

Insiders' Use of Hedging Instruments: An Empirical Examination

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Abstract

Over the last decade there has been an increased emphasis on tying executive's wealth to firm performance through the use of stock and stock option based compensation. Little known in the literature is the development of derivative instruments that investors, and in particular insiders and large blockholders, can use to hedge their equity positions in the firm. Because these instruments typically protect against downward movements in the firm's stock price one potential issue with these securities is that they can significantly weaken the sensitivity of wealth to firm performance of top executive officers including the CEO. Another concern is that they provide a mechanism that insiders can use to trade on inside information prior to adverse corporate events without the level of transparency typically associated with open market sales. We leverage a novel data set of over 2,000 hedging transactions spanning 1996 through 2006 to investigate the use of derivative securities by insiders and the motivation they have for hedging. The derivative contracts used typically are zero cost collars, prepaid variable forwards, equity swaps and exchange funds. We find a growing use in these instruments over this time period and that a diverse group of insiders (i.e., CEOs, CFOs, board chairman, corporate directors and beneficial owners) hedge a significant fraction of their ownership (30% on average for certain types of hedges). We also find a significant reversal in stock price subsequent to two types of hedging instruments – zero cost collars and prepaid variable forwards – but do not find a reversal in performance for insider investments into an exchange fund. The fact that some of these transactions precede poor performance suggests that the use of some of these instruments is information driven but also indicates there is heterogeneity in the reasons insiders hedge and in the type of instruments they choose. Our research suggests that studying the use of hedging transactions by insiders provides insight into incentive contracts and the effect insider trading has on significantly altering these incentive contracts.

1. Introduction

In 1994 Bankers Trust structured an equity swap agreement for the CEO of Autotote Lorne Weil. Under the swap agreement Mr. Weil would get a return of LIBOR minus 2% on 500,000 shares placed at the bank which were worth \$13.4 million and give the bank any appreciation in the stock price. Additionally and importantly, as part of the swap agreement he was protected from any decrease in the company's stock price. The publicly stated purpose of the contract was to diversify Mr. Weil's ownership position in the firm. Following the initiation of the swap Autotote's stock price declined 20%. This single transaction helped jumpstart a burgeoning industry in derivative securities insiders can use to hedge their equity positions in the firm. Currently in addition to swaps, other hedging instruments that are available include zero-cost collars, prepaid variable forward sales, and exchange funds.¹

There are a number of readily apparent reasons why a risk-averse executive would want to hedge their equity position in the firm. Corporate insiders often have a significant amount of equity holdings and human capital tied to the company. The ability to diversify via hedging reduces the risk of any firm-specific financial and human capital investments. Hedging at the personal level could also prevent costly hedging and investment distortions at the firm level (Amihud and Lev (1981) and Stulz, (1984)). In addition, in some cases, these instrument can be monetized which allows the insider to use the proceeds for diversification. An advantage of hedging versus an outright sale for purposes of diversification is that these instruments allow the insider to defer any taxes associated with the transaction yet retain voting rights and dividend payments.

¹ We discuss in more detail below the specific characteristics of these four different types of financial instruments.

But there are also aspects associated with these devices which may be troublesome to shareholders and even regulators. These securities reduce the sensitivity of an executive's wealth to firm performance which can reduce the incentives of executives to increase stock price. Celen and Ozerturk (2007) show theoretically that derivative contracts such as equity swaps can completely unwind existing equity incentives of managers. In addition, at least some of these instruments allow insiders to use their knowledge of firm specific information to initiate a hedge in advance of a decline in firm performance. Using a hedging contract to trade on inside information can be more advantageous than selling shares prior to a stock price decline because these securities are typically less transparent than an open market sale and potentially lower the risk of regulatory or shareholder actions.²

Understanding these instruments, how they are used, and by whom, is important not only to understanding the role incentives play in corporate governance but also in how insiders can use private information to trade in their own securities. In this context, the purpose of this paper is primarily twofold. Our first objective is to provide facts about the types of hedging instruments used, their evolution over time, their fundamental characteristics, the amount of ownership hedged, and the frequency in which they are used. Our second goal is to better understand what motivates insiders to hedge. In particular we are interested in whether insiders hedge primarily to take advantage of private information that has not yet been impounded into share prices, or whether they

² These transactions are less transparent than a regular sale of stock because they are reported in Table II of form 4 which makes them much harder for shareholders and the market to identify. In addition, these transactions are potentially less likely to raise regulatory and legal issues that surround insider trading and open market sales. Besides being reported on Table II many of these transactions are recorded in footnotes or as attachments to the regular forms. We discuss below how these contracts are reported and the reasons they are harder to track compared to an insider sale.

are used by insiders primarily for diversification/monetization while retaining voting rights and the ability to still benefit from material share-price appreciation.

Beginning in 1996 Primark/Disclosure (now part of Thomson Reuters) began collecting all of the hedging transactions that appear in Table II of forms 3, 4, and 5 (most of them revealed in footnotes). Using this data set along with hand collected data from our own keyword searches of these and other forms we gather information on hedging transactions reported by corporate insiders starting in January of 1996 through December of 2006. Our data set consist of over 2,000 hedging transactions initiated by over 1,000 insiders at over 900 firms. To date, as far as we are aware, this is the most complete data set gathered of insider hedging transactions.

With regard to our first objective, we document a recurrent use of three particular types of transactions - zero cost collars (zero-premium collar), pre-paid variable forwards (PVFs), and exchange trusts³. Zero cost collars and PVFs are similar instruments that allow executives to protect themselves from any downside movement in the firm's stock price while retaining the opportunity to benefit from significant share price appreciation. Exchange trusts on the other hand are portfolios of securities formed when insiders from different companies contribute their own shares into the portfolio. We find that there is time series variation in the demand for these different instruments. For example, while popular in the mid and late 1990s the use of zero cost collars has declined recently whereas PVFs and exchange funds have increased in popularity. While an equity swap was one of the first types of hedging transaction they are in general used much less frequently but have recently shown somewhat of resurgence. Part of this has to do with

³ Throughout the paper, we use the term "Exchange Fund" and "Exchange Trust" interchangeably.

the 1997 Tax Payer Relief Act, which rendered a swap agreement as a constructive sale removing the tax deferral advantage it had earlier.

The data reveal that a diverse group of corporate insiders engage in these transactions. These insiders include CEOs, CFOs, board chairpersons, corporate directors and other beneficial owners (i.e., 10% blockholders). We find that the amount of ownership that is hedged is significant but varies by the type of hedging instrument. The average level of ownership hedged with zero cost collars (31%), forwards (28%), and swaps (33%) is quite similar. The percentage hedged is economically significant and larger than the average open-market insider sale (Lakonishok and Lee (2001)). These results suggest that on average the magnitude of these hedging transactions affect the sensitivity of executive wealth from firm ownership to changes in stock price. In contrast we find significantly lower levels of ownership hedged via exchange trusts, where the average hedge is 9% of ownership. We speculate that the lower fraction of ownership hedged with exchange trusts is due to institutional features of these instruments. Exchange trusts are portfolios of securities contributed by an assortment of corporate insiders from different firms and the entities that form the trust often place limitations on the size of each individual contribution.

Related to our second goal, to better understand the motivation insiders have for hedging, we begin by examining the stock price patterns surrounding the initiation of a hedge and how this varies by hedging instrument. All of the hedging transactions exhibit economically and statistically significant positive raw and abnormal stock price returns prior to the hedge. For example, the average abnormal (relative to a size and industry control) stock-price performance prior to collars, forwards, and exchange trusts over the

250 trading days prior to the transaction is 40%, 17%, and 37%, respectively. There is, however, heterogeneity in the stock price performance following the initiation of a hedging transaction. Both collars and PVFs exhibit a significant reversal in stock price performance over the year (250 trading days) following the transaction with the largest reversal in stock price associated with collars. The average abnormal performance for collars for the 250 trading days *following* the hedge is a negative 22.42% and for forwards it is a negative 7.93%. Also consistent with poor performance following these transactions we find that over 52% of the collars are in-the-money (below the stock price floor on the put) one year after the initiation of the collar and 58% of the collars are in-the-money at contract termination. There is also some evidence that equity swaps are followed by poor performance. In sharp contrast, when insiders contribute their shares to an exchange fund on average they have *positive* abnormal stock price performance (11% on average) following the transaction.

We contend that the difference in return patterns across hedging instruments provides some insight into why insiders use these securities. The poor abnormal performance following both collars and forward agreements, suggests that forwards and collars are likely to be at least partially information driven. Further bolstering the probability that these instruments are used based on private information is our evidence that firms where the executives engaged in a zero cost collar or a PVF are more likely to face shareholder securities-based litigation following the transaction and are more likely to restate earnings following these transactions. In contrast, exchange trusts are less likely to present insiders with the ability to trade prior to poor performance since investment banks that establish these funds collect fees associated with the funds and any

income from current and future funds are likely dependent on the trusts' performance. In addition, the chance for opportunism by insiders is likely negated for exchange trusts because these trust arrangements may take months to form given that they typically consist of different insiders from a large number of diverse firms who must all agree to the terms of the arrangement.⁴

We next examine the characteristics of firms that have insiders who hedge compared to a size and industry matched sample of control firms with no hedging transactions.⁵ In multivariate logistical analysis we confirm the result that hedging firms experience better stock price performance prior to the transaction and worse stock price performance following the transaction relative to a control sample (the poor post performance is confined to the collar and forward transactions). We also find that hedging firms have less independent directors on the board suggesting that firms whose insiders have higher board representation are more likely to permit their use. We also find some evidence that hedging transactions are more frequent at firms with higher market-to-book ratios. We do not find that these hedging transactions are associated with other firm characteristics such as higher stock price volatility. We would expect more hedging at higher volatility firms where there is greater uncertainty about firm performance.

Finally, we examine the firm, governance, and insider position associated with the frequency in the use of a particular hedging security. There is little difference in firm,

⁴ In addition, executives who contribute to these funds may have personal reputations at stake when contributing securities of their own firms to an exchange trust but would not suffer any peer-related pressure in executing any other individual hedge transaction with the bank.

⁵ We use several different criteria to find a match set of control firms. Primarily we form control firms based on size and industry. Because the hedging transactions are so large we also form a control group of firms that are similar to our hedge firms in size and industry but also have open market sales by insiders similar in size to the hedging transactions. We discuss in more detail below how we form the different control samples.

insider, and governance characteristics associated with the use of a collar versus a forward. The most significant differences in both firm and insider characteristics occur between exchange trusts and collars/PVFs. Compared to collars/PVFs we find exchange trusts are more likely to be used by CEOs while lower level executive insiders tend to use zero cost collars and PVFs to hedge. The percentage of ownership hedged and the dollar value of the hedge is lower with exchange trusts relative to collars/PVFs. We do not find any differences in board characteristics or block ownership between firms where insiders hedge with an exchange fund versus a collar/PVF. Perhaps one of the reasons CEOs use exchange funds to hedge more frequently is because CEOs are more likely to be subject to monitoring by boards, shareholders, and financial markets. Since smaller amounts of ownership are typically contributed to an exchange fund by each participating insider, and because it is potentially more difficult for insiders to use investments in exchange funds to trade opportunistically, this could mean that boards are less reluctant to allow CEOs to hedge their ownership with that instrument.

To date there has been limited research in this area directly related to our work. The two notable empirical exceptions are Bettis, Bizjak, and Lemmon (2001) who look at 85 zero cost collar transactions, and Jagolinzer, Matsunaga, and Yeung (2007) who examine 203 prepaid variable forward sale transactions (PVFs). In the sections that follow we discuss in more detail how our work complements and extends their analysis and also differs from their work. Our extensive data set covering four different kinds of hedging transactions enables us to examine a number of issues not previously addressed. In addition, we provide the first empirical examination of exchange trusts and the role they play in hedging by insiders. The general goal of our analysis is to provide

information about derivative securities used by insiders to hedge that is not currently known to academics, shareholders and regulators.

