirals may be misused for such purposes.

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## Appendix: Calculation of Increases in the Number of Shares Held by Controlling Party

This appendix outlines the detailed procedure used to calculate the changes in the number of shares held by the controlling party reported in table 8. We first calculate the number of shares held by the controlling party  $i$  at time  $t$  by multiplying proportional ownership by the number of common shares outstanding at each fiscal year end as follows.

$$N_{-1}^i = OWN_{-1}^i \times Common_{-1}$$

$$N_{+1}^i = OWN_{+1} \times Common_{+1}$$

$$N_{+3}^i = OWN_{+3} \times Common_{+3}$$

\*\*\*i 상첨자를 두번째 및 세번째 OWN 에도 넣어 주기 바랍니다\*\*\*

Then, we calculate the changes in number of common shares held by the controlling party as follows.

$$Difference^i 1_{(-1,+1)} = (N_{+1}^i - N_{-1}^i)$$

$$Difference^i 1_{(-1,+3)} = (N_{+3}^i - N_{-1}^i)$$

However, above difference also includes mechanical changes in the number of shares outstanding such as stock splits and reverse stock splits. To exclude these mechanical changes and focus on the controlling party's active decision to maintain or increase their shares (by participating in rights offering or exercising their conversion rights of hybrid securities – CBs or BWs – in primary market or purchasing existing shares from other shareholders in the secondary market), we obtain the increases in total number of shares due to mechanical changes as follows.

$$Common_{+1} - Common_{-1} = \Delta Common_{(-1,+1)}$$

$$\Delta Common_{(-1,+1)} = \Delta X_1 + \Delta X_2$$

$\Delta X_1$  : numerical changes by stock splits, etc.

\*\*\*numerical 이 아니라 mechanical 로 수정\*\*\*

\*\*\*deltaX2 에 대한 정의 (changes in number of shares due to new capital raised or repurchases ?)

추가\*\*\*

$$Difference^i 2_{(-1,+1)} = (N_{+1}^i - N_{-1}^i) - [\Delta X_1 \times OWN^*]$$

\*\*\*\*Difference i 2 (-1,+3) 추가\*\*\*\*

where OWN\* corresponds to the proportional ownership as of the nearest fiscal year before the mechanical changes in total outstanding shares take place.

Table 1  
Sample Summary Statistics

This table presents the summary statistics for the full sample. The sample includes all hybrid securities (convertible bonds or bonds with warrants) issued between January 1998 and December 2006 by non-financial firms listed on Korea Stock Exchange (KSE). Panel A reports the number of issues while panel B reports the total proceeds raised. The first column in each panel reports the numbers for all hybrid securities issued over the sample period. The next seven columns report the numbers for death spiral issues. Death spirals are floating-priced convertible bonds (CBs) or bond with warrants (BWs) where the conversion or exercise price may adjust downwards in case stock price falls subsequent to the issue. We further classify death spirals into three sub-categories; CBs vs. BWs, domestic vs. overseas issue, and public vs. private issue. The next seven columns present the corresponding numbers for conventional fixed-priced non-death spiral issues.

Panel A: Number of Hybrid Security Issues by Type

Year	All	Death Spirals (Floating-Priced)							Non - Death Spirals (Fixed-Priced)						
		Total	CB	BW	Domestic	Oversea	Public	Private	Total	CB	BW	Domestic	Oversea	Public	Private
1998	70	2	2	0	0	2	2	0	68	66	2	57	11	32	36
1999	228	14	8	6	3	11	11	3	214	158	56	161	53	85	127
2000	77	5	1	4	1	4	5	0	72	59	13	64	8	17	52
2001	63	23	8	15	7	16	20	2	40	36	4	34	6	8	32
2002	42	18	12	6	12	6	8	10	24	23	1	23	1	3	19
2003	32	17	15	2	12	5	6	11	15	14	1	12	3	5	10
2004	28	18	7	11	11	7	7	11	10	9	1	8	2	1	9
2005	62	52	28	24	25	27	31	21	10	8	2	8	2	3	7
2006	55	50	33	17	21	29	35	15	5	4	1	5	0	2	3
Total	657	199	114	85	92	107	125	73	458	377	81	372	86	156	295

