Death Spiral Issues in Emerging Market: A Control Related Perspective †

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Abstract

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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 prices 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 problem 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 are back in action. The amount of money raised by structured PIPEs - another name for death spirals - peaked in 2000 at USD 3.14 billion, dropped down to USD 0.28 billion in 2003, and then hit its new record at USD 14.20 billion in 2007.[1] 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

[1] PIPE stands for private investment in public equity. In US, floating-priced convertibles are private placements (Hillion and Vermaelem, 2004), although there are public offerings of death spirals in other countries. Visit www.sagientresearch.com/pt for detailed statistics on structured PIPEs in US.

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) verify this explanation, 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 if death spirals are issued 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 illustrates how this could actually occur in practice.

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

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

purchased both by 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 debt was paid back in full only one year after the issuance in July 2000.

In subsequent years share price dropped which lead 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 fully exercised their warrants in October 2002 they could have increased the family ownership of Doosan Corporation from 15.7% to 39.1%.[3] In October 2002, this scheme was uncovered by a local governance research institute, which led Financial Supervisory Service (FSS) to investigate on the matter.[4] In February 2003, the controlling family announced that they would voluntarily void their entire holdings of Doosan Corp. warrants. The case of Doosan Corp. 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.[5]

To empirically test the *control enhancing or control transferring hypothesis* as this example illustrates, we focus on Korea which is widely known for its high level of private benefits of control.[6] 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 *last-resort financing hypothesis,* but rather consistent with the *control enhancing or control transferring hypothesis*.

First, death spirals are not necessarily issued by firms with poor performance. A number of

[3] Family control, including the shares owned by Doosan affiliated firms, could have increased from 59.72% to 70.9%.
[4] See CGCG (2003).
[5] See PSPD (2003).
[6] Nenova (2003) shows that the control block premium in Korea is among the highest around the world.

operating performance measures are all significantly positive in the year before the death spiral issue and they do not deteriorate over time following the issue. This shows a striking contrast to the results reported in Hillioin and Vermaelen (2004). Moreover, none of the accounting performance measures are able to explain the choice between a death spiral issue and a conventional issue.

Second, 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 for reasons other than last resort financing. 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.

Third, for the same subset of firms, we examine the proportional ownership and number of shares held by the controlling party subsequent to the death spiral issue.[7] Under last resort financing hypothesis, we should observe a decrease in proportional ownership due to heavy dilution incurred by conversion or exercise of 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

[7] 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.

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 be later converted into firm's voting shares.[8] Our findings suggest that in approximately half of these firms, at least one member of the controlling party holds on to some hybrid securities.[9]

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 the least, this paper suggests and identifies a new perspective behind death spirals issues that may be more pertinent in emerging markets.

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

[8] By hybrid securities, we are referring to convertible bonds (CBs) and bonds with warrant (BWs) throughout the paper, regardless of whether they are floating-priced or not.
[9] Unfortunately, available holdings data do not allow us to distinguish between a death spiral and a non-death spiral.

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% of all hybrid securities issuances during 1998-2006, in terms of amount issued (30% in terms of 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, bonds with floating-priced warrants should be considered as a death spiral along with floating-priced convertibles. Unlike in the US, bonds with warrants have been one of the key hybrid securities next to convertible bonds. 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 in Korea, those with floating-priced warrants are also prevalent. Table 1 shows that, during 1998-2006, bonds with floating-priced warrants account for approximately 43% of total death spiral issuances in terms of numbers and 18% in terms of amount issued. 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, Korean death spirals typically do not allow upward adjustments of conversion prices (exercise prices in case of bonds with floating-priced warrants). This means 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 15th 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 precludes the validity of the *undervaluation hypothesis*, another alternative considered in Hillion and Vermaelen (2004). According to this hypothesis, firms issue floating-priced convertibles instead of the fixed-priced convertibles when managers believe that the share price is undervalued at the time of issuance. If fixed-priced convertibles are issued, conversion will take place below the share's fair value as it cannot be adjusted upward after the issuance. But if floating-priced convertibles are issued instead, conversion will take place at a higher price as information spreads in the market during the lock-up period. But, the key presumption of this argument is that conversion (or exercise) prices can be adjusted upward, which is not the case in Korea.