The paper is organized as follows. Section 2 provides a description of the different types of hedging transactions that have arisen and proliferated over the last 11 years. Section 3 provides a description of the data. Section 4 provides a background for the different motivations for use of derivative contracts by insiders. Section 5 contains the examination of stock price performance and corporate events surrounding hedging transactions. Sections 6 and 7 provide evidence on the determinants of the use of hedging contracts. Section 8 concludes.

2. Hedging Instruments

Over the last couple of decades there has been an increased emphasis on tying executive wealth to firm performance both through the use of incentive based pay, which comes primarily through stock options, and increased stock ownership by executives and other insiders.⁶ Moreover a strong stock market, increased M&A activity, and stock-for-stock mergers during our sample period all contributed to an increase in equity ownership for both individual executives and institutions. Since insiders, in particular corporate executives, tend to have substantial concentration of wealth and human capital in their own firm, they have an incentive to reduce their exposure to firm specific risk. There are a number of ways individuals and institutions can hedge risk associated with concentrated ownership. Executives could, for example, use their personal wealth to trade securities

⁶ Murphy (1999) along with Hall and Liebman (1998) document an increase in the use of stock options as part of compensation packages over the last two decades. Holderness, Kroszner, and Sheehan (1999) document an increase in equity ownership by both executives and board members over the last 50 years.

that have a low correlation with the firm's stock. Executives could also use stock index futures, single stock futures and options to hedge their exposures to their firms. Hedging instruments however allow corporate executives to very specifically target their exposure to firm specific risk. Also, by using customized, off-the-exchange contracts an executive can avoid issues related to liquidity and trade anonymity that may accompany the use exchange traded single stock futures or options. In this section we discuss the key features of the four most common hedging instruments reported and used by corporate insiders.⁷

2.1 Equity Swaps.

One of the first types of derivative hedging instruments used by insiders were equity swaps which are also referred to as a total return equity swap. In equity swap agreements investors exchange the future returns on their stock for the cash flows of another financial instrument, such as the Autotote example used in the introduction where the CEO swapped the returns on the firm's stock over a 5 year period for LIBOR minus 2%. While this swap traded the return on the firm's stock for a debt instrument equity swaps can also involve the exchange of the firm's returns for the returns on any other financial instrument such as the S&P 500.

In the 1997 Tax Payer Relief Act the IRS ruled that an equity swap is equivalent to the sale of the underlying stock that is part of the swap agreement. Because swap transactions are deemed a "constructive sale" and trigger an immediate tax liability most corporate insiders have turned to other hedging securities discussed below that have more favorable tax treatments. Recently, however, swap transactions have seen a recurrence

⁷ In the next section we discuss in more detail how we identify hedging instruments and the specific data we use for this study.

with hedge funds and other large blockholders. An interesting aspect of swap agreements is they allow the separation of economic ownership from voting rights. By separating economic ownership from voting ownership investors can avoid public disclosure of their equity position in the firm and this appears to have been a strategy by a number of hedge funds involved in proxy fights or M&A activity. A recent court case reveals how this type of transaction works. Children's Investment Fund, 3G Capital and a number of other hedge funds used equity swaps which gave them an effective ownership stake greater than 5%, which typically triggers disclosure in the U.S., in CSX railroad prior to launching a proxy contest at the firm. Because the long position in the swap did not have voting rights the hedge funds claimed they did not have to reveal their equity position in the company prior to engaging in a proxy battle. It is noteworthy that investment banks usually hedge the M&A deal - in this case by buying shares in CSX - thus these hedge funds can easily obtain the shares from the investment banks when they are needed to vote in the proxy fight, but at the same time can delay disclosing their ownership to the market.

Another advantage of equity swaps is that they can also be used to keep voting rights but not an economic interest. This occurs by taking a short position in the swap and also holding shares. The ability to decouple ownership from voting power with a swap transaction has raised concerns by both companies and regulators. In addition, several hedge funds are being investigated for using swaps to hide ownership positions prior to takeovers and proxy fights. See Hu and Black (2007) for more detailed discussion of how insiders and hedge funds (or any institutional investor) can use swap transactions to decouple economic and voting ownership and the recent controversy that

surrounds their use. To the best of our understanding, the equity swaps included in our sample involve transactions where the company insiders hold shares in the company and take a short position using an equity swap contract effectively unwinding the economic ownership in the firm, and yet retaining voting power.

2.2 Zero-Cost Collars (Collars) and Prepaid Variable Forward Contracts (Forwards or PVFs).

While collars and PVFs are technically different instruments they share some of the same characteristics. Both collars and PVFs have; 1) a floor price which determines the level of downside protection in stock price the investor can hedge against, 2) a ceiling price which determines the level of upside growth in stock price the investor can participate in, 3) a set maturity that determines the contract length, and 4) a cash advance feature (a feature more common with forwards).

More specifically, a collar transaction involves the simultaneous purchase of a put option and sale of a call option covering the firm's shares. Most collar transactions are "zero cost" because the proceeds from the sale of the written call are used to purchase the put. The put option component of the collar transaction provides insurance for the holder against downward movement in the stock price below the strike price of the put. Any stock price appreciation above the strike price on the call option is forgone profit. One reason for the popularity of collars versus equity swaps for insiders following the change in the tax code in 1997 is that collars, written with sufficient spread, are not considered a constructive sale and subsequently do not trigger a taxable event. This means that

insiders can defer capital gains taxes on any appreciation for the life of the collar in addition to hedging against stock price risk.⁸

A PVF is a strategy that combines features of a forward sale of stock and an equity collar. In a PVF agreement the investor enters into a forward sale agreement, typically with an investment bank, and promises to deliver shares of the firm's stock at some future date in exchange for an up-front cash advance. The amount of stock that must be forfeited upon termination of the contract depends on the value of the stock at that future date. At maturity if the share price has fallen below a pre-specified price (the floor price of the contract) the investor is required to deliver all the shares covered by the contract. Typically the floor price on the forward is the current stock price. Consequently a typical PVF provides full downside protection against depreciation of the underlying stock price. The investor participates fully in any price appreciation in the underlying stock up to a preset level (the upper ceiling on the contract). If the stock price exceeds the upper ceiling the investor receives a predefined percentage of any price appreciation above the upper ceiling of the contract which means they give up some upside gain. If the share price appreciates the investor is required to deliver only that percentage of the shares necessary to repay the contract amount. It is also possible to structure the agreement so that the investor has the right to cash settle the contract and retain the underlying shares when the contract terminates. By cash settling the contract the investor avoids any capital gains tax that would occur upon disposition of the shares and also retains voting and cash flow rights associated with the shares.⁹

⁸ For additional information on the specific structure of collars see Bettis et al (2001).

⁹ For more detailed information about prepaid variable forwards see Jagolinzer et al (2007).

With both PVF's and collars the insider is protected against a decline in the underlying stock price while retaining a predefined amount of upside in the underlying stock. The insider is also able to defer taxes on the sale of the underlying security while receiving some of the benefits of a sale. One difference between a PVF and a zero-cost collar is how the contracts can be monetized. PVF contracts allow the investor to receive a much larger upfront cash payment in the range of 80% to 90% of the value of the underlying stock. Typically the shorter the contract and the more upside gain sacrificed the more upfront cash payment the insider receives. Monetization of zero-cost collars is more complex. To monetize insiders would receive a loan when the collar is initiated. The loan amount and interest rate charged depend on the stated purpose of the loan. If the proceeds of the loan are being used to purchase marketable securities, what is referred to as a "purpose loan", the insider can typically borrow up to 50% of the market value of the hedged position. If the insider wants to use the loan proceeds for reasons such as to purchase insurance or invest in private equity, then the bank may choose to lend up to 90% of the put strike price. This would be referred to as a "non-purpose" loan.

Both zero-cost collars and PVFs are private bilateral agreements between the corporate insider and a counter party, the latter usually an investment bank. Investment banks receive commissions and spreads in addition to potentially strengthening their relationship with the corporation via the senior executives. With a PVF the investment banks usually factor in the costs of the contract as an additional discount in the cash advance received by the investor. With a zero-cost collar the investment banks often receive commission fees and/or make money on the spread between the call and put contract.

2.3 Exchange Funds

Exchange funds, sometimes referred to as exchange trusts or swap funds, are perhaps the oldest type of hedging instrument used by insiders. Exchange funds have existed since the 1960s and while they have evolved in their sophistication and use their basic structure is fundamentally the same. In an exchange fund a group of insiders individually place their shares in a limited partnership or limited liability company. By pooling shares into a single entity the participants in the fund are able to create a diversified portfolio of securities. In addition, the contribution of shares into the fund does not trigger a tax event that would occur if the shares were sold.

In order for the contributions into the fund to not trigger an immediate capital gains tax liability for the participants, the partnership (fund) cannot invest more than 80% of its assets in marketable equities. Twenty percent of its assets must be invested in non-publicly traded securities which are often relatively illiquid real estate investments. Typically the assets must remain in the fund for up to seven years but the length can vary. There are often significant penalties for early withdrawal but redemptions policies also vary. Upon the dissolution some funds distribute the particular stock contributed back to the insider while others distribute a pro rata portion of the fund's total marketable securities. As long as investors stay in the fund the full seven years they do not pay any taxes until they sell their underlying stock. Finally, the executive contributing the shares can exercise control over the voting of the shares via the manager of the fund.

Most exchange funds are organized and administered by large investment banks and require a minimum investment of \$1 million with an additional requirement that the investor must have a net worth of \$5 million. The size of the funds can vary, but they

often have at least 50 investors, even though some can be as large as 500 investors. Fees for investing in exchange funds can be substantial including a front-end load and ongoing advisory and servicing fees. The investment purpose of the fund can vary widely. Some funds are structured to benchmark standard indexes such as the S&P 500 while others are more targeted. Because exchange funds are illiquid they are often used for estate planning. In fact, some of these funds are established specifically to attract insiders who want a gift to remain illiquid or inaccessible for a period of time.

3. Sample Collection and Summary Statistics

3.1 Identifying Hedges.

Arguably insiders have always been required by the SEC to report hedging transaction in Table II of Forms 4 and 5. Beginning in 1996 Primark/Disclosure (now part of Thomson Reuters) via its Lancer Analytics strategic partnership with Gradient Analytics began collecting all of the hedging transactions that appear in Table II of these forms. Our data is composed of transactions collected by Thomson-Reuters, supplemented by additional filings identified by Gradient Analytics Inc and by our investigation of identified filings. The quality of reporting for hedging transactions varies widely. Information about the specifics of the contracts varies from specific details to generic references and in almost all cases is provided in the footnotes to the filings. Not all filings contain all the details associated with the transaction, however. When the data are available we collect the type of instrument reported, the transaction date, the number of shares hedged in the transaction, and the length of the contract. For collars and PVFs

when reported we also gather information on the floor and ceiling price and for PVFs the cash payment received from monetization of the hedging contract.¹⁰

It is important to note that prior to June 2003 companies were not required to file the SEC forms electronically. Consequently, any hedging transactions prior to June 2003 that were not filed electronically would not be identified through keyword searches using the typical vendors who provide Table II data. For example, Jagolinzer et al (2007) used keyword searches of Forms 4 and 5 to identify PVF transactions between 1996 and 2004. Between 1996 and 2002 they identify a total of 74 PVF transactions. In contrast, we identify 444 PVF transactions over that same time period. The primary reason for the discrepancy is that prior to 2003 Jagolinzer et al have access only to transactions filed electronically, which were a small minority of all filings. In contrast, pursuant to their strategic partnership with Gradient Analytics via Lancer Analytics, Thomson manually examined all the Table II filings prior to 2003 in order to identify the various types of hedging transactions.

We recognize that while we have attempted to identify all hedging transactions our sample may underestimate the total amount of hedging by corporate insiders. There has historically been ambiguity as to whether it was necessary to report these transactions to the SEC. In addition, while the SEC and other service providers give guidance on how insiders should report hedging transactions there remains wide variation in both how these transactions are recorded on Forms 4 and 5 and the level of detail of information that is provided. Over time, however, there should be less ambiguity over whether these should be filed as the SEC has continually clarified its position regarding derivative

¹⁰ For collars the amount of cash received if the transaction is monetized is almost never reported in the filing.

securities and has unequivocally stated that insiders are required to report transactions in derivative instruments.