Table 1 - *continued*

Panel B: Total Proceeds Raised from Hybrid Security Issues by Type (in KRW billion)

Year	All	Death Spirals (Floating-Priced)							Non - Death Spirals (Fixed-Priced)						
		Total	CB	BW	Domestic	Oversea	Public	Private	Total	CB	BW	Domestic	Oversea	Public	Private
1998	1,805	23	23	0	0	23	23	0	1,783	1,748	35	1,447	336	875	908
1999	8,184	680	315	365	262	418	643	37	7,504	5,751	1,753	5,360	2,144	3,396	4,043
2000	2,002	117	10	107	10	107	117	0	1,885	1,675	210	1,770	115	520	1,301
2001	8,242	4,308	4,024	284	4,011	297	3,547	11	3,934	3,168	766	3,131	803	1,529	2,405
2002	1,690	159	110	49	110	49	69	90	1,530	1,510	20	1,526	4	234	1,292
2003	1,536	372	362	10	272	100	105	267	1,164	1,127	37	827	337	472	692
2004	599	506	386	120	140	366	75	431	93	57	36	88	5	36	57
2005	1,453	603	387	216	277	326	332	271	850	841	9	102	748	828	22
2006	658	526	362	164	228	298	346	180	132	130	2	132	0	82	50
Total	26,169	7,294	5,979	1,315	5,310	1,984	5,257	1,287	18,875	16,007	2,868	14,383	4,492	7,972	10,770

Table 2  
Analyses of Cumulative Abnormal Returns (CARs) around Death Spiral Issue Announcement

This table presents averages of cumulative abnormal returns surrounding the original disclosure announcement of death spiral issue from day -10 through day +60. We use both market-adjusted model and market model to estimate CARs where the market returns are value-weighted index returns compiled by the Korea Capital Market Institute (KCMI). Market model parameter estimates are obtained using past 200 trading days from day -220 to -21 of the issue announcement. Panel A reports the results for the full sample and panel B reports corresponding numbers for subsamples grouped by relative corporate governance levels. We consider three proxies for firm-level corporate governance; chaebol or large business group affiliation, foreign ownership, and an index provided by the Korea Corporate Governance Service (KCGS). Based on these three measures, we define low corporate governance firms as chaebol issuers, issuers with foreign ownership lower than the sample median, or issuers with Korea Corporate Governance Index (KCGI) lower than the sample median. In both panels, we present the results separately for all issues and first issues only. We report two types of *t*-statistics in panel A; one based on cross-sectional standard errors during the event period and the other based on time-series standard deviations of portfolio returns during the estimation period (Brown and Warner, 1985). The sample period is from January 1998 to December 2006.

Panel A: All Death Spiral Issuers

Benchmark model	All issues included	Only first issues included
Market adjusted model		
average CAR	-8.47%	-6.31%
<i>t</i> -stat (cross-section)	-3.215	-1.912
<i>t</i> -stat (portfolio)	-2.893	-1.751
<i>N</i>	187	124
Market model		
average CAR	-13.29%	-11.55%
<i>t</i> -stat (cross-section)	-4.037	-2.792
<i>t</i> -stat (portfolio)	-4.514	-3.225
<i>N</i>	184	121

Table 2 – Continued

## Panel B: High Corporate Governance vs. Low Corporate Governance Issuers

	All issues included			Only first issues included		
	High CG	Low CG	Difference [ <i>p</i> -value]	High CG	Low CG	Difference [ <i>p</i> -value]
<b>I. Non-chaebol vs. Chaebol</b>						
average CAR	-6.58%	-21.32%	14.74%	-2.79%	-24.65%	21.87%
<i>t</i> -stat (cross-section)	-2.284	-3.764	[0.026]	-0.762	-3.936	[0.005]
<i>N</i>	163	24		104	20	
<b>II. High foreign ownership vs. Low foreign ownership</b>						
average CAR	-0.76%	-16.31%	15.56%	0.31%	-14.84%	15.15%
<i>t</i> -stat (cross-section)	-0.198	-4.573	[0.003]	0.068	-3.124	[0.002]
<i>N</i>	91	91		64	57	
<b>III. High KCGI vs. Low KCGI</b>						
average CAR	0.69%	-11.11%	-11.81%	11.71%	-10.90%	-22.61%
<i>t</i> -stat (cross-section)	0.158	-3.784	[0.027]	1.874	-3.456	[0.000]
<i>N</i>	82	82		41	66	