On the other hand, this feature does not preclude possibility of an investment strategy using death spirals found in the US among hedge funds. Under this strategy, an investor purchases a death spiral, short sells the underlying shares incurring 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 basically states that share price declines after the death spiral issuance because of its faculty contract design that allows short selling, conversion, dilution, and so on. With upward adjustment of conversion price blocked, any random downward move of share price can lead to a conversion (or exercise) price drop, which would trigger a downward spiral.

Third, at the time of issuance, Korean death spirals do not allow any conversion (or exercise)

discount. That is, the conversion (or exercise) price must be equal to some reference price based on prevailing market price.[10] This is quite different from US death spirals that allow such a discount from a reference price.[11] 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, upward adjustment of the conversion price and the discount from a reference price can be thought of as complementing contractual features. Since death spiral holder receives smaller number of shares as stock prices go up, appropriate discount from the prevailing market price is provided. US death spirals have these features while Korean death spirals do not.

3. Hypotheses

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 death spirals and non-death spirals That is, we can only identify up to general type of securities, i.e. commons stocks, preferred stocks, convertibles, or BWs. So, instead of showing a direct evidence of insiders holding death spirals, we develop a number of predictions that are consistent with the *control enhancing or transferring hypothesis*, but not with the *last resort financing hypothesis*.

[10] 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.

[11] In an efficient market, the value of this discount would be reflected in a higher fair value of the death spiral.

In this paper, we do not explicitly test the *faulty contract design hypothesis*. That is, we do not separately investigate whether some contractual features of the death spiral security, such as lock-up period, discount, and others, exacerbate the stock price decline upon issuance. Rather, we propose our *control enhancing or transferring hypothesis* as one possible explanation why managers would approve the issuance of death spirals despite its faulty contract design. As explained earlier, there is no need to test the *undervaluation hypothesis* in the Korean context.

We begin with the test that investigates whether the issuance of death spirals are followed by significant negative abnormal returns. Note that this test is not intended to reject one hypothesis in favor of the other. This is because both hypotheses predict that share prices would decline following the issuance. Under the *last resort financing hypothesis*, firms issue floating-priced convertibles over fixed-priced alternatives when share prices are believed to be overvalued by outside investors at the time of issuance.[12] When floating-priced convertibles are offered, outside investors would willingly acquire them for its floating conversion price provides protection against the risk of overpayment. That is, conversion price would drop over time as initially overvalued stock price declines. Fixed-priced convertibles, however, do not provide such protection. Thus, according to the *last resort financing hypothesis*, issuance of a death spiral would be a signal that shares are overvalued, which is why share prices drop following the issuance. Under the *control enhancing or control transferring hypothesis*, share prices drop not because shares are initially overvalued, but 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. 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

[12] 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.

exercise warrants) at a cheaper price and thus obtain more shares.

Next, we 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 the time of issuance, as long as the level of operating performance is at a reasonable level, firms would still be able to issue straight debt. But firms under severe financial distress with extremely poor accounting performance 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 so because, controlling shareholder would be less likely to enhance or transfer his/her control of a firm that is poorly performing.

Related to this second test, 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 over time while the latter does not. Thus, the issuance of a death spiral would be a signal that operating performance would deteriorate after the issuance. The *control enhancing or control transferring hypothesis*, on the other hand, has no prediction regarding ex-post operating performance.[13]

Unlike our first test on ex-post share price movement, these two tests allow us to reject one hypothesis in favor of the other. 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

[13] 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 would 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.

reasons other than last resort financing.

Another empirical strategy to find evidence on the existence of control-related motives is to identify a subset of firms that are more likely to have issued death spirals for control enhancing or control transferring motives and investigate if these firms indeed exhibit various firm characteristics that could be found only in firms with such motives. To identify these firms, we resort to *ex post* outcomes with respect to changes in control subsequent to the issue. More specifically, we focus our analysis to death spiral issuers, where control is preserved within the family, even after the death spiral issuance. The idea is that under the last resort financing hypothesis, the cash-constrained controlling party would issue death spirals to an outside investor, which will heavily dilute the controlling party's ownership and ultimately lead them to lose control. Thus, our alternative hypothesis is that death spiral issuers that do not experience any changes in control are more likely to be those that have issued death spirals for control-related motives. However, it could well be the case that firms with no subsequent changes in control were really marginal firms that effectively emerged out of distress through a successful death spiral issue.