For the sample of firms with hedging transactions we also gather data on individual position and individual ownership from corporate proxy statements. We also gather information on board structure along with insider ownership and blockholding data from corporate proxy statements. Stock price and financial data come from CRSP and COMPUSTAT. We also use data on corporate governance from the IRRC and insider trading data from Thomson Reuters. We provide more detail on the data being used and its particular source below.

3.2 Sample Statistics.

Table 1 Panels A, B and C provide a description of the frequency of the different types of hedging transactions that we identify between 1996 and 2006. Between 1996 and 2006 there were 2,010 unique transactions by 1,181 unique individuals that hedged their ownership positions at 911 different firms. We also identify four unique types of instruments that are reported. It is useful to compare our data and these numbers to the samples in Bettis et al (2001) and Jagolinzer et al (2007). Bettis et al (2001) examine 85 zero-cost collars initiated at 65 different firms between January 1st 1996 and December 31st 1998. Jagolinzer et al (2007) examine 203 prepaid variable forward contracts at 100 different firms initiated between August 8th 1996 and June 30th 2004. Table 1 indicates that the data examined in this paper is the most comprehensive dataset of derivative securities examined empirically by any paper till date.

Table 1 also shows some variation over time in the use of the different types of instruments. In general the use of derivative securities has increased over time with the

majority of hedging transactions occurring on and right after 2000. A possible reason for the large number of transactions occurring around 2000 could be because insiders anticipated the stock market downturn that began in that year. We also see that collars were initially the most popular type of transaction with a steady growth in their use through 2000. Starting in 2000 PVFs replaced collars as the most popular hedging instrument. One of the potential reasons that PVFs have become more popular than collars is because they are easier to monetize and allow insiders to more easily raise cash with the transaction. The majority of investments in exchange funds appear to be clustered in 1999 and 2000 with a significant reduction in subsequent years. Part of the reason for the clustering could be because these hedging instruments are structured by the investment banks and are not likely to be offered every year. Finally, Panels B and C show the same patterns when looking at the use of derivatives at both the individual and firm level.¹¹

Table 2 provides summary statistics on the amount of ownership hedged by each type of instrument. In reporting the details in Table 2, we aggregate the transactions used by a certain insider in a given year. We do this because it is common for insiders to engage in multiple transactions in a calendar year. Since we are interested in examining the economic magnitude of transactions used, the aggregation during a year for an insider provides the most reasonable measure of economic magnitude. Panel A shows the percentage of ownership hedged and Panel B the dollar value hedged. Overall Table 2 provides evidence that on average insiders hedge a significant amount of ownership when

¹¹ Of course we do not know if these patterns are a result of changes in the use of these instruments or are more a function of attitudes regarding the reporting of these securities. We speculate, however, that even if reporting is incomplete there should be a strong correlation between reporting and the use of these securities.

they engage in a collar or forward transaction. For both collar and forward transactions insiders hedge about 30% of their ownership position in the firm. Swaps also have a similar percentage of ownership hedged. All three have a significantly larger percentage of ownership hedged than exchange trusts, where on average insiders hedge approximately 9% of their ownership. As discussed previously, the difference may be attributed to investment banks limiting the amount of equity an insider can place in an exchange fund.

Panel C of Table 2 provides evidence on the position of the individual who initiates the hedging transaction. Exchange funds are used by a higher proportion of CEOs/ Chairmen of the Board (41%), and collars/forwards and swaps to a lesser extent are used by CEOs and Chairmen of the Board. Another distinguishing feature is the use of equity swaps by outside 10% blockowners (58%) compared to the use of other derivative contracts.

Panels A and B of Table 3 contain statistics on the structure of collar and PVF agreements that illustrate some distinct differences. On average, collars provide insiders with more upside share price gain than forwards. The average (median) stock price appreciation the investor retains with a collar is 58% (41%), compared to 33% (29%) for forwards. In contrast, insiders sacrifice more downside share price loss before the collar hedge takes effect. Specifically for collars the stock price would have to fall an average (median) of 14% (10%) before receiving downside protection from the agreement. For forwards the downside hedge is very close to (or the same as) the stock price at the PVF contract date with a median downside floor of just 1% of the stock price on the transaction date. In general, collars tend to be contractually shorter in length with a

median contract term of 2.98 years compared to 3 years for forwards but the difference does not appear to be economically important. Table 3 Panel B provides data on the dollar amount monetized by the forward transactions. On average, insiders receive \$13 million in cash associated with the agreement while the median amount of cash associated with the transaction is \$3.4 million.

Overall the data indicate that insiders hedge a significant fraction of their ownership position, especially with collars and forwards. When using a collar and forward agreement they also maintain a significant amount of upside in potential future share price appreciation. Given the average contracts are approximately three years in length and the average appreciation they maintain is around 30% this means that the stock price would have to rise by about 10% a year over the life of the contract in order for the insiders to sacrifice any of the upside gain in the stock price of the firm. At the same time both collars and forwards provide the insiders with the potential to hedge a substantial amount of downward movement in the stock price.

4. Insiders Motivation to Hedge

In this section we discuss a variety of reasons that insiders would want to hedge. In the next section we begin with the empirical analysis to gain insight on the reasons for their hedging decision.

4.1 Why hedge?

4.1.1 Hedging for diversification purpose. Corporate insiders often have a significant amount of wealth and human capital invested in the firm and tend to be relatively

undiversified in their equity position. Muelbroek (2000) demonstrates that executives are willing to sell shares at a discount in order to reduce their exposure to firm specific risk. Hall and Murphy (2002), Carpenter (2000) and Muelbroek (2000) show that executives value options below their market value because they cannot hedge the risk associated with the options. Ofek and Yermack (2000) provide evidence that managers tend to sell previously held shares of stock following a new option grant which suggests executives manage the amount of wealth they have at risk in the firm. The derivative transactions discussed above provide for a mechanism for insiders to manage their exposure to firm specific risk and in addition to avoid or at least defer the tax liability that would be associated with an outright sale of stock. In addition, by reducing exposure to firm specific risk, these securities may encourage managers to take on risky but value enhancing investments. Since the use of derivatives lowers exposure to firm specific risk, these instruments might reduce the investment distortions within the firm and encourage greater risk taking. For example, Gao (2008) argues that manager's ability to hedge increases risk taking incentives that have a direct effect on corporate policy.¹²

Perhaps not too surprisingly a stated purpose by insiders of the reasons for engaging in these transactions is for diversification purposes. Following his retirement as Chairman of the Board at Hasbro, Allen Hassenfeld entered into a variable forward contract to hedge over one million shares of Hasbro stock with the stated intention of “financial planning purposes, including to diversify his investment portfolio, realize liquidity ... and provide funding against charitable pledges.”

¹² A number of other papers in recent years have studied the effects of managerial hedging on incentives which include the works of Jin (2002) and Garvey and Milbourn (2003).

Given the risk-averse nature of executives who on average have a disproportionate amount of wealth tied to the firm, if executives are hedging for purposes of reducing their exposure to firm specific risk we should expect to see an increased demand for hedging as the value of their equity position increases (e.g., following a significant run up in stock price). Risk averse insiders should also be more likely to engage in a hedging transaction when stock price volatility is high or when they anticipate an increase in stock price volatility. In general we anticipate that insiders are more likely to purchase derivative securities to hedge when they are exposed to more idiosyncratic risk. Consequently, we anticipate that hedging is more likely to be associated with greater stock-price volatility or when insiders expect a change in volatility. We also anticipate that these transactions will be more common in younger firms or firms that have recently gone public. Insiders in newer firms tend to have larger holdings of stock and managers in younger firms tend to be entrepreneurs with a significant amount of human capital investment in the firm and these shares are often subject to lockup provisions (Field and Hanka (2001)).

4.1.2 Informational hedging and changing incentives. While hedging contracts provide an opportunity to reduce exposure to stock price risk they also provide an opportunity for insiders to trade on their private value-relevant information. In addition to providing protection against share price decline hedging instruments may be advantageous over an outright sale of stock if the insider is trading on inside information. First, these transactions appear only on Table II of Form 4 while an open market sale appears on Table 1 of Form 4. Table II data is not as widely disseminated to shareholders through most commercial sources as the data on insiders trades derived from Table I. Second,

these transactions do not affect managerial ownership reported in the proxy statement. Third, unlike an open market sale these transactions typically allow the insiders to keep both the voting rights and dividends associated with the shares. Finally, case law surrounding the use of derivative securities is less developed than the case law associated with stock dispositions and sales by insiders which provides more opportunity for insiders to use these contracts to trade on inside information.¹³

If the use of derivative instruments is associated with inside information we would expect to observe declines in the stock price of the firm following these transactions. It is also reasonable to assume that these transactions would be larger than a typical open market sale. AIG serves as an illustration of the potentially opportunistic use of these securities. In November 2005 Maurice “Hank” Greenberg hedged 4.42 million shares of AIG concurrent with his stepping down as CEO in April 2005 following an accounting scandal. AIG shares at the time were trading for around \$67. He subsequently settled the forward contract in 2008 for \$8.4 million by returning the hedged shares to the investment bank at a price of \$1.97 (a 97% decline in stock value) netting him over \$230 million dollars from the transaction.¹⁴

Another aspect of these securities is they reduce the sensitivity of the value of equity holdings to changes in stock price. They also separate cash flow from voting rights which may further exacerbate the agency problem between insiders and stockholders (Lease, McConnell, and Mikkelsen (1983)).

¹³ To date we are unaware of any enforcement actions by either the SEC or other agency that is directly related to an insider using a derivative instrument to trade on inside information that was not tangential to other issues that were the target of the enforcement action.

¹⁴ Another interesting aspect of this transaction which suggests a lack of transparency with these instruments is that Greenberg’s PVF was done through C.V. Star & Co. which is an investment fund run by Greenberg.

If derivative use is associated with opportunistic behavior on the part of insiders to reduce their incentives, in particular the managers of the firm, it is more likely that these instruments will be used by insiders in firms with weaker corporate governance. More specifically, we would expect that the use of these securities to be more common when there are fewer independent directors on the board. If the cost of the reduction in the sensitivity of executive wealth to firm performance outweighs the potential benefit of reduction in investment distortion due to executive risk aversion for a firm, we could expect to observe a decline in firm performance following these contracts. In contrast if the use of hedging instruments by insiders does not affect incentives of the executive to take on risky NPV projects, then we would not expect that their use would be associated with the governance structure of the firm or that there would be any relation between the use of hedging instruments and future stock price performance.

5. Stock Price Performance and Corporate Events Surrounding Hedging by Insiders

There is evidence that open market sales of stock by insiders are associated with information about future performance. For example, Givoly and Palmon (1985), Seyhun (1986) and Lakonishok and Lee, (2001) find that open market sales precede negative stock returns. In this section we examine the stock price performance surrounding the four different types of hedging contracts. An analysis of the stock price performance surrounding these contracts allows us to draw inferences about the motives behind their use, and whether the disclosure of their use by insiders provides information about future firm performance.

5.1 Stock price changes surrounding hedging transactions

When analyzing the stock price performance surrounding a hedging transaction we use several benchmarks to evaluate abnormal returns. We compare returns for hedging firms with the equally-weighted and value-weighted CRSP indexes, and a size and industry matched sample. We also use firms similar in size and industry that have an open market sale of stock by insiders similar in size to the hedge transaction. We use open market sales as an additional match firm control since hedging transactions in our sample firms could be viewed in some ways as similar to a large open market sale. In addition, we present stock price returns without reference to a benchmark since ultimately the construction of these instruments is directly related to raw stock price performance. We report the return patterns surrounding these contracts separately for each type of hedging contract since the motivation to use each of these hedging instruments may vary. We consider multiple transactions at the same firm in the same month for the same insider as an individual observation.

Table 4 present the results of the performance analysis. As all four panels illustrate all four hedging transactions experience significant stock price runups prior to the hedge – with slightly weaker results for swaps. Using the size and industry controls as a benchmark for purposes of discussion we see average abnormal returns of 40% for collars, 17% for forwards, 37% for exchange trusts, and 25% for swaps. These are all both statistically and economically significant. These findings are consistent with the findings in Bettis et al (2001) for collars and Jagolinzer et al (2007) for forwards.