Table 3  
Cross-sectional Regression of CARs on Corporate Governance Variables

This table presents the results from OLS regressions where the dependent variable is market-adjusted CARs surrounding the announcement of death spiral issues from day -10 to day +60. The key explanatory variables are three corporate governance dummies. Chaebol dummy equals one if the issuer is a member of large business group designated by the Korea Fair Trade Commission (KTFC), or zero otherwise. Foreign ownership dummy equals one if equity ownership by foreigner investors is larger than the median of the regression sample, or zero otherwise. KCGI dummy equals one if KCGI (Korea Corporate Governance Index) is larger than the median of the regression sample. As control variables, we include leverage (ratio of debt to assets), return volatility (standard deviation of daily stock returns during the past 12 months before the announcement date), age (number of years since IPO), Tobin's  $q$  (ratio of the sum of market value of common equity and the book value of debt to the book value of assets), interest coverage (EBIT over interest expenses), and ROA (net income over assets). All specifications include industry and year fixed effects. The first three columns report the results for all issues while the remaining columns present the results for each firm's first issue only.  $p$ -values are reported in the brackets. \*, \*\*, and \*\*\* indicate statistical significance at 10%, 5%, and 1%, respectively. The sample period is from January 1998 to December 2006.

	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.089 [0.464]	0.008 [0.946]	-0.040 [0.750]	0.025 [0.876]	-0.027 [0.866]	-0.148 [0.397]
Leverage	-0.046 [0.441]	-0.052 [0.383]	-0.031 [0.587]	-0.055 [0.747]	-0.122 [0.467]	-0.084 [0.662]
Return Volatility	-0.046 [0.043]**	-0.048 [0.049]**	-0.012 [0.629]	-0.041 [0.161]	-0.042 [0.165]	0.003 [0.905]
Age	0.007 [0.059]*	0.005 [0.177]	0.002 [0.658]	0.010 [0.011]**	0.008 [0.040]**	0.005 [0.211]
Tobin's $q$	-0.011 [0.788]	0.004 [0.918]	-0.034 [0.401]	-0.004 [0.936]	0.006 [0.918]	-0.037 [0.459]
Interest Coverage	-0.002 [0.931]	0.004 [0.878]	0.005 [0.844]	0.003 [0.918]	0.006 [0.826]	0.014 [0.553]
ROA	0.002 [0.865]	-0.001 [0.952]	0.005 [0.643]	0.003 [0.837]	0.001 [0.924]	0.008 [0.511]
Chaebol Dummy	-0.201 [0.015]**	-	-	-0.251 [0.008]***	-	-
Foreign Ownership Dummy (High)	-	0.152 [0.015]**	-	-	0.144 [0.054]*	-
KCGI Dummy (High)	-	-	0.158 [0.012]**	-	-	0.258 [0.001]***
$N$	144	143	127	106	106	93
R-square	0.119	0.115	0.137	0.179	0.167	0.243



Table 4  
Operating Performance of the Death Spiral Issuers

This table presents the median values of various measures of operating performance for death spiral issuers from one fiscal year before the issue up to 3 fiscal years following the issue. Year 0 corresponds to the fiscal year-end immediately following the issue. EBITDA is the sum of operating income and depreciation. Profit margin is net income divided by sales. ROA is net income divided by assets. CF (cash flow) is operating income adjusted for non-operating income and expenses. INV is capital expenditures plus R&D. ADV is expenditures for advertisement. Market/Book is the ratio of the market value of equity to the book value of equity, where firms with negative book equity are excluded. Tobin's  $q$  is the ratio of the sum of market value of common equity and the book value of debt to the book value of assets. In panel A, we report results for all death spiral issuers. In panels B and C, we report operating performance for chaebol and non-chaebol death spiral issuers, respectively. All test statistics used in this analysis are estimated from Wilcoxon signed-rank test. In panel D, we test the difference in median values between chaebol and non-chaebol death spiral issuers. \*, \*\*, and \*\*\* indicate statistical significance at 10%, 5%, and 1%, respectively. The null value for Market/Book and Tobin's  $q$  is one rather than zero. The sample period is from January 1998 to December 2006.