To distinguish between the two possibilities, we investigate a number of firm characteristics that are consistent with control-related motives for this subset of death spiral issuers. We first investigate their operating performance at the time of the issue. If this subgroup of firms exhibit operating performance superior to those where family loses control, it would be evidence consistent with the *control enhancing or control transferring hypothesis*, but not with the *last resort financing hypothesis.*

Next, we investigate whether the controlling party of these firms preserves the level of its ownership or even experiences an increase in its ownership after the death spiral issuance. Under the *last resort financing hypothesis*, existing shareholders including the controlling party cannot or are not interested in buying more shares due to wealth constraints or portfolio considerations.

Consequently, their ownership will experience a heavy dilution. So, if we find evidence that they preserved or even increased the level of their ownership after the death spiral issuance, it is evidence consistent with the *control enhancing or control transferring hypothesis*, but not with the *last resort financing hypothesis*

To strengthen our finding, we also investigate whether the members of the controlling party of these firms actually purchase the existing shares in the market or subscribe to new shares offered by the company after the death spiral issuance and whether any of its members hold hybrid securities that can later be converted into voting shares. If we find any of these, it is again evidence consistent with the *control enhancing or control transferring hypothesis*, but not with the *last resort financing hypothesis.*

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 the issue such as the type, amount, conversion ratio, issue date, expiration date, etc. To 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.[14] In the process, we also double checked whether the information contained in *TS2000* is consistent with

[14] The difference between the actual issue date and the original announcement date can be as short as one trading day up to two months.

the original disclosure.[15] 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 (DART) system which is an electronic disclosure system similar to EDGAR in US.[16] To identify controlling shareholders for each firm, we resort to *KISLINE*.

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-price 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.

[15] In case where there was a discrepancy, we followed the original disclosure.
[16] 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.

The numbers for all issues indicate that there was a clustering of issues in 1999. We 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 has been decreasing continuously. 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 death spiral group than in the non-death spiral group.[17] 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.[18]

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 residual returns are obtained using past 200 trading days from day

[17] In US, death spirals are typically issued through private placements.
[18] 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.[19]

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

The results from figure 1 and table 2 indicate that the death spiral issuers experience a significant drop in stock prices following the issue announcement. The average drop is -13.29% based on market model, and -8.47% based on market adjusted model over a two month period.[20] This is consistent with Hillion and Vermaelen (2004), where they report abnormal returns between -30.1% to -54% over a 12 month period.[21] These results are consistent with either the *last resort financing hypothesis* or the *control enhancing or transferring hypothesis*, but not with the *undervaluation hypothesis*. As mentioned earlier, the undervaluation hypothesis is irrelevant in the Korean regulatory context. In unreported results, we examined whether there were any differences in abnormal returns between CBs and BWs, domestic and overseas issues, and public and private issues, but they were generally not statistically significantly different between these groups.

In the second column of table 2, we report the results only using 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 spirals (Hillion and Vermaelen, 2004).

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[19] 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 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.

[20] We also tried various horizons, up to +30, +90, and +180 trading days and obtained similar results.

[21] Hillion and Vermaelen 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 we use daily returns rather than monthly returns.

Overall, the results in this subsection show that death spiral issues are followed by significant negative abnormal returns. This suggests that death spiral issuers may be using this type of security either as a last resort financing or as a vehicle to pursue control-related motives.[22]

C. Operating Performance of the Death Spiral Issuers

In this sub-section, we attempt to distinguish between the *last resort financing hypothesis* and the *control enhancing or transferring hypothesis* 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*.[23] If *last resort financing hypothesis* also holds in our sample, we expect to see substantially negative operating performance for the death spiral issuers.

Table 3 reports the results of this analysis.[24] In panel A, we present the median values of various measures of operating performance for the death spiral issuers.[25] In marked contrast with the Hillion and Vermaelen (2004) sample, the death spiral issuers in our sample do not exhibit poor operating performance at all. In fact, none of the point estimates of the performance measures are negative. And many of the variables exhibit an increasing trend over time. All of the variables,

[22] There are a few papers that study hybrid securities in general issued by Korean firms. These papers use samples that may include death spirals, but do not provide any separate analyses focusing on death spirals. See Jung (2003), Park and Baek (2003), and Kang, Park, and Baek (2007).