While the results on prior performance are similar across hedging type and consistent with other smaller sample evidence in previous studies, there is more variation in performance following the hedging transaction between the different securities which

differs to some degree from previous studies. Both collars and forwards experience poor performance up to a year following the transaction compared to both the size and industry control (-22% for collars and -8% of forwards) and the size, industry, open market sales control (-8% for collars and -9% for forwards). Collar firms also experience statistically significant negative returns compared to the equal and value-weighted index while forwards experience negative returns relative to the equally-weighted index but statistically insignificant returns relative to the value-weighted index. Collars on average have negative raw returns of almost 8% following the transaction while the raw returns for PVFs are positive but not statistically significant. There is some evidence that on average the small sample of equity swap firms also on average have poor performance following the transactions. The negative returns, however, are not statistically significant across all benchmarks. We attribute this difference mainly to the significantly larger sample of firms we examine in this paper.

The evidence from Table 4 suggests a significant shift in the average stock price performance following collars/PVFs, and to a lesser extent equity swaps. The findings, in general, provide evidence that at least to some degree collars and PVFs precede poor stock price performance. While we would expect hedging for diversification purposes to take place following a run-up in stock price the fact that, at least for collars and PVFs, we see poor performance following the transactions suggests that a number of these trades are potentially based on insider information. The post hedge results for collars stands in contrast to the findings of Bettis et al (2001) who did not find significant abnormal share price decline following those transactions. Jagolinzer et al (2007) also investigate post hedge performance for their sample of PVFs and find that with the exception of abnormal

returns relative to the CRSP equally-weighted index, stock returns following the use of PVFs are not statistically different from zero. Our results provide additional evidence that PVFs may precede poor stock-price performance.

In contrast to the post performance results for collars, PVFs and swaps, we find positive stock price performance following exchange trust transactions. Shares that are contributed by insiders into an exchange trust experience average positive abnormal performance of 11% relative to a size and industry matched control and 9% compared to a size, industry, and open market sales matched control. Results are also consistent for the equally-weighted and value-weighted index benchmarks. Given that exchange trust are preceded by a run-up in stock price but are not followed by poor performance suggests that these transactions may not be used opportunistically. The difference in performance for exchange funds compared to the other hedging instruments could be explained by structural differences discussed in Section 3. In sum, exchange funds are monitored by the institutions running the funds making opportunistic behavior more unlikely. In addition, the establishment of a fund is typically done in advance with a fixed future date providing less opportunity of insiders to time their contribution of shares to the fund.

5.2 The frequency that collar and PVFs are in the money

To provide further evidence on the extent hedging transaction precede abnormally poor firm performance we examine the frequency with which collars and forward transactions hit the contractual floor price associated with these securities. From details within a subset of the filings in our sample we were able to determine the put price floor

for 259 collar transactions and the floor price for 362 forward transactions.¹⁵ These are transactions where we aggregate data for each insider across all transactions during a particular month. If hedging transactions precede poor performance we would expect the share price of hedging firms to be below the contractual floor price more frequently than the control sample of firms. Table 5 provides the empirical evidence.

For comparison purposes we use a size and industry matched control and a size, industry and open market sales control identical to the benchmarks used in Table 4. In constructing the control sample we place a hypothetical floor for the control group that is similar to the floor of the actual contract of the hedge sample firm. Because the average contract length for both collars and forwards is three years we extend the analysis of the frequency with which these contracts end up with stock price below the floor out to three years. Since this requires us to analyze long-term performance we also form a third control group using the methodology of Barber and Lyon (1997), matching on size and book-to-market in the year prior to the hedging transaction.

The data in Panel A of Table 5 demonstrates that compared to a size and industry control sample and the Barber and Lyon (1997) matched sample, collar firms are more likely to end up below the contractual floor (that triggers the put) more frequently than the control firms. On average 58% of the collar firms end up “in-the-money” while only 39% of the size and industry control firms have stock price performance that would hypothetically put them below the put floor. Similarly only 31% of the Barber and Lyon (1997) matched firms would end up with a stock price below the contractual floor. The

¹⁵ Information on the specific contractual features such as the ceilings and floors for collars and forwards varies in the Form 3, 4, and 5 filings. Some filings give explicit details on these features while other filings provide little information beyond the fact that the insider engaged in one of these transactions.

evidence is weaker when using the size, industry, and open market sales control firms. Overall, however, these results are consistent with the performance results above and suggest that insiders on average initiate a collar prior to anticipation of poor performance.

Panel B of Table 5 presents similar analysis for PVFs. While the frequency that the PVF firms hit the floor price is higher relative to the controls, the differences are not typically statistically significant at traditional levels.

5.3 Hedging prior to corporate events

To further explore what might be causing poor share price performance subsequent to collars and PVFs, we examine the frequency with which a number of different value-relevant corporate events follow these hedging transactions. Specifically we investigate the incidence of shareholder litigation, earnings restatements, and equity issuances. Prior literature has shown that these corporate events are associated with economically large stock price declines around announcements. We also examine whether the hedge firms are involved in subsequent acquisitions. Since hedging enable the insiders to separate voting rights from cash flows they may use a derivative transaction to hedge against the uncertainty associated with the potential acquisition and also to reduce their exposure to a decrease in the stock price that may correspond to the deal. Moreover, when compared to an open market sale, the use of hedging transactions allows insiders to use retain their voting rights in proxy contexts when voting power is presumably quite important.

We gather data on litigation from the Securities Class Action Clearinghouse (SCAC) data maintained by Stanford University. The database contains information on

federal class action securities fraud lawsuits.¹⁶ We obtain data on equity issuances and M&A activity from Securities Data Corporation (SDC) and data on earnings restatements compiled by the General Accounting Office (GAO) of the U.S. government. For all the tests we form a size and industry control sample of firms that do not file a hedging transaction identical to the size and industry matched firms we used for the performance analysis. We extend and report our analysis to two years subsequent to the transaction but since results are qualitatively similar in all post periods, for discussion purposes we focus primarily on the frequency of these events in the year following the hedge.

Table 6 presents the results on the frequency of shareholder litigation, earnings restatements, corporate acquisitions and equity issuances surrounding zero-cost collars. We find no differences in the frequency of shareholder litigation prior to the collar (Panel A) between the control and matched firms, but an increase the year after the collar. The findings are similar for earnings restatements (Panel B) with collar firms more likely to restate earnings in the year following the transaction. We also find that collar firms are more likely to be involved in an acquisition (Panel C) in the year prior to the collar and that acquisition activity continues after the hedge. In general the results suggest that insiders engage in a collar prior to corporate events that are typically associated with abnormally poor future firm performance. Table 6 also presents the frequency of equity issuances for collar firms (Panel D). We do not find evidence of an increased frequency of security offerings following the transaction, but we do find that collar firms are four times more likely to raise equity the year prior to the collar compared to the matched sample. Given that equity issuances are typically followed by weak stock price

¹⁶ More detailed information on this database can be found at <http://securities.stanford.edu/>.

performance (Loughran and Ritter (1995)) the results also support the notion that insiders at collar firms hedge in anticipation of poor future firm performance.

Table 7 presents evidence that similar to collars, PVF firms are more likely to experience a shareholder lawsuit (Panel A) and are more likely to be involved in an acquisition (Panel C) following the forward transaction. We also find evidence that these firms are more likely to restate earnings (Panel B) following the transaction (looking two years after the forward contract). Similar to collars we do not find an increase in the frequency of equity issuances (Panel D) following the PVF, but a substantially increased frequency that the firm issues equity in the year prior to the transaction. In general the results are consistent with results for collar firms and suggest that insiders use these hedging securities surrounding corporate events because of increased uncertainty about future firm performance. The results are also consistent with insiders opportunistically hedging when they anticipate poor performance.

Table 8 extends the analysis to exchange trusts. Again similar to both collars and PVFs we find an increase in the frequency of shareholder lawsuits (Panel A), but with much less frequency than with collars or forwards. We find that firms where insiders hedge with an exchange trust are more likely to be involved in acquisitions following the agreement (Panel C). Also similar to the results above we find that these firms are more likely to raise equity (Panel D) the year prior to the transaction but no greater frequency of equity issuances following the hedge. In contrast to both collars and forwards we find little evidence that exchange trusts are associated with earnings restatements (Panel B) at the firm. For the most part the results suggest that exchange trust transaction also coincide with increased uncertainty about future firm performance. In contrast with

collars and PVFs, given there is no evidence of poor firm performance following these transactions, overall these results are consistent with exchange funds being used more as a risk reduction tool.

Finally Table 9 presents the evidence of the frequency of the above corporate events surrounding equity swaps. We note that the power of these tests is substantially lower given the limited number of observations. We find little evidence that equity swaps are associated with an increase in shareholder litigation equity issuances or acquisitions. There is some weak evidence that equity swap firms are more likely to restate earnings at least two years subsequent to the transaction but not in the year following the transaction. For the most part, in contrast to other hedging transactions, there is little evidence that these on average negative corporate events are associated with the decision by an insider to use an equity swap.

6. The Characteristics of Firms that Hedge

In this section we examine the firm and governance characteristics associated with hedging firms. In order to focus on differences in financial characteristics we use a size-industry control matched sample (identical to the one we use for the performance analysis) where we match sample firms with firms in the CRSP/Compustat universe. In order to examine differences in governance characteristics we also form a size and industry control sample but restrict our control sample to firms in the IRRC database.

6.1 Financial characteristics of hedging firms

Table 10 presents multivariate logistic analyses of firm characteristics between the firms with hedging transactions relative to a size-industry matched control sample taken from the universe of CRSP/Compustat firms. The dependent variable is one if the firm had a hedging transaction and zero otherwise. The independent variables are constructed to measure financial characteristics of the firm. We estimate the model for all hedging transactions but also provide separate models for collars, PVFs, and exchange trusts. We do not examine equity swaps because of the small sample size.

Independent variables include firm size, firm performance, the market-to-book ratio, R&D expenditures, stock price volatility, and an IPO dummy variable. We measure firm size as the book value of total assets, performance is measured as the abnormal stock price performance of the firm relative to the value-weighted market index, and stock price volatility is measured as the annualized standard deviation of daily stock returns. We measure both stock price performance and volatility over the 250 trading days both prior and subsequent to the hedging transaction.¹⁷ Also included in each specification is a dummy that equals one if the firm went public in the last two years. We correct the standard errors for heteroskedasticity and clustering at the firm level.

The multivariate analysis allows us to explore the relative importance of a number of different financial and governance characteristics. Based on our univariate analysis we anticipate positive abnormal stock price performance prior to hedging transactions. As discussed previously a significant run-up in stock price increases the amount of financial capital that insiders have tied up with the firm and may further motivate the need to

¹⁷ We get similar results when using a shorter window of 120 trading days.

hedge in order to reduce the exposure of overall wealth to the firm. We also expect to see a higher propensity to hedge when there is more uncertainty about firm value. It follows that we would expect a greater frequency of hedging transactions the higher the market-to-book ratio, since this would indicate more of the firm's value is made up by intangible assets and a greater level of R&D. Higher levels of R&D may also reflect more uncertainty about future firm value and increase the desire to hedge. We expect to see more hedging the greater the firm risk. We include stock return volatility both prior and subsequent to the hedge to capture firm risk. We also include a dummy variable equal to one if the firm went public in the prior two years. Insiders at newly public firms are often subject to lockup provisions which restrict their ability to sell shares following the IPO and may increase their desire to hedge. Based on the results from previous tests we also include the stock price performance of the firm following the hedging transaction – we measure performance relative to the value-weighted index. If hedging is based on private and material value-relevant information we expect to observe negative abnormal performance following the hedge.