Panel A: All death spiral issuers										
Fiscal year	EBITDA/assets	EBITDA/sales	Profit Margin	ROA	CF/assets	INV/assets	ADV/sales	Market/Book	Tobin's $q$	Firm-Years
-1	2.898%***	3.388%***	0.785%**	0.713%**	1.390%***	2.501%***	0.148%***	0.863	0.965	155
0	2.008%***	2.327%***	0.476%***	0.478%***	0.979%**	2.556%***	0.153%***	1.106***	1.056***	157
1	0.871%	1.346%	-0.349%***	-0.321%***	0.228%***	2.984%***	0.152%***	1.106***	1.043***	151
2	1.506%	1.876%**	-1.332%***	-1.365%***	-0.671%***	2.263%***	0.152%***	1.081**	1.043**	145
3	2.525%**	2.367%**	-1.532%***	-1.413%***	-0.635%***	2.302%***	0.149%***	0.972	1.023	134
Panel B: Chaebol issuers										
-1	5.547%***	8.460%***	0.879%*	0.828%*	2.284%**	2.526%***	0.176%***	0.607	0.895	23
0	7.407%***	7.609%***	1.550%*	1.158%*	2.379%**	3.450%***	0.193%***	0.694	0.932	23
1	6.787%***	7.825%***	3.632%**	2.771%**	5.277%**	3.749%***	0.301%***	0.699	0.928	23
2	6.015%***	7.311%***	1.282%	1.648%	2.027%	3.621%***	0.190%***	0.571	0.949	22
3	5.481%***	7.246%***	2.653%*	1.814%*	4.366%*	3.533%***	0.231%***	0.730	0.948	21

Table 4 – *Continued*

Panel C:(Non-chaebol issuers)										
Fiscal year	EBITDA/assets	EBITDA/sales	Profit Margin	ROA	CF/assets	INV/assets	ADV/sales	Market/Book	Tobin's <i>q</i>	Firm-Years
-1	1.920%	2.139%	0.747%	0.664%*	1.335%	2.470%***	0.127%***	0.933	0.998	132
0	0.894%	1.462%	-0.448%***	-0.503%***	-0.085%***	2.436%***	0.149%***	1.183***	1.087***	134
1	-0.032%**	-0.180%**	-2.885%***	-2.195%***	-0.775%***	2.802%***	0.140%***	1.126***	1.072***	128
2	-0.340%**	-0.477%***	-3.319%***	-1.907%***	-1.677%***	2.227%***	0.152%***	1.119***	1.059***	123
3	0.814%	1.077%**	-9.564%***	-5.344%***	-3.200%***	2.191%***	0.126%***	1.062	1.060*	113
Panel D: Test of difference between the two sub-groups										
-1	[0.001]***	[0.000]***	[0.273]	[0.225]	0.180]	[0.263]	[0.095]*	[0.063]*	[0.192]	-
0	[0.000]***	[0.000]***	[0.095]*	[0.080]*	[0.018]**	[0.217]	[0.257]	[0.020]**	[0.048]**	-
1	[0.000]***	[0.000]***	[0.001]***	[0.002]***	[0.001]***	[0.335]	[0.169]	[0.083]*	[0.076]*	-
2	[0.000]***	[0.000]***	[0.005]***	[0.006]***	[0.003]***	[0.147]	[0.266]	[0.005]***	[0.078]*	-
3	[0.000]***	[0.000]***	[0.001]***	[0.001]***	[0.000]***	[0.078]*	[0.031]**	[0.116]	[0.291]	-

Table 5  
Operating Performance Prior to Death Spiral Issue: No Subsequent Changes in Control vs. Changes in Control