[23] 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.

[24] 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 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.

[25] 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.

except for market to book and Tobin's Q, are significantly positive just prior to the issue of death spirals.[26] And these firms are spending significantly positive amount on capital expenditures, R&D, and advertisements throughout the whole sample period. In unreported results, we repeated the analysis using only the death spiral issuers that did not issue any non-death spirals during the whole sample period (exclusive death spiral issuers), and found similar results. This strongly suggests that death spiral issuers in the Korean market on average may be issuing them for reasons other than last source of financing. This is also consistent with our earlier finding on stock price reactions. Over a three-month period, cumulative abnormal returns (CAR) drops about 10%, which is significantly smaller in absolute terms than the magnitude reported in Hillion and Vermaelen (2004) on US firms (about 20% over the same length period), which are mostly issuing death spirals as a last source of financing.

In table 4, we explore this issue further by testing whether the decision to include death spiral characteristic conditional on issuing a hybrid security is affected by operating performance. Specifically, we run a logit model where the dependent variable equals one if the issues 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 results in table 3 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 behind 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

[26] The number of firms years used to calculate Market/Book and Tobin's Q are slightly smaller than reported in table 3 due to availability of market data.

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 value of assets (in Korean Won thousands), 'Age' the number of years from the IPO until -1 fiscal year before the announcement date, and 'Return Volatility' measured by 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 4 indicate that death spiral issuers are indeed smaller than non death spiral issues. Both leverage and age are not statistically significant. A somewhat puzzling result is that death spiral issuers exhibit less stock return volatility then non death spiral issuers.

One of the most striking results from table 4 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. Overall, the results from tables 3 and 4 strongly suggest that the death spiral issues in Korea are not consistent with the *last resort financing hypothesis* supported by Hillion and Vermaelen (2004) using US data.

D. Subset of Firms Likely to Have Issued Death Spirals for Control-Related Motives

In this subsection, we identify a subset of firms that are more likely to have issued death spirals for control enhancing or control transferring motives. As explained earlier, we focus our analysis on death spiral issuers, where control is preserved, even after the death spiral issuance. The basic idea is that under the last resort financing hypothesis, existing shareholders, including the controlling party face wealth constraints, so that once death spirals are issued to an outside

investors it can lead to heavy dilution of the controlling party's ownership and potentially lead them to lose control. Thus, our alternative hypothesis is that death spiral issuers that do not experience any changes in control are more likely to be those that have issued death spirals for control-related motives. On the other hand, we note that firms with no subsequent changes in control could well be really marginal firms that came out of distress following death spiral issue, consistent with the last resort financing hypothesis.

To test between these two competing alternatives, we investigate a number of characteristics that could be found only in firms with control-related motives but not with last resort financing motives. Each of the following subsections report the results. In identifying this subset of firms, we only include those where the controlling shareholder remained in tact subsequent to the death spiral issue up until the expiration date or 3 years after the issue if the expiration date is not specified.[27]

(1) Operating Performance at the Time of Death Spiral Issuance

In this subsection, we explore the operating performance of three groups of firms; 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), death spiral issuers that experienced a changes in controlling shareholder before the expiration (group B), and non-death spiral issuers (group C). Cases where issuers were merged or acquired by other entities that are not members of the controlling party are classified as group B.[28] Then, we compare groups A and B as well as A and C.

[27] We chose 3 years since the average difference between the issue announcement and the expirations was around 3.6 years.

[28] 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.

Table 5 reports the results of this analysis. First, we note that in more than 60% of death spiral issuers, controlling shareholders remain in tact. A priori, these firms could either be marginal firms that emerged from distress since death spiral issue, or healthy firms that were not in distress from the first place. However, once we examine the operating performance, we observe a clear difference within death spiral issuers between those that did not experience a change in control and those that did. Firms with no changes in controlling shareholder (group A) generally have much better operating performance than those with changes in controlling shareholders (group B). 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 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.

