Merger Deal Structures and Investment Strategies

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During the last several decades, mergers and acquisitions have continued to be one of the major research topics in finance. Many financial economists have explored the target and bidding firms' return patterns during merger and acquisition attempt periods. Some researchers have explored the signals of information asymmetry associated with the payment methods or firm size regarding under or over valuation of securities. They generally have found that these signals help explain the abnormal return patterns (Myers and Majluf [1984]; Hansen [1987]; Travlos [1987]; Martin [1996]; and Moeller, Schlingermann and Stulz [2004]). One payment method, the collar offer, is especially designed to protect target shareholder wealth in a circumstance of information asymmetry. Its increasing use raises some interesting questions, specifically, how does the use of a collar offer (wealth protection) impact the abnormal return patterns and probability of merger completion during the merger attempt period? Various studies (Houston and Ryngaert [1997]; Fuller [2003]; Mitchell, Pulvino and Stafford [2003]; and Officer [2004]); find that the use of a collar offer has a positive impact on both the target's abnormal returns and the probability of merger completion.

A collar merger offer is a special type of stock swap offer. Unlike a straight stock swap offer where the exchange ratio is defined precisely in the merger announcement, a collar offer's final exchange ratio will not be established until the consummation date. The final value for the ratio is calculated by a predetermined formula which is a function of up and down boundaries and the acquiring firm's stock price levels (e.g., average stock price) during the pricing period. The pricing period for the offer is generally defined as a period of 10 to 30 days before the regulatory approval, target stockholders' meeting or consummation date. If the acquiring firm's average stock price during the pricing period is within the specified up and down boundaries, the final exchange ratio would be either a pre-determined exchange ratio or calculated to provide a fixed dollar amount for a share of target stock. Otherwise, the final exchange ratio would be based on (typically equal to) the price or the exchange ratio at the boundaries. In some cases, a price for the acquirer's shares that falls outside the boundaries would allow the merger attempt to be terminated by one side or the other.

Collar offers are believed to provide the target shareholders with better wealth protection over varying acquiring firm stock prices than do standard stock offers. Several financial economists have explored the structural differences between typical stock swap and collar merger offers in an attempt both to understand why collar offers are used and to explain the abnormal return patterns of target and acquiring firms' shares. Houston and

Ryngaert [1997] test information asymmetry and an adverse selection hypothesis in an attempt to explain the abnormal returns of acquiring firms in regulated bank mergers. They find that those deal structures which provide better protection for target shareholders' wealth tend to produce higher abnormal returns for the acquiring firms' shares around the merger announcement date. Fuller [2003] argues that rather than reducing information asymmetry, a collar offer is used to protect ownership. She finds that targets in fixed payment collar mergers tend to achieve higher abnormal returns than do targets involving cash and other types of stock mergers. Officer [2004] argues that a collar offer structure is used to reduce the renegotiating costs that may otherwise be incurred when the acquiring firm's stock price fluctuates dramatically during the merger attempt period.

These findings imply that the choice made between various deal structures can signal useful information regarding the acquiring and/or target firms' wealth, the level of wealth protection for target shareholders and the chance of merger completion. This choice may influence the stock price movements and possibly the performance of various investment strategies designed to extract arbitrage profits during takeover attempt periods, especially for the merger/risk arbitrage trading strategy.

Merger/risk arbitrage refers to a trading strategy designed to exploit the offer premium embedded in the target firm's stock price during the merger attempt period (the period between the takeover offer announcement and completion of the deal). Merger/risk arbitrageurs typically take a long position in target firms' shares and/or a short position in acquiring firms' shares after merger announcement dates to earn the offer premium over the market price of the target stock. If the takeover attempt is successfully consummated, arbitrageurs and other investors would earn the offer premium plus any dividend paid by the target, as well as any interest payments on their short balance if they short the acquirer's shares. Conversely, if the takeover attempt fails, the arbitrageurs tend to lose money as a result of the market's reaction to the offer's failure.