This table presents the median values of various measures of operating performance for death spiral issuers as well as non-death spiral issuers as of one fiscal year before the issue. The first row presents the results for those death spiral issuers with no changes in controlling shareholder until the expiration date or 3 years after the issue if the expiration date is not specified (group A). The second row presents the corresponding numbers for those death spiral issuers that experienced a changes in controlling shareholder before the expiration date or within 4 years after the issue if the expiration date is not specified (group B). The third row presents the corresponding numbers for non-death spiral issuers (group C). The fourth and fifth row reports the z-stats for testing the differences between groups A and B, and groups A and C, respectively based on Wilcoxon two sample median test. EBITDA is the sum of operating income and depreciation. Profit margin is net income divided by sales. ROA is net income divided by assets. CF (cash flow) ratio is operating income adjusted for non-operating income and expenses. INV is capital expenditures plus R&D. ADV is expenditures for advertisement. Market/Book is the ratio of the market value of equity to the book value of equity, where firms with negative book equity are excluded. Tobin's  $q$  is the ratio of the sum of market value of common equity and the book value of debt to the book value of assets. The sample period is from January 1998 to December 2006.

Sub-groups		EBITDA /assets	EBITDA /sales	Profit Margin	ROA	CF/assets	INV/assts	ADV/sales	Tobin's $q$	Market /Book	Firm-Years
Death Spiral Issuers	No change in controlling shareholder (A)	5.497%	6.167%	1.857%	1.181%	2.797%	3.111%	0.077%	0.865	0.565	73 (72)
	Change in controlling shareholder (B)	-0.298%	-0.207%	-10.546%	-8.005%	-10.206%	3.090%	0.268%	0.992	0.971	45 (38)
Non Death Spiral Issuers (C)		4.727%	6.167%	0.537%	0.346%	1.177%	2.557%	0.128%	0.913	0.655	313 (264)
z-statistics	(A) - (B)	-5.103***	-4.671***	-4.327***	-4.433***	-4.665***	-1.186	-1.308	1.524*	1.870**	-
	(A) - (C)	1.248	0.878	2.951***	3.263***	3.402***	1.014	-1.382*	-1.949**	-0.923	-

Table 6

## Determinants of Death Spiral Issue Conditional on Issuing a Hybrid Security: Multivariate Analysis

This table presents the results from logit estimation where the dependent variable equals one if the issue is a death spiral (a total of 151 firm-years) and zero if it is a conventional non-death spiral hybrid security (a total of 309 firm-years). Explanatory variables are as defined in tables 3 and 4. Due to data availability, mostly of corporate governance variables, we use a total of 133 death spiral issues and a total of 220 conventional non-death spiral issues in the actual estimation. In panel A, we regress on operating performance, chaebol dummy, foreign ownership dummy and the interaction between the last two. In panel B, we replace foreign ownership dummy with governance index (KCGI) dummy. *p*-values are reported in brackets. All specifications include industry and year fixed effects. \*, \*\*, and \*\*\* indicate statistical significance at 10%, 5%, and 1%, respectively. The sample period is from January 1998 to December 2006.

## Panel A: Operating Performance, Chaebol-affiliation, and Foreign Ownership

	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	11.56 [0.000]***	11.35 [0.000]***	11.38 [0.000]***	8.740 [0.007]***	11.37 [0.000]***	11.56 [0.000]***
Leverage	-0.623 [0.125]	-0.648 [0.118]	-0.618 [0.136]	-0.868 [0.055]*	-0.619 [0.137]	-0.696 [0.120]
Size	-0.493 [0.001]***	-0.474 [0.001]***	-0.476 [0.001]***	-0.337 [0.033]**	-0.476 [0.001]***	-0.463 [0.001]***
Return Volatility	-0.263 [0.055]*	-0.284 [0.032]**	-0.282 [0.034]**	-0.282 [0.036]**	-0.283 [0.033]**	-0.336 [0.014]**
Age	-0.017 [0.322]	-0.017 [0.299]	-0.017 [0.302]	-0.024 [0.160]	-0.017 [0.302]	-0.022 [0.189]
Tobin's <i>q</i>	0.399 [0.247]	0.373 [0.277]	0.363 [0.289]	0.616 [0.126]	0.363 [0.289]	0.412 [0.285]
EBITDA/Asset	0.837 [0.567]	-	-	-	-	-
Profit Margin	-	-0.005 [0.729]	-	-	-	-
ROA	-	-	0.039 [0.858]	-	-	-
INV/Asset	-	-	-	-0.001 [0.170]	-	-
CF/Asset	-	-	-	-	0.029 [0.884]	-
Interest Coverage	-	-	-	-	-	-0.021 [0.030]**
Chaebol Dummy	1.329 [0.019]**	1.290 [0.021]**	1.290 [0.021]**	1.331 [0.023]**	1.289 [0.021]**	1.254 [0.024]**
Foreign ownership Dummy (High)	-0.433 [0.211]	-0.421 [0.224]	-0.429 [0.216]	-0.336 [0.334]	-0.428 [0.217]	-0.499 [0.157]
Chaebol* Foreign ownership	-1.789 [0.066]*	-1.744 [0.071]*	-1.746 [0.070]*	-1.817 [0.059]*	-1.746 [0.070]*	-1.651 [0.087]*
Pseudo-R <sup>2</sup>	0.397	0.396	0.396	0.402	0.396	0.403