Second, we do not observe much difference in operating performance between group A (death spiral issuers with no changes in control) and group C (non-death spiral issuers). The 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 group A firms are strongly inconsistent with *last resort financing hypothesis*, but group B firms might be consistent.

Overall, above results 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.

(2) Controlling Party's Ownership Change

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 death spiral holders exercise their conversion rights increasing the number of shares outstanding and hence diluting the proportional ownership of the existing shareholders. We examine the changes in ownership of the controlling shareholder as well as the related parties since the death spiral issue to test whether this prediction holds. Note that this analysis can be implemented only for those firms where the controlling shareholder remained intact.

The results are reported in table 6. 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 spiral issues to change the control structure of their firms within the business group, while maintaining the same level of overall control rights in the target firm.

To address this issue in more depth, we examine the changes in the number of shares held by

the controlling party, after controlling for the mechanical changes in the number of shares.[29] The idea is that if the death spiral issue is mainly due to last resort financing, then the wealth constrained controlling party would not have enough resources to actively participate in subsequent equity or hybrid security offerings by the issuer or purchase existing shares or hybrid securities from other investors to recover and maintain their original proportional ownership.

We report the results of this analysis in table 7. 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 group 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 controlling party as a whole increase their shareholdings substantially even after we exclude all mechanical changes in the total number of shares outstanding.[30] 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.

[29] Mechanical changes in the number of shares include the following: stock splits and reverse splits, stock dividends, and reduction in paid in capital.
[30] The numbers are slightly larger after excluding the mechanical changes mainly due to reverse stock splits.

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. Although we would like to focus on death spiral holdings only, we are led to consider hybrid securities in general because 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 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 separated from the original bonds with warrants.

Table 8 reports the number of firms where any member of the controlling party holds hybrid securities after the death spiral issuance. In doing so, we are led to limit the sample to a subset of firms with no subsequent changes in control. Notice that the number of sample firms drops as we use a longer time horizon. This is because the number of firms with no changes in control drops over time. In panel A, we include all firms that issued either the death spirals or the non-death spirals. 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 increases up to approximately 50% during a longer time horizon. But, the results in panel A can be misleading in that the hybrid securities the controlling party is holding could be mostly conventional non-death spirals.

The results in panel B, however, suggest that this is unlikely. Even when focusing on firms where the hybrid securities held by the controlling party members are certainly death spirals, we obtain a similar result. 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 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*. This is even so considering the fact that the controlling party need not hold the death spirals to enhance or preserve its control over the firm. The controlling party can enhance its control by merely purchasing shares in the market after the share price has been sufficiently driven down by the death spiral issuance.

6. Conclusion

In this paper, we study the motive of issuing floating-priced convertibles or warrants, known as *death spirals*, in a country setting 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 *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 firms with poor operating performance at the time of issuance or by firms with deteriorating operating performance after the issuance. In fact, we find that none of the point estimates of the performance measures are negative for death spiral issuers. In a multivariate regression, we also find that death spiral issuers do not differ from conventional non-death spiral issuers in terms of their operating performance at the time of issuance.

Second, we find that a subset of firms that may have issued death spirals for control enhancing or control transferring motives (the 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 that are less likely to have issued them for control-related motives (the death

spiral issuers where there was a change in control). For example, the former group recorded EBITDA/Assets of 4.476% at the time of issuance, while the latter recorded that of -1.063%.

Third, in firms that may have issued death spirals for control-related motives, the proportional ownership by the controlling party as a whole is not affected by the death spiral issuance. Moreover, other family members exhibit the largest increases in the number of shares held after controlling for the mechanical changes in the number of total shares outstanding.

Finally, we find that in approximately half of the firms that may have issued death spirals for control-related motives, at least one member of the controlling party holds hybrid securities that can be later converted into firm's voting shares. Even when focusing on firms where the hybrid securities held by the controlling party members are surely death spirals, we obtain a similar result.

Although our sample consists of death spirals issued by firms from a single country, we believe the findings we report can 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 can 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, which are report in table 7. 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.

$$N^{i}_{-1} = OWN^{i}_{-1} \times Common_{-1}$$
$$N^{i}_{+1} = OWN_{+1} \times Common_{+1}$$
$$N^{i}_{+3} = OWN_{+3} \times Common_{+3}$$

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

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

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 - or purchasing existing shares from other shareholders), we obtain the increases in total number of shares due to mechanical changes as follows.