For the full sample, hedging transactions are preceded by a run-up in the firm's stock price. Also firms with hedging transactions have higher market-to-book ratios which is consistent with hedging being used by insiders at firms that have relatively more intangible assets. We do not, however, find that hedging is associated with higher levels of R&D. We do not find that in general hedging is associated with higher levels of stock return volatility either before or after the transaction. We also do not find that newly public firms are more likely to have insiders that hedge. Finally, consistent with our analysis above, hedging transactions are more likely to precede poor firm performance.

We find that on average hedging transactions following substantial increases in stock price the year prior to the hedge, regardless of the type of hedging transaction. When breaking down the analysis by transaction type we also find that collars and exchange funds have higher market-book-ratios before the hedge but no difference in market-to-book for the forward transactions relative to the control sample. Our evidence with collars parallels the findings in Bettis et al. (2001) with regards to market-to-book ratio. We find some evidence that collars are associated with higher stock return volatility prior to the transaction but no other hedging transactions have higher volatility around the hedge. There is some evidence that volatility actual falls following an investment into an exchange trust. Also none of the individual transactions are likely to follow an IPO. Finally, we find that the biggest performance decrease following a hedge is associated with collars. PVFs are also followed by negative performance but the coefficient is not statistically significant. Overall the results suggest that hedging transactions follow positive stock price performance and precede, at least for collars and forwards, poor stock price performance.

6.2 Firm and governance characteristics of hedging firms

Table 11 extends the analysis in Table 10 to include governance characteristics. For this set of tests we use a size-industry control group but require the match firms to be in the IRRC database. For purposes of a comparative or control sample we use the IRRC database of firms for the period from 1996 through 2006 since it provides detailed information on firm and governance characteristics at a set of firms that do not have insiders who report hedging transactions. In addition, the firms in the IRRC database

consist of firms of similar size across a broad range of industries over the same time period as firms in our hedging sample.

We include the same independent variables as Table 10 along with the fraction of independent directors on the board, the size of the board of directors, and a dummy equal to one for firms where the CEO is also the Chairman of the board (and zero otherwise). We correct the standard errors for heteroskedasticity and clustering at the firm level.

The results are substantively consistent with our multivariate results discussed earlier. As Table 11 indicates firms are more likely to engage in a hedging transaction following a run-up in stock price and are more likely to precede poor performance for collars and forwards. Compared to other IRRC firms, hedging transactions are more likely to be undertaken following an IPO. Unlike the evidence earlier we do not find that hedging firms have higher market-to-book ratios compared to the match sample. Finally, in terms of governance characteristics, hedging firms are more likely to have fewer independent directors on the board relative to the matched sample. The evidence on board structure could reflect more willingness by less independent boards to allow executives and other insiders to hedge their ownership and dilute the strength of the sensitivity of wealth to firm performance. These results are also consistent with Bettis et al (2001).

7. Further Analysis of Hedging Firms and Differences in the Use of Hedging Instruments

In this section we discuss why insider may chose a particular instrument and provide an empirical examination of the choice of hedging instrument.

7.1 Motivation for choosing a particular hedging security

We examine factors that affect the choice of the type of hedging instrument in an effort to gain additional insight into why insiders chose to hedge, and what hedging means for the firm and for shareholders. We first discuss why we expect differences in individual, firm and performance characteristics when insiders chose an exchange trust compared to a collar or PVF. We next discuss some empirical predictions on why insiders would choose a collar over a PVF.¹⁸

As discussed earlier, the biggest difference in hedging instruments is between exchange trusts and collars/PVFs. First, because an exchange trust involves contributions by other investors we would expect to see a smaller fraction of ownership hedged when insiders use an exchange fund versus a collar or PVF – consistent with what we found earlier. In order to keep the portfolio diversified we would expect the banks to limit the contribution that each participant can contribute to the fund. Also, because the time horizon of these funds is long we also expect a smaller fraction of ownership hedged. Second, because exchange funds are organized by investment banks which have a fiduciary role to the investors in the fund we would expect the investment banks to be selective about whom they allow into the fund. Consequently, we would expect to observe more high ranking officers and in particular CEOs to contribute to the fund. Third, we would expect that hedging via an exchange trust would not be done prior to poor stock price performance. We would not expect that insiders would be willing to bind themselves to the returns of an exchange trust if they felt there was significant negative selection bias in the securities that go into the trust. We also expect that insiders

¹⁸ We focus the discussion on collars, forwards, and exchange trusts because the use of equity swaps is much less frequent.

to be less likely to contribute shares when they anticipate poor future performance because of the potential reputational effects of such an action. For the reasons outlined above we expect investment in collars and PVFs to be larger in size, to cover a greater fraction of the ownership, to more likely to be based on insider information, and to involve lower level executives and blockholders.

While exchange trust and collars/PVFs have probably the biggest difference in overall structure there are some fundamental differences in collars and PVF contracts that should affect the choice of a collar versus a PVF as a hedge. As discussed above the biggest difference between collars and PVFs is the ability to monetize. PVFs offer more flexibility in the use of the proceeds for hedging and a greater opportunity to use the proceeds for diversification. Because of the monetization feature we expect that PVFs will be used more for diversification purposes. We proxy for the diversification need by defining the ownership of the insider in the firm and expect insiders at collar firms to have lower ownership compared to insiders who use PVFs.

7.2 Multinomial logistic analysis

Table 12 presents an analysis of the choice of hedging transactions. We use a multinomial logistic model to examine how firm, governance, and individual characteristics vary by the choice of hedging transaction. The base case is prepaid variable forwards and so the coefficient estimates presented in the table represent the difference in firm, governance, and individual characteristics between collars and exchange funds and forwards. We do not investigate equity swap transactions because of the limited sample size. Many of the independent variables such as firm size, market-to-book, R&D, performance, volatility, an IPO indicator, a dummy if the CEO is Chairman

of the board, the fraction of independent directors on the board and board size are identical to the variables included in the empirical specifications in Tables 10 and 11. We also include the fraction of equity owned by the insider who hedges, the fraction of ownership hedged, a dummy variable if the insider is either CEO or Board Chair, a dummy if the insider is an executive in the firm (besides the CEO), a dummy variable if the insider is a beneficial owner but not directly affiliated with the firm, stock ownership of insiders (defined as the ownership of directors and officers as a group), and stock ownership of blockholders. Also included in all the specifications are both industry (Fama-French classification of 30 industries) and year dummy variables. We correct the standard errors for heteroskedasticity and clustering at the firm level.

Table 12 indicates some differences in firm, governance and individual characteristics depending on the type of hedging transaction used. For tractability we first investigate the choice of exchange trusts versus forwards and then discuss the choice of collars versus forwards. Results indicate that insiders at firms with a higher market-to-book ratio are likely to use exchange funds instead of forwards. One possible interpretation is that investment banks target growth firms (i.e. higher market-to-book ratio) in the decision to include in the exchange fund in order to attract more interest from the investment community. There is strong evidence that the performance following the transaction is better for an exchange trust versus a forward. This is consistent with our expectations as discussed earlier. We find that the dollar amount and percentage of ownership hedged is lower for exchange trusts. Again this is consistent with the investment banks limiting the amount of shares that can be contributed to an exchange trust and is also consistent with the diversification. We find that blockholders are less

likely to use an exchange trust. We do not find any differences in board structure or ownership by insiders or directors other than the finding that firms whose insiders use exchange funds have larger board size in comparison to firms whose insiders use forwards.

When looking at the difference in firm characteristics between collars and forwards we do not find any differences in firm performance either before or after a collar or forward transaction. We find that stock ownership by insiders tends to be higher when a forward contract is used but the amount of ownership hedged is similar for collars and forwards. The stock ownership result is consistent with the notion that diversification is an important motivation for insiders to use forwards. We do not find that specific executives, such as the CEO, use forwards more or less frequently than collars. We also do not find any differences in ownership or board structure between firms with executives that use collars versus forwards. For the most part the result in Table 12 indicate that the firm and governance characteristics are similar between firms where insiders use collars to hedge and firms where insiders use forwards to hedge. These results are not surprising since collars and forwards are very similar in the type of hedging protection they provide.

8. Conclusion

Tying executives wealth to firm performance has been a major goal of shareholders over the last 10 years or so with the economic rationale to motivate managers to exert effort to increase the stock price performance of the firm. Shareholders have been largely successful in achieving this goal through the use of stock and stock option

based compensation along with minimum ownership requirements often imposed on management. Because of high levels of ownership and human capital that many executives now have in the firm these individuals have incentive to diversify or hedge their equity position in the firm. The development of various hedging securities has given executives and other insiders the flexibility to alter their ownership position in the firm and to reduce the sensitivity of their ownership to firm performance. While insiders have the motivation and means to hedge there is limited empirical research in this area.

In this paper we use a novel data set to provide an empirical examination on the hedging instruments used by corporate insiders that are reported in SEC filings. We find that the use of these instruments has become more popular over time and that there are predominately four types of securities that insiders use to hedge – zero premium collars, pre-paid variable forwards (PVFs), exchange trusts, and equity swaps. Our data indicate that a diverse group of insiders use these securities including CEOs, board members, non CEO executives and blockholders. We also find that the average effective ownership hedge is substantial, over 30% for some securities, which indicates these contracts can significantly change the sensitivity of insiders' wealth to firm performance.

Our analysis also indicates that there is heterogeneity in the use of these securities and in the motivation for why insiders hedge with these instruments. Focusing on stock price patterns surrounding the initiation of a hedge we find a considerable run up in the stock price preceding all four types of transactions but differences in stock price patterns following the hedge. For exchange funds we find that the stock price continues to improve after the hedge. This finding, along with the fact that insiders tend to hedge a significantly lower level of ownership with exchange funds, 9% on average, appears to

indicate that these securities are primarily used for diversification purposes. In contrast, we find a reversal in firm performance following insiders' transactions in collars and PVFs. The poor stock price performance that follows these transactions, zero cost collars in particular, coupled with the fact that the fraction of ownership hedged with these securities is substantial, suggests that insiders may time the use of these instruments opportunistically to take advantage of their knowledge of future firm performance. Consistent with the timing motivation we find that firms where insiders use collars and PVFs are more likely to be the targets of shareholder litigation and are more likely to restate accounting earnings subsequent to these transactions. We also find evidence that collar/PVF firms are more involved in acquisitions through mergers. While all these different instruments are likely to be used for diversification purposes our findings are consistent with the notion that some of the transactions allow insiders to trade opportunistically.

Further developments of financial instruments that insiders can use to hedge their firm specific wealth are likely to evolve in sophistication and use. Understanding the use of these securities is important to not only to research on corporate governance and managerial incentives but also to the research on insider trading.

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Table 1: Distribution of hedging contracts by year

The sample consists of 2,010 unique hedging transactions, spread across 1,181 individual filers and 911 unique firms during the period from 1996 to 2006. We sub-divide the sample into four different types of hedging contracts; zero cost collars, variable forwards, exchange funds and equity swaps.

Panel A: Year-wise distribution of unique transactions

	Zero Cost Collars	Exchange Funds	Variable Forwards	Swaps	Aggregate
1996	21	0	0	1	22
1997	46	2	0	0	48
1998	55	67	1	1	124
1999	70	121	3	7	201
2000	131	138	48	5	322
2001	78	36	165	2	281
2002	34	20	227	3	284
2003	13	10	193	25	241
2004	0	19	165	3	187
2005	0	18	117	56	191
2006	2	10	64	33	109
Aggregate	450	441	983	136	

Panel B: Year-wise distribution of unique individuals

	Zero Cost Collars	Exchange Funds	Variable Forwards	Swaps	Aggregate
1996	14	0	0	1	15
1997	35	2	0	0	37
1998	37	64	1	1	103
1999	41	112	3	5	161
2000	57	132	25	3	217
2001	49	35	91	1	176
2002	16	20	94	1	131
2003	8	10	96	4	118
2004	0	17	81	3	101
2005	0	15	50	9	74
2006	1	9	33	5	48
Aggregate	258	416	474	33	

Panel C: Year-wise distribution of unique firms

	Zero Cost Collars	Exchange Funds	Variable Forwards	Swaps	Aggregate
1996	13	0	0	1	14
1997	29	2	0	0	31
1998	26	52	1	1	80
1999	26	81	3	5	115
2000	38	99	23	3	163
2001	39	31	76	1	147
2002	13	17	75	1	106
2003	6	5	71	4	86
2004	0	16	52	3	71
2005	0	14	35	8	57
2006	1	8	27	5	41
Aggregate	191	325	363	32	

Table 2: Ownership characteristics of hedged instruments

This table provides the percentage of ownership hedged with each instrument (panel A), the value (in millions of dollars) that is hedged with each hedging observation (panel B), and the distribution of hedged instruments across our classification of “insiders” (panel C) as defined by Section 16 of the Securities Exchange Act of 1934. We begin with 2,010 unique individual hedging transactions from 1996 through 2006. In order to get hedging sample observations, we aggregate hedging transactions for each individual insider in each calendar year. We sub-divide the sample into four different types of hedging contracts; zero cost collars, variable forwards, exchange funds and equity swaps. We classify insiders into two executive categories and two others. Executives are classified as either the CEO/Chairman or “other officer”. The other two classifications are non-officer directors, and beneficial owners (10% or more ownership interest).