Table 6 – *Continued*

## Panel B: Operating Performance, Chaebol-affiliation, and Corporate Governance Index (KCGI)

	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	9.820 [0.001]***	9.699 [0.001]***	9.703 [0.001]***	7.528 [0.019]**	9.703 [0.001]***	9.863 [0.001]***
Leverage	-0.307 [0.468]	-0.322 [0.452]	-0.302 [0.481]	-0.545 [0.258]	-0.300 [0.488]	-0.383 [0.409]
Size	-0.463 [0.001]**	-0.448 [0.001]**	-0.449 [0.001]**	-0.329 [0.039]**	-0.449 [0.001]**	-0.433 [0.002]***
Return Volatility	-0.381 [0.016]**	-0.399 [0.009]***	-0.398 [0.009]***	-0.399 [0.009]***	-0.398 [0.009]***	-0.461 [0.004]***
Age	-0.011 [0.525]	-0.012 [0.501]	-0.012 [0.501]	-0.017 [0.352]	-0.012 [0.501]	-0.018 [0.334]
Tobin's $q$	0.339 [0.360]	0.315 [0.391]	0.310 [0.400]	0.546 [0.213]	0.310 [0.400]	0.372 [0.374]
EBITDA/Asset	0.780 [0.642]	-	-	-	-	-
Profit Margin	-	-0.002 [0.901]	-	-	-	-
ROA	-	-	0.037 [0.882]	-	-	-
INV/Asset	-	-	-	0.000 [0.239]	-	-
CF/Asset	-	-	-	-	0.036 [0.883]	-
Interest Coverage	-	-	-	-	-	-0.015 [0.059]*
Chaebol Dummy	1.822 [0.022]**	1.779 [0.024]**	1.775 [0.024]**	1.733 [0.029]**	1.776 [0.024]**	1.773 [0.026]**
KCGI	1.373	1.341	1.342	1.272	1.342	1.277
Dummy (High)	[0.005]***	[0.006]***	[0.006]***	[0.009]***	[0.006]***	[0.009]***
Chaebol*	-1.731	-1.697	-1.693	-1.725	-1.693	-1.688
KCGI	[0.052]*	[0.055]*	[0.055]*	[0.054]*	[0.055]*	[0.057]*
Pseudo-R <sup>2</sup>	0.424	0.424	0.424	0.428	0.424	0.429

Table 7  
Average Changes in Proportional Ownership Following a Death Spiral Issue

This table presents the averages of proportional ownership (in percentages) held by various types of shareholders within the controlling party before and after the death spiral issue. The analysis is restricted to those firms where the controlling shareholder remained intact since the death spiral issue up until the expiration date or 4 years (\*\*\*\*앞에서는 3 년이라고 되어 있는데, 3 년인지 4 년인지 명확히 확인 바람\*\*\*\*after the issue if the expiration date is not specified. Hence, firms that are merged or acquired subsequent to the issue are excluded from this analysis. Control rights refer to the sum of proportional ownership held by the controlling shareholder, other family members, affiliated firms and non-family executives. Panel A presents the comparison between year -1 and year +1 while Panel B compares year -1 and year +3. Panel C compares year -1 with the year of expiration date. *p*-values are based on pair-wise comparison. \*, \*\*, and \*\*\* indicate statistical significance at 10%, 5%, and 1%, respectively. The sample period is from January 1998 to December 2006.