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

ΔX_1 : numerical changes by stock splits, etc.

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

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-price convertible bonds (CBs) or bond with warrants (BWs) where the conversion ratio may increase in case the 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 general, non-death spiral issues.

Panel A: Number of Hybrid Security Issues by Type

Year	All	Death Spirals							Non - Death Spirals						
		Total	CB	BW	Domestic	Overseas	Public	Private	Total	CB	BW	Domestic	Overseas	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 (Korean Won bil.)

Year	All	Death Spirals							Non - Death Spirals						
		Total	CB	BW	Domestic	Overseas	Public	Private	Total	CB	BW	Domestic	Overseas	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

Cumulative Abnormal Returns (CARs) following the Death Spiral Issue Announcement

This table presents the averages of the cumulative abnormal returns of the death spiral issuers surrounding the original disclosure announcement 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 Securities Research Institute (KSRI). Market model residual returns are obtained using past 200 trading days from day -220 to -21 of the issue announcement. . For each model, we test the statistical significance based on two different procedures. First, we report the t-stats based on the cross-sectional standard errors from the event period. The second t-stat is based on the time-series standard deviations of portfolio returns during the estimation period (Brown and Warner, 1985). In the first column, we report the results for all issues. In the second column, we report the results only using the first issue by each firm. All returns represent CARs since day -10. The sample period is from January 1998 to December 2006.

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

Table 3
Operating Performance of the Death Spiral Issuers

This table presents the median values of various measures of operating performance for the death spiral issuers from one fiscal year before the issue up to 3 fiscal years following the issue. Panel A reports the median values and panel B reports the p-values from testing that the median is zero. 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) 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.

Fiscal year	EBITDA/assets	EBITDA/sales	Profit Margin	ROA	CF /assets	INV/assets	ADV/sales	Market/Book	Tobin's Q	Firm-Years
Panel A: Death spiral issuers										
-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%	1.081	1.041	157
1	1.055%	1.725%	0.193%	0.255%	0.438%	3.038%	0.142%	0.904	0.985	149
2	1.910%	2.284%	0.805%	0.535%	1.235%	2.506%	0.105%	0.805	0.999	105
3	4.733%	4.772%	1.400%	1.427%	2.597%	2.911%	0.129%	0.954	1.022	62
Panel B: p-values										
-1	<0.0001***	<0.0001***	0.0157**	0.0157**	0.0037***	<0.0001***	<0.0001***	0.3190	0.5124	155
0	0.0013***	0.0013***	0.6322	0.6322	0.3382	<0.0001***	<0.0001***	0.3256	0.1705	157
1	0.1401	0.1401	1.0000	1.0000	0.8699	<0.0001***	<0.0001***	0.4351	0.8496	149
2	0.0785*	0.0785*	0.3291	0.3291	0.3291	<0.0001***	<0.0001***	0.3581	1.0000	105
3	0.0013***	0.0013***	0.0980*	0.0980*	0.0559*	<0.0001***	<0.0001***	0.7552	0.8830	62