Panel A: Percentage of ownership hedged with each instrument for 1,044 hedging observations with data for both holdings and the size of the hedging contract.

	<i>N</i>	Mean	Median
Zero Cost Collars	210	31.30	21.95
Variable Forwards	441	28.37	18.07
Exchange Funds	362	8.99	4.40
Swaps	31	32.58	14.89

Panel B: Value (in \$ million) hedged with each instrument for 1,079 unique hedging observations where data was available to calculate the value in millions of dollars for the hedging instruments. Value is defined as the market value of the shares on the day(s) of the hedge transaction(s).

	<i>N</i>	Mean	Median
Zero Cost Collars	237	36.20	5.25
Variable Forwards	452	44.91	7.65
Exchange Funds	363	5.20	2.20
Swaps	27	16.02	4.02

Panel C: Classification of insiders (percentage) for unique hedging observation with available information about the insider’s position.

	<i>N</i>	CEO/ Chairman	Other officer	Outside 10% owner	Non-officer director	Other
Zero Cost Collars	243	27.98	40.33	10.29	17.70	3.70
Variable Forwards	469	28.14	29.64	17.91	23.24	1.07
Exchange Funds	410	41.22	29.02	6.34	18.54	4.88
Swaps	33	18.18	6.06	57.58	18.18	0.00

Table 3: Contract life, cash value, and spreads for collar and forward sale contracts

We begin with 450 individual zero cost collar transactions and 983 prepaid forward sale contracts for the period 1996 – 2006. Both types of contracts have specific term lengths, and contract ceiling and floors. The details necessary to determine the length/term of the contracts, the ceiling-to-floor and ceiling-to-price ratios are provided in Form 4 filings for a subset of these transactions. A feature of prepaid variable forward contract is that cash is available at the time in which the contract is signed. We use Form 4 footnote disclosures for prepaid variable forward transactions to determine the cash received by the insider (as defined in Section 16 of the Securities Exchange Act of 1934).

Panel A: Characteristics of zero cost collar contracts

	Days-to- expiration	Ceiling-to- floor ratio	Ceiling-to- price ratio	Price-to- floor ratio
Mean	1067	1.82	1.58	1.16
Median	1087	1.62	1.41	1.11
<i>N</i>	381	386	386	386

Panel B: Characteristics of variable forward contracts

	Days-to- expiration	Ceiling-to- floor ratio	Ceiling-to- price ratio	Price-to- floor ratio	Cash received (\$ '000)	Cash discount
Mean	1025	1.43	1.33	1.07	13,292	21.79 %
Median	1095	1.34	1.29	1.01	3,433	17.27%
<i>N</i>	807	612	612	612	558	558

Table 4: Stock returns around initiation of hedging contracts for zero-cost collars

The Table provides stock returns for firms whose insiders engage in hedging transactions during the period 1996 to 2006. We begin with 2,010 unique individual hedging transactions from 1996 through 2006 and aggregate hedging transactions for each individual insider in each calendar month of a year and end up with a total of 1,353 hedging transactions. Cumulative abnormal returns (CARs) are calculated relative to the CRSP Value-Weighted Index, CRSP Equal-Weighted Index and control firms. There are two sets of control firms appearing in the Table. The first control group is size (measured by book value of assets) and industry (2-digit SIC code) matched firms drawn from the intersection of CRSP and Compustat. The second control group is size (measured by book value of assets), industry (2-digit SIC code), and open market sales (measured by the numbers of shares sold by an insider in the open market deflated by the total shares outstanding for the firm) matched firms drawn from the intersection of CRSP, Compustat and Thomson Reuters insider trading database. *p*-values are reported in parentheses.

Panel A: Zero Cost Collars

Mean Cumulative Abnormal Return (%)

	Raw	EW	VW	Matched Firm: Size & Industry	Matched Firm: Size, Industry, & Insider Sales
[-250,0]	54.43 (0.000)	30.75 (0.000)	44.88 (0.000)	40.22 (0.000)	2.54 (0.669)
[-120,0]	22.69 (0.000)	12.76 (0.000)	19.82 (0.000)	18.47 (0.000)	-3.56 (0.399)
[0,+120]	1.16 (0.667)	-8.45 (0.001)	0.21 (0.933)	-3.75 (0.276)	1.92 (0.601)
[0,+250]	-7.72 (0.065)	-24.78 (0.000)	-8.01 (0.045)	-22.42 (0.000)	-8.45 (0.076)

Panel B: Variable Forwards

Mean Cumulative Abnormal Return (%)

	Raw	EW	VW	Matched Firm	Matched Firm: Size, Industry, & Insider Sales
[-250,0]	39.50 (0.000)	17.51 (0.000)	38.67 (0.000)	17.34 (0.00)	-0.74 (0.834)
[-120,0]	19.73 (0.000)	7.53 (0.000)	17.93 (0.000)	8.75 (0.000)	-2.96 (0.224)
[0,+120]	1.75 (0.288)	-9.19 (0.000)	0.10 (0.945)	-6.54 (0.001)	-3.61 (0.080)
[0,+250]	5.20 (0.027)	-16.18 (0.000)	0.81 (0.708)	-7.93 (0.010)	-8.63 (0.003)

Panel C: Exchange Funds

Mean Cumulative Abnormal Return (%)

	Raw	EW	VW	Matched Firm: Size & Industry	Matched Firm: Size, Industry, & Insider Sales
[-250,0]	58.24 (0.000)	32.25 (0.000)	44.74 (0.000)	37.23 (0.000)	15.76 (0.002)
[-120,0]	24.34 (0.000)	14.50 (0.000)	22.40 (0.000)	16.98 (0.000)	-4.86 (0.157)
[0,+120]	16.54 (0.000)	1.90 (0.545)	9.66 (0.003)	6.98 (0.050)	7.73 (0.065)
[0,+250]	27.12 (0.000)	3.84 (0.337)	19.03 (0.000)	10.70 (0.026)	8.93 (0.110)

Table 4 (continued): Stock returns around initiation of hedging contracts for zero-cost collars

The Table provides stock returns for firms whose insiders engage in hedging transactions during the period 1996 to 2006. We begin with 2,010 unique individual hedging transactions from 1996 through 2006 and aggregate hedging transactions for each individual insider in each calendar month of a year and end up with a total of 1,353 hedging transactions. Cumulative abnormal returns (CARs) are calculated relative to the CRSP Value-Weighted Index, CRSP Equal-Weighted Index and control firms. There are two sets of control firms appearing in the Table. The first control group is size (measured by book value of assets) and industry (2-digit SIC code) matched firms drawn from the intersection of CRSP and Compustat. The second control group is size (measured by book value of assets), industry (2-digit SIC code), and open market sales (measured by the numbers of shares sold by an insider in the open market deflated by the total shares outstanding for the firm) matched firms drawn from the intersection of CRSP, Compustat and Thomson Reuters insider trading database. *p*-values are reported in parentheses.

Panel C: Swaps

	Mean Cumulative Abnormal Return (%)				
	Raw	EW	VW	Matched Firm: Size & Industry	Matched Firm: Size, Industry, & Insider Sales
[-250,0]	45.93 (0.000)	21.46 (0.127)	29.83 (0.040)	25.36 (0.076)	0.52 (0.978)
[-120,0]	10.95 (0.143)	0.88 (0.894)	5.67 (0.430)	-7.09 (0.381)	9.10 (0.457)
[0,+120]	2.54 (0.643)	-11.43 (0.053)	-6.21 (0.286)	-6.12 (0.398)	0.49 (0.967)
[0,+250]	3.74 (0.671)	-13.95 (0.115)	-7.90 (0.388)	-29.46 (0.075)	11.13 (0.551)

Table 5: Frequency that collar and forward contracts end up below stock-price floor

The Table provides the frequency with which zero cost collars and prepaid forward contracts end up below the stock-price floor specified in the contract. Sample firms are as described in Table 4. There are three sets of control firms appearing in the Table. The first control group is size (measured by book value of assets) and industry (2-digit SIC code) matched firms drawn from the intersection of CRSP and Compustat. The second control group is size (measured by book value of assets), industry (2-digit SIC code), and open market sales (measured by the numbers of shares sold by an insider in the open market deflated by the total shares outstanding for the firm) matched firms drawn from the intersection of CRSP, Compustat and Thomson Reuters insider trading database. The third control group is formed following the approach in Barber and Lyon (1997). Specifically, for each sample firm, we find a control firm with a market value of equity that lies within 70% to 130% of the sample firm's market value of equity. Within this subset of possible matches, we select a control firm that has the closest book-to-market value of equity. We measure market value of equity at the end of June of the year t , i.e. the year of adoption of performance-vesting provision. We measure book-to-market value of equity at the end of year $t-1$. p -values are reported in parentheses.

Panel A: Zero Cost Collars

	Year 1	Year 2	Year 3	At Contract Expiration
Zero Cost Collar	52.21	59.51	55.56	57.51
Size & Industry Match	42.25	48.17	43.82	38.60
<i>p-value</i>	<i>0.036</i>	<i>0.023</i>	<i>0.024</i>	<i>0.000</i>
Size Industry Insider Sales	47.85	56.18	51.79	49.68
<i>p-value</i>	<i>0.378</i>	<i>0.509</i>	<i>0.475</i>	<i>0.144</i>
Barber & Lyon Match	40.00	38.46	25.97	30.64
<i>p-value</i>	<i>0.011</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>

Panel B: Variable Forwards

	Year 1	Year 2	Year 3	At Contract Expiration
Variable Forwards	39.24	37.33	30.89	34.43
Size & Industry Match	33.66	31.12	25.96	27.73
<i>p-value</i>	<i>0.149</i>	<i>0.113</i>	<i>0.225</i>	<i>0.120</i>
Size Industry Insider Sales	33.21	29.88	29.95	32.38
<i>p-value</i>	<i>0.131</i>	<i>0.065</i>	<i>0.825</i>	<i>0.645</i>
Barber & Lyon Match	32.67	35.03	29.41	32.33
<i>p-value</i>	<i>0.088</i>	<i>0.559</i>	<i>0.715</i>	<i>0.627</i>

Table 6: Hedging around corporate events – Zero Cost Collars

The Table provides the frequency of various corporate events for firms whose insiders engage in a zero-cost collar during the period 1996 to 2006. Sample firms are as described in Table 4. Two sets of control firms appear in the Tables. The methodology for construction of control firms is described in Table 4. The Securities Class Action Lawsuits filing data is obtained from Securities Class Action Clearinghouse website (SCAC) (<http://securities.stanford.edu/>). Earnings restatements data is obtained from the website of General Accounting Office (GAO) office of the U.S. Government. The M&A and SEO data is obtained from SDC database. For each firm, we define a pre- and post- event window. For example, Year -1 is defined as a window consisting of 365 calendar days prior to the event. Years subsequent to the event are cumulative calendar days subsequent to the event date. Chi-square *p*-values for difference in proportions appear in italics.