Fiscal Year	Controlling Shareholder (%)	Other Family Members (%)	Affiliated Firms (%)	Non-Family Executives (%)	Control Rights (%)	<i>N</i>
Panel A: from year -1 to +1						
-1	11.89	8.05	10.91	0.71	31.56	110
+1	9.71	7.10	12.30	0.77	29.88	110
<i>p</i> -value	[0.000]***	[0.023]**	[0.146]	[0.673]	[0.085]*	-
Panel B: from year -1 to +3						
-1	10.76	7.04	10.91	0.71	29.42	48
+3	8.54	7.66	13.46	0.42	30.08	48
<i>p</i> -value	[0.010]***	[0.484]	[0.179]	[0.048]**	[0.714]	-
Panel C: from year -1 to expiration date						
-1	9.82	6.95	12.79	0.83	30.39	38
expiration date	7.35	8.30	14.94	0.49	31.08	38
<i>p</i> -value	[0.023]**	[0.297]	[0.395]	[0.060]*	[0.779]	-

Table 8

## Average Increases in the Number of Shares Held by the Controlling Party Following a Death Spiral Issue

This table presents the averages of increases in the number of shares held by the controlling party (in percentages) subsequent to a death spiral issue. The analysis is restricted to those firms where the controlling shareholder remained intact since the death spiral issue up until the expiration date or 4 years after the issue if the expiration date is not specified. In panel A, we report the increases in the number of shares for the controlling party as a whole, and in panel B we report the numbers separately for each shareholder type within the controlling party. In the first two columns of panel A, we include the increases in number of shares held due to mechanical changes in the total number of shares outstanding, such as stock splits, reverse splits, and stock dividends. In the last two columns of panel A and in panel B, we exclude such mechanical changes so that changes in holdings reflect only the following; subscription to rights offering, conversion or exercise of hybrid securities (CBs and BWs), or purchase of stocks from other shareholders. *p*-values are based on pair-wise comparison. \*, \*\*, and \*\*\* indicate statistical significance at 10%, 5%, and 1%, respectively. The sample period is from January 1998 to December 2006.

## Panel A: Controlling Party as a Whole

	Include all changes in number of common shares		Exclude mechanical changes in number of outstanding shares		<i>N</i>
	Mean (%)	Median (%)	Mean (%)	Median (%)	
From year -1 to +1	+48.69 [0.002]***	+9.69 [0.000]***	+51.21 [0.001]***	+11.30 [0.000]***	109
From year -1 to +3	+166.19 [0.002]***	+53.30 [0.000]***	+182.36 [0.001]***	+53.30 [0.000]***	48
From year -1 to expiration date	+219.4 [0.006]***	+48.51 [0.008]***	+248.19 [0.003]***	+57.41 [0.000]***	38

## Panel B: Sub-groups Within the Controlling Party

	Controlling Shareholder		Other Family Members		Affiliated firms		Non-Family Executives	
	Mean (%)	<i>N</i>	Mean (%)	<i>N</i>	Mean (%)	<i>N</i>	Mean (%)	<i>N</i>
From year -1 to +1	+34.05 [0.052]*	108	+56.05 [0.055]*	106	+63.72 [0.000]***	105	+22.21 [0.182]	98
From year -1 to +3	+109.45 [0.038]**	48	+441.54 [0.061]*	47	+185.41 [0.030]**	45	+33.31 [0.349]	46
From year -1 to expiration date	+137.23 [0.043]**	38	+1000 [0.167]	37	+219.25 [0.039]**	35	+40.40 [0.274]	37

Table 9

## Holdings of Hybrid Securities by the Controlling Party Following a Death Spiral Issue

This table presents the number of firms (and relative proportions in percentages) where any member of the controlling party holds hybrid securities issued by that specific firm following a death spiral issue. The analysis is restricted to those firms where the controlling shareholder remained intact since the death spiral issue up until the expiration date or 4 years after the issue if the expiration date is not specified. Hybrid securities include convertible bonds, bonds with warrants, and warrants separated from the original bonds with warrants. In panel A, we include all firms that issued any type of hybrid security regardless of whether it has floating-priced death spiral feature or not. In panel B, we only include exclusive death spiral issuers, i.e. firms that issued only death spirals and did not issue any non-death spirals. In each panel, we report the results for three different time horizons. The sample period is from January 1998 to December 2006.