Table 4
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 149 firm-years) and zero if it is conventional non-death spiral hybrid security (a total of 308 firm-years). Leverage is the ratio of debt to assets. Size is measured by log value of assets (n Korean Won thousands). Return volatility is measured by standard deviation of daily stock returns during the past 12 months before the announcement date. Age is the number of years since the IPO until -1 fiscal year before the announcement date. 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. EBITDA is the sum of operating income and depreciation. Profit margin is net income divided by sales. ROA is net income divided by assets. INV is capital expenditures plus R&D. CF (cash flow) ratio is operating income adjusted for non-operating income and expenses. Interest Coverage is operating income divided by interest expense. All specifications include industry and year fixed effects. The sample period is from January 1998 to December 2006.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	7.3225	7.3554	7.3189	7.3261	7.2052	7.3257	7.3465	7.2819
(*p* -value)	(0.0014)	(0.0014)	(0.0014)	(0.0014)	(0.0017)	(0.0014)	(0.0015)	(0.0021)
Leverage	-0.7087	-0.7070	-0.7226	-0.6987	-0.7895	-0.7000	-0.7771	-1.2062
(*p* -value)	(0.0824)	(0.0818)	(0.0799)	(0.0907)	(0.0636)	(0.0915)	(0.0796)	(0.0372)
Size	-0.2490	-0.2543	-0.2486	-0.2494	-0.2386	-0.2494	-0.2318	-0.2276
(*p* -value)	(0.0139)	(0.0141)	(0.0141)	(0.0138)	(0.0188)	(0.0138)	(0.0231)	(0.0332)
Return Volatility	-0.3272	-0.3190	-0.3269	-0.3265	-0.3248	-0.3267	-0.3752	-0.3041
(*p* -value)	(0.0079)	(0.0121)	(0.0079)	(0.0081)	(0.0083)	(0.0080)	(0.0030)	(0.0197)
Age	-0.0418	-0.0145	-0.0150	-0.0148	-0.0158	-0.0148	-0.0196	-0.0207
(*p* -value)	(0.3664)	(0.3785)	(0.3638)	(0.3670)	(0.3392)	(0.3668)	(0.2422)	(0.2276)
Tobin's Q	0.4874	0.5041	0.4923	0.4829	0.5456	0.4835	0.5370	0.6524
(*p* -value)	(0.1430)	(0.1367)	(0.1419)	(0.1489)	(0.1166)	(0.1486)	(0.1475)	(0.1204)
EBITDA/Asset	-	0.3617	-	-	-	-	-	0.8159
(*p* -value)		(0.8006)						(0.6353)
Profit Margin	-	-	-0.0048	-	-	-	-	-0.1838
(*p* -value)			(0.7310)					(0.1416)
ROA	-	-	-	0.0226	-	-	-	4.1893
(*p* -value)				(0.8926)				(0.3195)
INV/Asset	-	-	-	-	-2.2091	-	-	-2.6419
(*p* -value)					(0.3741)			(0.2984)
CF/Asset	-	-	-	-	-	0.0165	-	-3.1855
(*p* -value)						(0.9159)		(0.4643)
Interest Coverage	-	-	-	-	-	-	-0.0183	-0.0223
(*p* -value)							(0.0369)	(0.0223)
Pseudo R^2	0.3843	0.3844	0.3845	0.3844	0.3854	0.3843	0.3900	0.3975

Table 5
Operating Performance Before the Death Spiral Issue: No Subsequent Changes in Controlling Shareholder vs. Changes in Controlling Shareholder

This table presents the median values of various measures of operating performance for the 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 4 years after the issue if the expiration date is not specified (group B), while the third row presents the corresponding numbers for non-death spiral issues (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.

		EBITDA/assets	EBITDA/sales	Profit Margin	ROA	CF/assets	INV/assets	ADV/sales	Market/Book	Tobin's Q	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%	0.565 (72)	0.865 (72)	73
	Change in controlling shareholder (B)	-0.298%	-0.207%	-10.546%	-8.005%	-10.206%	3.090%	0.268%	0.971 (38)	0.992 (38)	45
Non Death Spiral Issuers (C)		4.727%	6.167%	0.537%	0.346%	1.177%	2.557%	0.128%	0.655 (264)	0.913 (264)	313
z-statistics: difference	(A) - (B)	-5.1029***	-4.6708***	-4.3272***	-4.4325***	-4.6652***	-1.1857	-1.3076	1.8701**	1.5244*	-
	(A) - (C)	1.2482	0.8778	2.9514***	3.2625***	3.4023***	1.0141	-1.3822*	-0.9225	-1.9491**	-

Table 6
Average Changes in Proportional Ownership Following the Death Spiral Issue by Various Shareholder Types

This table presents the averages of ownership by various shareholder types before and after the death spiral issue. We only include those firms where the controlling shareholder remained in tact since the death spiral issue up until the expiration date or 4 years after the issue if the expiration date is not specified. Hence, firms that were merged or acquired are excluded from this analysis. Control rights indicate the ownership sum of controlling shareholder, families, affiliated firms and executives. Panel A presents the comparison between year -1 and year +1. Panel B compares year -1 and year +3 while panel C compares year -1 with the year of expiration date. p-values are based on pair-wise comparison. The sample period is from January 1998 to December 2006.