Panel A: Shareholder Litigation

	Year -1	Year 1	Year 2	<i>Chi-Sq: Diff (Yr-1vs Yr 1)</i>
Collar Firms (N=281)	4.27	17.41	29.54	<i>0.0000</i>
Control: Size & Industry Match	5.34	3.91	9.25	<i>0.4218</i>
<i>Chi-Sq:Diff (Collars vs Control)</i>	<i>0.5540</i>	<i>0.0000</i>	<i>0.0000</i>	
Collar Firms (N=240)	1.67	16.67	27.92	<i>0.0000</i>
Control: Size Industry &Insider Sales	3.75	6.67	10.00	<i>0.1504</i>
<i>Chi-Sq: Diff (Collars vs Control)</i>	<i>0.1597</i>	<i>0.0006</i>	<i>0.0000</i>	

Panel B: Earnings Restatements

	Year -1	Year 1	Year 2	<i>Chi-Sq: Diff (Yr-1vs Yr 1)</i>
Collar Firms (N=281)	1.07	5.69	10.68	<i>0.0024</i>
Control: Size & Industry Match	2.14	2.49	6.41	<i>0.7790</i>
<i>Chi-Sq:Diff (Collars vs Control)</i>	<i>0.3134</i>	<i>0.0553</i>	<i>0.0701</i>	
Collar Firms (N=240)	1.25	5.42	10.42	<i>0.0110</i>
Control: Size Industry &Insider Sales	2.08	3.33	6.67	<i>0.3989</i>
<i>Chi-Sq: Diff (Collars vs Control)</i>	<i>0.4758</i>	<i>0.2645</i>	<i>0.1416</i>	

Panel C: M&A Acquisitions

	Year -1	Year 1	Year 2	<i>Chi-Sq: Diff (Yr-1vs Yr 1)</i>
Collar Firms (N=281)	54.45	47.69	62.99	<i>0.1089</i>
Control: Size & Industry Match	35.94	26.69	40.57	<i>0.0180</i>
<i>Chi-Sq:Diff (Collars vs Control)</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	
Collar Firms (N=240)	54.17	46.25	61.25	<i>0.0828</i>
Control: Size Industry &Insider Sales	46.25	42.08	59.17	<i>0.3580</i>
<i>Chi-Sq: Diff (Collars vs Control)</i>	<i>0.0828</i>	<i>0.3580</i>	<i>0.6410</i>	

Panel D: Equity Issues

	Year -1	Year 1	Year 2	<i>Chi-Sq: Diff (Yr-1vs Yr 1)</i>
Collar Firms (N=281)	24.56	8.90	11.03	<i>0.0000</i>
Control: Size & Industry Match	6.05	8.19	11.74	<i>0.3249</i>
<i>Chi-Sq:Diff (Collars vs Control)</i>	<i>0.0000</i>	<i>0.7628</i>	<i>0.7906</i>	
Collar Firms (N=240)	25.42	9.17	11.67	<i>0.0000</i>
Control: Size Industry &Insider Sales	18.33	11.67	15.00	<i>0.0408</i>
<i>Chi-Sq: Diff (Collars vs Control)</i>	<i>0.0605</i>	<i>0.3700</i>	<i>0.2827</i>	

Table 7: Hedging around corporate events – Prepaid Variable Forwards

The Table provides the frequency of various corporate events for firms whose insiders engage in prepaid variable forward contracts during the period 1996 to 2006. Sample firms are as described in Table 4. Two sets of control firms appear in the Tables. The methodology for construction of control firms is described in Table 4. The Securities Class Action Lawsuits filing data is obtained from Securities Class Action Clearinghouse website (SCAC) (<http://securities.stanford.edu/>). Earnings restatements data is obtained from the website of General Accounting Office (GAO) office of the U.S. Government. The M&A and SEO data is obtained from SDC database. For each firm, we define a pre- and post- event window. For example, Year -1 is defined as a window consisting of 365 calendar days prior to the event. Years subsequent to the event are cumulative calendar days subsequent to the event date. Chi-square *p*-values for difference in proportions appear in italics.

Panel A: Shareholder Litigation

	Year -1	Year 1	Year 2	<i>Chi-Sq: Diff (Yr-1vs Yr 1)</i>
Variable Forward Firms (N=557)	6.28	10.95	19.93	<i>0.0055</i>
Control: Size & Industry Match	3.23	5.57	11.49	<i>0.0575</i>
<i>Chi-Sq:Diff (PVF vs Control)</i>	<i>0.0167</i>	<i>0.0011</i>	<i>0.0001</i>	
Variable Forward Firms (N=467)	6.85	10.49	20.34	<i>0.0481</i>
Control: Size Industry & Insider Sales	3.64	6.64	10.92	<i>0.0380</i>
<i>Chi-Sq: Diff (PVF vs Control)</i>	<i>0.0277</i>	<i>0.0353</i>	<i>0.0001</i>	

Panel B: Earnings Restatements

	Year -1	Year 1	Year 2	<i>Chi-Sq: Diff (Yr-1vs Yr 1)</i>
Variable Forward Firms (N=557)	2.69	4.49	12.03	<i>0.1073</i>
Control: Size & Industry Match	8.08	5.39	8.80	<i>0.0729</i>
<i>Chi-Sq:Diff (PVF vs Control)</i>	<i>0.0001</i>	<i>0.4893</i>	<i>0.0774</i>	
Variable Forward Firms (N=467)	2.57	4.93	12.42	<i>0.0581</i>
Control: Size Industry & Insider Sales	3.21	3.85	8.14	<i>0.5949</i>
<i>Chi-Sq: Diff (PVF vs Control)</i>	<i>0.5580</i>	<i>0.4245</i>	<i>0.0312</i>	

Panel C: M&A Acquisitions

	Year -1	Year 1	Year 2	<i>Chi-Sq: Diff (Yr-1vs Yr 1)</i>
Variable Forward Firms (N=557)	44.34	43.27	54.40	<i>0.7171</i>
Control: Size & Industry Match	30.52	20.11	33.03	<i>0.0001</i>
<i>Chi-Sq:Diff (PVF vs Control)</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	
Variable Forward Firms (N=467)	45.40	41.11	53.96	<i>0.1865</i>
Control: Size Industry & Insider Sales	35.55	35.97	48.18	<i>0.8914</i>
<i>Chi-Sq: Diff (PVF vs Control)</i>	<i>0.0022</i>	<i>0.1066</i>	<i>0.0772</i>	

Panel D: Equity Issues

	Year -1	Year 1	Year 2	<i>Chi-Sq: Diff (Yr-1vs Yr 1)</i>
Variable Forward Firms (N=557)	14.72	9.69	11.67	<i>0.0104</i>
Control: Size & Industry Match	8.80	7.36	10.77	<i>0.3791</i>
<i>Chi-Sq:Diff (PVF vs Control)</i>	<i>0.0021</i>	<i>0.1631</i>	<i>0.6350</i>	
Variable Forward Firms (N=467)	13.06	8.57	9.85	<i>0.0261</i>
Control: Size Industry & Insider Sales	17.34	7.07	11.13	<i>0.0000</i>
<i>Chi-Sq: Diff (PVF vs Control)</i>	<i>0.0684</i>	<i>0.3935</i>	<i>0.5218</i>	

Table 8: Hedging around corporate events – Exchange Funds

The Table provides the frequency of various corporate events for firms whose insiders engage in an exchange fund during the period 1996 to 2006. Sample firms are as described in Table 4. Two sets of control firms appear in the Tables. The methodology for construction of control firms is described in Table 4. The Securities Class Action Lawsuits filing data is obtained from Securities Class Action Clearinghouse website (SCAC) (<http://securities.stanford.edu/>). Earnings restatements data is obtained from the website of General Accounting Office (GAO) office of the U.S. Government. The M&A and SEO data is obtained from SDC database. For each firm, we define a pre- and post- event window. For example, Year -1 is defined as a window consisting of 365 calendar days prior to the event. Years subsequent to the event are cumulative calendar days subsequent to the event date. Chi-square *p*-values for difference in proportions appear in italics.

Panel A: Shareholder Litigation

	Year -1	Year 1	<i>Chi-Sq: Diff (Yr-1vs Yr 1)</i>	Year 2	Year 3
Exchange Fund Firms (N=374)	3.48	7.75	<i>0.0110</i>	20.05	25.40
Control: Size & Industry Match	2.94	4.01	<i>0.4246</i>	10.16	13.10
<i>Chi-Sq:Diff (Collar vs Control)</i>	<i>0.6782</i>	<i>0.0296</i>		<i>0.0002</i>	<i>0.0000</i>
Exchange Fund Firms (N=317)	4.10	8.83	<i>0.0154</i>	21.77	27.76
Control: Size Industry & Insider Sales	3.79	6.31	<i>0.1467</i>	11.36	14.20
<i>Chi-Sq: Diff (Collar vs Control)</i>	<i>0.8383</i>	<i>0.2297</i>		<i>0.0004</i>	<i>0.0000</i>

Panel B: Earnings Restatements

	Year -1	Year 1	<i>Chi-Sq: Diff (Yr-1vs Yr 1)</i>	Year 2	Year 3
Exchange Fund Firms (N=374)	3.48	2.41	<i>0.3867</i>	6.95	12.03
Control: Size & Industry Match	1.87	2.67	<i>0.4617</i>	7.75	10.16
<i>Chi-Sq:Diff (Collar vs Control)</i>	<i>0.1738</i>	<i>0.8162</i>		<i>0.6743</i>	<i>0.4151</i>
Exchange Fund Firms (N=317)	4.10	2.52	<i>0.2672</i>	6.94	12.93
Control: Size Industry & Insider Sales	3.47	3.15	<i>0.8244</i>	5.68	8.83
<i>Chi-Sq: Diff (Collar vs Control)</i>	<i>0.6773</i>	<i>0.6325</i>		<i>0.5135</i>	<i>0.0974</i>

Panel C: M&A Acquisitions

	Year -1	Year 1	<i>Chi-Sq: Diff (Yr-1vs Yr 1)</i>	Year 2	Year 3
Exchange Fund Firms (N=374)	46.79	50.53	<i>0.3058</i>	58.82	63.64
Control: Size & Industry Match	31.02	25.40	<i>0.0880</i>	31.82	37.70
<i>Chi-Sq:Diff (Collar vs Control)</i>	<i>0.0000</i>	<i>0.0000</i>		<i>0.0000</i>	<i>0.0000</i>
Exchange Fund Firms (N=317)	46.69	52.68	<i>0.1312</i>	60.25	64.98
Control: Size Industry & Insider Sales	42.27	38.80	<i>0.3736</i>	48.26	53.31
<i>Chi-Sq: Diff (Collar vs Control)</i>	<i>0.2632</i>	<i>0.0005</i>		<i>0.0025</i>	<i>0.0028</i>

Panel D: Equity Issuances

	Year -1	Year 1	<i>Chi-Sq: Diff (Yr-1vs Yr 1)</i>	Year 2	Year 3
Exchange Fund Firms (N=374)	28.07	12.30	<i>0.0000</i>	18.18	20.32
Control: Size & Industry Match	8.82	4.55	<i>0.0192</i>	8.29	10.43
<i>Chi-Sq:Diff (Collar vs Control)</i>	<i>0.0000</i>	<i>0.0001</i>		<i>0.0001</i>	<i>0.0002</i>
Exchange Fund Firms (N=317)	29.02	11.67	<i>0.0000</i>	17.35	19.24
Control: Size Industry & Insider Sales	16.72	8.52	<i>0.0019</i>	12.30	14.20
<i>Chi-Sq: Diff (Collar vs Control)</i>	<i>0.0002</i>	<i>0.1874</i>		<i>0.0738</i>	<i>0.0806</i>

Table 9: Hedging around corporate events – Equity Swaps

The Table provides the frequency of various corporate events for firms whose insiders engage in equity swaps during the period 1996 to 2006. Sample firms are as described in Table 4. Two sets of control firms appear in the Tables. The methodology for construction of control firms is described in Table 4. The Securities Class Action Lawsuits filing data is obtained from Securities Class Action Clearinghouse website (SCAC) (<http://securities.stanford.edu/>). Earnings restatements data is obtained from the website of General Accounting Office (GAO) office of the U.S. Government. The M&A and SEO data is obtained from SDC database. For each firm, we define a pre- and post- event window. For example, Year -1 is defined as a window consisting of 365 calendar days prior to the event. Years subsequent to the event are cumulative calendar days subsequent to the event date. Chi-square *p*-values for difference in proportions appear in italics.