## Panel A: All Hybrid Security Issuers

	Held by Controlling Party		Not Held by Controlling Party		Total
	N	%	N	%	N
From year 0 to +1	34	29.8	80	70.2	114
From year 0 to +3	24	48.0	26	52.0	50
From year 0 to expiration date	23	57.5	17	42.5	40

## Panel B: Exclusive Death Spiral Issuers

	Held by Controlling Party		Not Held by Controlling Party		Total
	N	%	N	%	N
From year 0 to +1	15	26.3	42	73.7	57
From year 0 to +3	10	41.7	14	58.3	24
From year 0 to expiration date	9	47.7	10	52.6	19



Figure 1

Cumulative Abnormal Returns (CARs) following Death Spiral Issue Announcement

The figures present the averages of the cumulative abnormal returns (CARs) of the death spiral issuers surrounding the original disclosure announcement from day -10 through day +60. Panel A reports CARs based on market-adjusted model and panel B reports those based on market model where market return are value-weighted index returns compiled by the Korea Capital Market Institute (KCMI). Market model parameter estimates are obtained using past 200 trading days from day -220 to -21 of the issue announcement. In both panels, the thin line represents CARs of all death spiral issuers, while the dashed line and the bold line presents those of non-chaebols and chaebols, respectively. We consider all death spiral issues including the first as well as follow-on issues. The sample period is from January 1998 to December 2006.

Panel A: Market-Adjusted Model

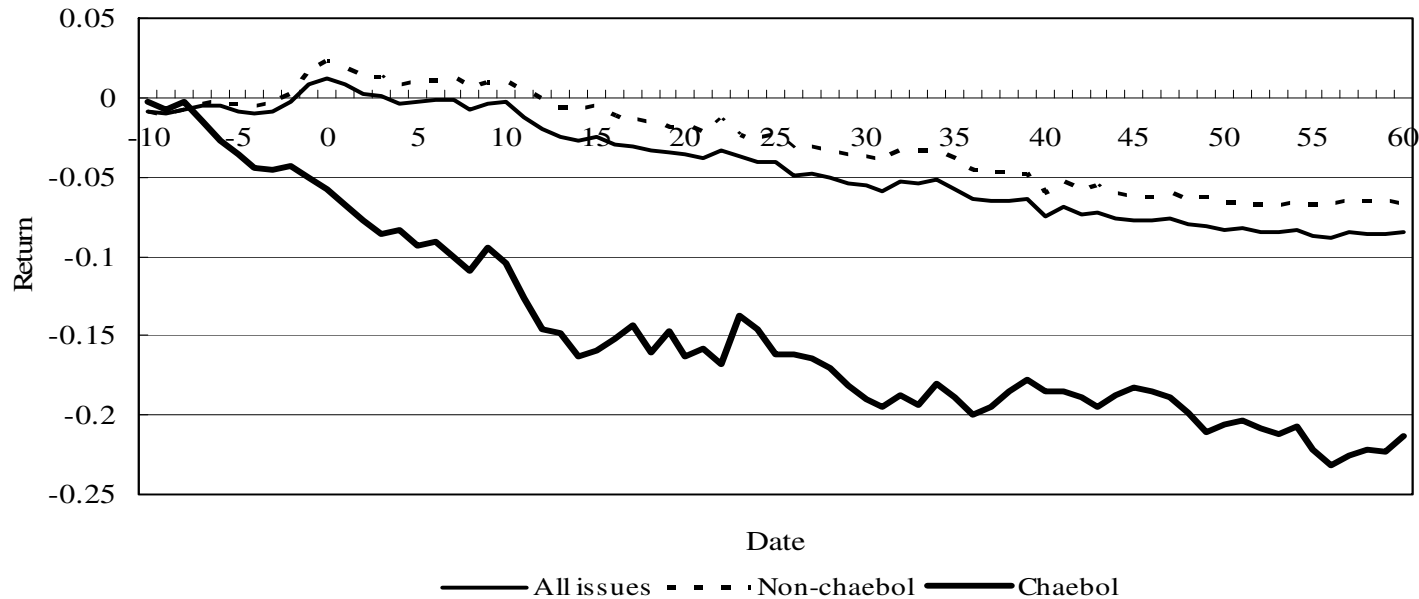


Figure 1 – Continued

Panel B: Market Model