Panel A: from year -1 to +1

Year	Controllong Shareholder	Families	Affiliated Firms	Executives	Control Right	N
-1	11.89	8.05	10.91	0.71	31.56	110
+1	9.71	7.10	12.30	0.77	29.88	110
Difference	-2.179***	-0.953**	1.391	0.057	-1.684*	-
p -value	<0.0001	0.0231	0.1460	0.6731	0.0846	-

Panel B: from year -1 to +3

Year	Controllong Shareholder	Families	Affiliated Firms	Executives	Control Right	N
-1	10.76	7.04	10.91	0.71	29.42	48
+3	8.54	7.66	13.46	0.42	30.08	48
Difference	-2.222***	0.624	2.548	-0.288**	0.662	-
p -value	0.010	0.4837	0.1792	0.0483	0.7145	-

Panel C: from year -1 to expiration date

Year	Controllong Shareholder	Families	Affiliated Firms	Executives	Control Right	N
-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
Difference	-2.468**	1.349	2.149	-0.339*	0.691	-
p -value	0.0226	0.2972	0.395	0.0598	0.7788	-

Table 7

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

This table presents the averages of increases in the number of shares held by the controlling party (in percentages) subsequent to the death spiral issue. 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 group 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 exercise of hybrid securities (CBs and BWs), or purchase of stocks from other shareholders. In each panel, we track the increases in shareholdings up to the expiration date. p-values are based on pair-wise comparison. The sample period is from January 1998 to December 2006.

Panel A: Increases in number of common shares held by controlling party after issuing Death spiral

	Include all changes in number of common shares		Exclude mechanical changes in number of common shares		
Fiscal year	Mean	Median	Mean	Median	N
From year -1 to +1	+48.69% [0.0015]***	+9.69% [<0.0001]***	+51.21% [0.0008]***	+11.30% [<0.0001]***	109
From year -1 to +3	+166.19% [0.0021]***	+53.30% [<0.0001]***	+182.36% [0.0013]***	+53.30% [<0.0001]***	48
From year -1 to expiration date	+219.4% [0.0057]***	+48.51% [0.0076]***	+248.19% [0.0025]***	+57.41% [<0.0001]***	38

Panel B: Increases in number of common shares held by sub-groups within the controlling party

	Type of Controlling party							
Fiscal year	Controlling Shareholder		Families		Affiliated firms		Executives	
	Mean	N	Mean	N	Mean	N	Mean	N
From year -1 to +1	+34.05% [0.0521]*	108	+56.05% [0.0549]*	106	+63.72% [0.0002]***	105	+22.21% [0.1817]	98
From year -1 to +3	+109.45% [0.0377]**	48	+441.54% [0.0607]*	47	+185.41% [0.0297]**	45	+33.31% [0.3490]	46
From year -1 to expiration date	+137.23% [0.0428]***	38	+1000.1% [0.1673]	37	+219.25% [0.0391]***	35	+40.4% [0.2744]	37

Table 8

Number of Firms where Any Controlling Party Member Holds Hybrid Securities after the Death Spiral Issuance

This table presents the number of firms where any member of the controlling party holds hybrid securities after the death spiral issuance. In doing so, we limit the sample to a subset of firms where there was no change in control. Hybrid securities include convertible bonds, bonds with warrants, and warrants separated from the original bonds with warrants. In panel A, we include firms that issued either the death spirals or the non-death spirals. In panel B, we limit to those firms that issued only the 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: Firms that issued the death spirals and the non-death spirals

Fiscal year	No. of Hold (%)	No. of Not hold (%)	Total
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: Firms that issued only the death spirals

Fiscal year	No. of Hold (%)	No. of Not hold (%)	Total
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 the Death Spiral Issue Announcement

This figure presents the averages of the cumulative abnormal returns of the death spiral issuers surrounding the original disclosure announcement 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 Securities Research Institute (KSRI). Market model residual returns are obtained using past 200 trading days from day -220 to -21 of the issue announcement. The thick line represents CARs based on market-adjusted model and the dashed line presents those based on market model. All returns represent CARs since day -10. The sample period is from January 1998 to December 2006.