In the relevant literature, Baker and Savasoglu [2002] find that the performance of those merger/risk arbitrage positions is determined largely by whether the takeover attempt succeeds. Mitchell and Pulvino [2001] find that market conditions are positively and nonlinearly related to the performance of merger/risk arbitrage trading. Hsieh and Walkling [2005] argue that as active arbitrageurs

influence managerial decisions through increased holdings in target shares, their holdings tend to be positively related to both the chance of merger completion and the performance of merger/risk arbitrage. Branch and Yang [2006] show that payment methods associated with information asymmetry help explain the performance of merger/risk arbitrage for both completed and failed merger attempts. This article seeks to extend those findings. Herein, we explore how wealth protection provided to target firm shareholders by collar offers influences the performance of merger/risk arbitrage positions and the probability of merger completion. We believe that the collar structure's improved wealth protection would signal greater certainty for the value of the target, the profitability of the potential acquisition to the acquiring firm, and the promised offer premium to the target firm's shareholders. The enhanced wealth protection thereby provided would tend to increase the chance of merger completion as well as the performance of merger/risk arbitrage positions, which are largely influenced by the target firms' stock price movement.

We test the validity of this protection argument in this article. In the literature, the elasticity of the target's compensation to the bidder's stock price (Houston and Ryngeart [1997]) has been commonly used either to measure indirectly the wealth protection of the target shareholders or to represent deal types. Officer [2004] argues, however, that the elasticity measure may be of limited value. For example, a fixed payment collar and a fixed exchange collar offer can have the same elasticity, yet their actual wealth protection may be very different. Thus, in this article, we use dummy variables, interaction variables and the summation of dummy variables for deal components to examine the protection argument. Specifically, we explore the impact of a protection index (designed to measure the expected increasing level of wealth protection resulting from plausible combinations of deal components) on the performance of merger/risk arbitrage and on the likelihood of merger completion. We also explore factors that help determine the choice of a fixed payment (fixed dollar amount) collar offer or a fixed exchange (variable dollar value exchange ratio) collar offer.

COLLAR MERGER TYPES

Collar offers can be broadly classified into either fixed payment or fixed exchange offers with a single layer,

depending on whether a dollar amount or an exchange ratio is announced.[1] Sometimes, however, these fixed payment and exchange collar offers include multiple layers. For each type, the formula is applied to the acquirer's average share price as of the defined pricing period.

Fixed payment collar. This type of collar offer formula contains a layer having up and down boundaries. If the acquiring firm's average stock price stays within the pre-specified boundaries, the final exchange ratio is calculated by dividing a fixed dollar amount for the target firm's stock by the average stock price of the acquiring firm during the pricing period. If the acquiring firm's average (reference) stock price ends up outside of the boundaries (either above or below), the exchange ratio is set at the same value as it would be at the end point of the boundary. In some structures, a breach of the boundary allows either the target or acquiring firm an option to terminate the merger deal.

As an example, consider the Provident Financial Group (NASDAQ: PFGI) offer to acquire Fidelity Financial of Ohio (NASDAQ: FFOH). In 1999, FFOH shareholders were to receive $21.00 worth of Provident common stock if Provident's 10-day average daily closing price ending on the date of the last regulatory approval was between $40.00 and $44.50. If the average closing price was less than $40.00, FFOH shareholders would receive a fixed exchange ratio of 0.525. If the average closing price was more than $44.50, FFOH shareholder would receive 0.4719 shares of Provident common stock

for each FFOH share. Actually, the average price during the pricing period ended on 17th of November in 1999 was $42.51875. At merger consummation, each outstanding common share of FFOH was converted into 0.4939 shares of Provident common stock. Thus one share of FFOH was worthy of $21.00 ($42.51875 × 0.4939 = $21.00) in accordance with the terms of acquisition agreement. Exhibit 1 illustrates the payoff to the target firm's shareholder over the relevant range for the acquiring firm's average closing stock price.

Fixed exchange collar. In this case, a layer with up and down boundaries is provided. If the acquiring firm's average stock price is within the pre-specified boundaries over the pricing period, a predetermined exchange ratio applies. If the acquiring firm's average stock price ends up outside of the boundaries, the exchange ratio would be determined by a pre-specified formula. Alternatively, either the target or the acquiring firm would have the option to cancel the takeover agreement.