Panel A: Shareholder Litigation

	Year -1	Year 1	Year 2	<i>Chi-Sq: Diff (Yr-1vs Yr 1)</i>
Equity Swap Firms (N=34)	8.82	2.94	5.88	<i>0.0110</i>
Control: Size & Industry Match	0.00	5.88	8.82	<i>0.4246</i>
<i>Chi-Sq:Diff (Collar vs Control)</i>	<i>0.0765</i>	<i>0.5548</i>	<i>0.6422</i>	
Equity Swap Firms (N=29)	10.34	3.45	6.90	<i>0.3000</i>
Control: Size Industry & Insider Sales	3.45	0.00	3.45	<i>0.3131</i>
<i>Chi-Sq: Diff (Collar vs Control)</i>	<i>0.3000</i>	<i>0.3131</i>	<i>0.5533</i>	

Panel B: Earnings Restatements

	Year -1	Year 1	Year 2	<i>Chi-Sq: Diff (Yr-1vs Yr 1)</i>
Equity Swap Firms (N=34)	5.88	2.94	8.82	<i>0.5548</i>
Control: Size & Industry Match	5.88	0.00	0.00	<i>0.1512</i>
<i>Chi-Sq:Diff (Collar vs Control)</i>	<i>1.0000</i>	<i>0.3137</i>	<i>0.0765</i>	
Equity Swap Firms (N=29)	6.90	3.45	6.90	<i>0.5533</i>
Control: Size Industry & Insider Sales	10.34	0.00	0.00	<i>0.0753</i>
<i>Chi-Sq: Diff (Collar vs Control)</i>	<i>0.6399</i>	<i>0.3131</i>	<i>0.1501</i>	

Panel C: M&A Acquisitions

	Year -1	Year 1	Year 2	<i>Chi-Sq: Diff (Yr-1vs Yr 1)</i>
Exchange Fund Firms (N=34)	17.65	17.65	29.41	<i>1.0000</i>
Control: Size & Industry Match	29.41	35.29	38.24	<i>0.6042</i>
<i>Chi-Sq:Diff (Collar vs Control)</i>	<i>0.2528</i>	<i>0.0991</i>	<i>0.4419</i>	
Exchange Fund Firms (N=29)	17.24	20.69	34.48	<i>0.7377</i>
Control: Size Industry & Insider Sales	31.03	20.69	34.48	<i>0.3683</i>
<i>Chi-Sq: Diff (Collar vs Control)</i>	<i>0.2197</i>	<i>1.0000</i>	<i>1.0000</i>	

Panel D: Equity Issuances

	Year -1	Year 1	Year 2	<i>Chi-Sq: Diff (Yr-1vs Yr 1)</i>
Equity Swap Firms (N=34)	17.65	5.88	8.82	<i>0.1322</i>
Control: Size & Industry Match	8.82	2.94	11.76	<i>0.3026</i>
<i>Chi-Sq:Diff (Collar vs Control)</i>	<i>0.2830</i>	<i>0.5548</i>	<i>0.6898</i>	
Equity Swap Firms (N=29)	20.69	6.90	10.34	<i>0.1277</i>
Control: Size Industry & Insider Sales	17.24	6.90	6.90	<i>0.2266</i>
<i>Chi-Sq: Diff (Collar vs Control)</i>	<i>0.7377</i>	<i>1.0000</i>	<i>0.6399</i>	

Table 10: Logistic regression of the likelihood of insiders engaged in hedging transaction relative to size-industry matched control firms drawn from the intersection of CRSP and Compustat

The table provides maximum likelihood estimates from a logistic regression of the determinants of the likelihood of insiders engaged in a hedging transaction during the period 1996 to 2006. The dependent variable is one if the insider purchased a derivative instrument and zero otherwise. Derivative instruments include exchange trusts, zero-cost collars, and prepaid variable forwards. Control group is size (measured by book value of assets) and industry (2-digit SIC code) matched firms drawn from the intersection of CRSP and Compustat. Market-to-book ratio is the sum of market value of equity and book value of total liabilities divided by the book value of assets. Abnormal return is defined as the cumulative raw returns for a firm net of the cumulative returns for the CRSP Value-Weighted index. We measure both stock price performance and volatility over the 250 trading days both prior and subsequent to the hedging transaction. Stock return volatility is the (annualized) standard deviation of daily stock returns. Standard errors are corrected for heteroskedasticity and clustering at the firm level. Absolute values of Z-statistics are reported in parentheses. ***, **, and * denote significance at less than 1%, 5%, and 10% levels, two-tailed tests, respectively.

	All hedging transactions	Zero cost collars	Variable forwards	Exchange funds
Intercept	-0.218 (1.05)	-0.910** (2.15)	-0.076 (0.27)	-0.050 (0.17)
Book Value of Assets	0.000 (0.59)	0.000 (0.63)	0.000 (0.42)	0.000 (0.24)
Market to Book Ratio	0.106* (1.65)	0.265** (2.14)	0.018 (0.34)	0.204** (2.31)
R&D/Assets	-1.524 (1.18)	-11.653*** (4.09)	0.285 (0.16)	-0.350 (0.19)
Abnormal returns relative to the value-weighted market index over the 250 trading days <i>prior</i> to the transaction	0.761*** (6.28)	1.080*** (3.98)	0.604*** (3.25)	0.740*** (3.36)
Abnormal returns relative to the value-weighted market index over the 250 trading days <i>subsequent</i> to the transaction	-0.220* (1.82)	-0.528** (2.20)	-0.292 (1.35)	0.081 (0.39)
Stock return volatility 250 trading days <i>prior</i> to the transaction	0.102 (0.26)	1.593* (1.85)	0.138 (0.24)	-0.565 (0.99)
Stock return volatility 250 trading days <i>subsequent</i> to the transaction	-0.493 (1.52)	-0.963 (1.26)	-0.321 (0.67)	-0.923** (1.97)
Dummy equal to one for firms that went public in the prior two years	0.128 (0.58)	-0.061 (0.12)	-0.021 (0.07)	0.429 (1.10)
Pseudo R-square	0.063	0.173	0.028	0.120
Number of observations	2,270	530	1,059	681

Table 11: Logistic regression of the likelihood of insiders engaged in hedging transaction relative to size-industry matched control firms drawn from the intersection of CRSP, Compustat and IRRC

The table provides maximum likelihood estimates from a logistic regression of the determinants of the likelihood of insiders engaged in a hedging transaction during the period 1996 to 2006. The dependent variable is one if the insider purchased a derivative instrument and zero otherwise. Derivative instruments include exchange trusts, zero-cost collars, and prepaid variable forwards. Control group is size (measured by book value of assets) and industry (2-digit SIC code) matched firms drawn from the intersection of CRSP, Compustat and IRRC. Independent variables are as described in Table 10. Standard errors are corrected for heteroskedasticity and clustering at the firm level. Absolute values of Z-statistics are reported in parentheses. ***, **, and * denote significance at less than 1%, 5%, and 10% levels, two-tailed tests, respectively.

	All hedging transactions	Zero cost collars	Variable forwards	Exchange funds
Intercept	1.467*** (2.68)	-0.938 (0.96)	3.477*** (4.23)	0.736 (1.02)
Book Value of Assets	0.000 (1.08)	0.000 (0.81)	0.000 (0.93)	0.000 (0.75)
Market to Book Ratio	0.003 (0.07)	0.099 (1.06)	-0.030 (0.53)	0.025 (0.39)
R&D/Assets	-1.513 (1.08)	-9.647*** (3.44)	-1.676 (0.82)	1.136 (0.60)
Abnormal returns relative to the value-weighted market index over the 250 trading days <i>prior</i> to the transaction	0.751*** (5.42)	1.234*** (3.98)	0.768*** (3.57)	0.388* (1.71)
Abnormal returns relative to the value-weighted market index over the 250 trading days <i>subsequent</i> to the transaction	-0.316** (2.28)	-0.695** (2.56)	-0.473** (2.02)	0.104 (0.53)
Stock return volatility 250 trading days <i>prior</i> to the transaction	0.106 (0.27)	1.568* (1.78)	-0.243 (0.46)	-0.728 (1.01)
Stock return volatility 250 trading days <i>subsequent</i> to the transaction	-0.146 (0.47)	0.205 (0.37)	-0.331 (0.86)	0.137 (0.27)
Dummy equal to one for firms that went public in the prior two years	1.284*** (3.74)	1.708** (2.03)	1.209** (2.39)	1.305** (2.40)
<i>Governance characteristics:</i>				
Fraction of outside directors on the board	-3.118*** (5.08)	-2.094** (2.40)	-4.353*** (4.57)	-2.778*** (3.75)
Number of directors on the board	0.020 (0.42)	0.083 (1.21)	-0.068 (0.88)	0.074* (1.88)
Dummy equal to one for firms where CEO is also Chairman of the board	-0.109 (0.52)	-0.083 (0.26)	-0.161 (0.49)	0.044 (0.15)
Pseudo R-square	0.117	0.209	0.152	0.097
Number of observations	2,117	474	1,084	559

Table 12: Multinomial Logistic regression of the likelihood of engaging in a hedging transaction

The table provides maximum likelihood estimates from a multinomial logistic regression of the determinants of the hedging transactions during the period 1996 to 2006. The base category is prepaid variable forwards. Derivative instruments include exchange trusts, zero-cost collars, and prepaid variable forwards. Independent variables are as described in Table 10. Standard errors are corrected for heteroskedasticity and clustering at the firm level. Absolute values of Z-statistics are reported in parentheses. ***, **, and * denote significance at less than 1%, 5%, and 10% levels, two-tailed tests, respectively. Standard errors are corrected for heteroskedasticity and clustering at the firm level. Absolute values of Z-statistics are reported in parentheses. ***, **, and * denote significance at less than 1%, 5%, and 10% levels, two-tailed tests, respectively.

	Zero cost collars	Exchange Funds
Intercept	-2.677*** (2.66)	-1.347 (1.52)
Book Value of Assets	-0.000 (1.61)	0.000 (1.51)
Market to Book Ratio	0.071 (1.36)	0.111* (1.64)
R&D/Assets	-6.015*** (2.73)	1.779 (0.84)
Abnormal returns relative to the value-weighted market index over the 250 trading days <i>prior</i> to the transaction	0.091 (0.44)	-0.198 (0.82)
Abnormal returns relative to the value-weighted market index over the 250 trading days <i>subsequent</i> to the transaction	0.250 (0.86)	0.660** (2.14)
Stock return volatility 250 trading days <i>prior</i> to the transaction	0.484 (0.50)	-1.596 (1.57)
Stock return volatility 250 trading days <i>subsequent</i> to the transaction	1.227 (1.21)	1.321 (1.07)
Dummy equal to one for firms that went public in the prior two years	-0.594 (1.18)	-0.052 (0.12)
Dummy equal to one if insider is CEO or Chairman of the board	0.247 (0.67)	0.513 (1.63)
Dummy equal to one if insider is any other officer	0.408 (1.06)	-0.160 (0.45)
Dummy equal to one if insider is beneficial owner	-0.308 (0.62)	-1.253** (2.32)
Ownership by insider engaging in transaction	-3.853* (1.90)	-0.147 (0.09)
Log of transaction value	-0.065 (0.63)	-0.600*** (4.81)
Ownership hedged	-0.216 (0.54)	-5.157*** (3.27)
<i>Governance characteristics:</i>		
Fraction of outside directors on the board	-0.240 (0.34)	0.507 (0.65)
Number of directors on the board	0.137** (2.05)	0.156*** (2.87)
Dummy equal to one for firms where CEO is also Chairman of the board	-0.193 (0.67)	-0.388 (1.36)
Ownership of directors and officers	-0.681 (0.77)	1.915* (1.91)
Ownership of five-percent beneficial owners	0.873 (1.18)	-0.072 (0.11)
Pseudo R-square	0.204	