As an example, consider the 1999 merger attempt between Medco Research (NYSE: MRE) and King Pharmaceutical (NASDAQ: KING). The terms of the agreement set the exchange ratio at 0.6818 shares of King Pharmaceutical common stock for each share of Medco common stock if the average closing price of King common stock during the twenty (20) consecutive trading days ending on the third day preceding Medco's shareholder's meeting was between $33.00 and $49.87 per share. If the average closing price of King Pharmaceutical

EXHIBIT 1
Payoff for a Target Firm's Stock (FFOH) in a Merger Attempt of Provident Financial and FFOH in 1999
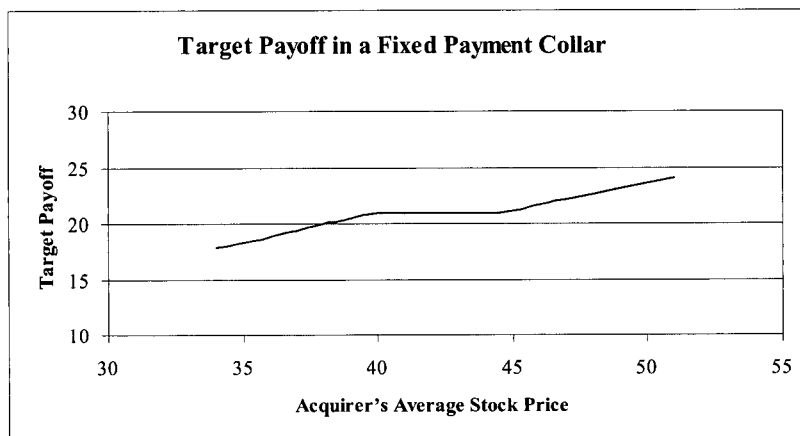
common stock was above $49.87 per share, King would pay $34.00 per share (using its own shares to make the payment) for Medco common stock. If the average closing price of King Pharmaceutical common stock was below $33.00 per share, King Pharmaceutical would provide a purchase price of $22.50 per share of Medco common stock, using its own shares for the payment. King Pharmaceutical could elect to not proceed with the transaction if the average closing price of King's common stock fell below $30.00 per share. At the pricing date ended on the 22nd of February in 2000, the average price of King Pharmaceutical was $50.31563. At merger consummation, each outstanding common share of Medco Research was converted into 0.6757 shares of King's common stock. Thus one share of Medco Research was exchanged for King Pharmaceutical stock worth approximately $34.00 ($50.31563 × 0.6757 = $33.99). Exhibit 2 illustrates the payoff to the target firm's shareholders over the acquiring firm's average closing stock price.

Fixed payment or exchange collar with multiple layers. This type of offer is structured to have the same form as either a fixed payment or fixed exchange collar merger offer. However, several sub-layers are included. Each layer has a different exchange ratio or fixed dollar amount for the target firm's stock. If the acquiring firm's stock price moves outside of the up and down boundaries, the exchange ratio would be fixed or either side may have the option to cancel the takeover agreement.

As an example, consider the 1999 merger attempt of Gilead Science (NASDAQ: GILD) to acquire NeXstar

Pharmaceutical (NASDAQ: NXTR). Gilead would exchange 0.425 of a share of Gilead stock for each share of NeXstar stock. The fixed exchange ratio of 0.425 was applicable for a range of Gilead common stock price from $36.47 to $45.88 per share, based on the average closing price over the period of 20 trading days ending on the third trading day prior to the NeXstar stockholders' meeting. If Gilead's average closing price exceeded $45.88 per share, the exchange ratio would adjust to provide a fixed value of $19.50 to NeXstar stockholders until Gilead's average closing price reaches $51.50. If it exceeded $51.50, the exchange ratio fixes at 0.3786. If the average closing price was less than $36.47, the exchange ratio would be adjusted to provide a fixed value of $15.50 to NeXstar stockholders. If it went down below the minimum average closing price of $31, the exchange ratio was to be fixed at 0.500. During the pricing period ended on the 27th of July in 1999, the acquirer's average stock price was $55.6125. Accordingly, NeXstar shareholder received 0.3786 of Gilead common stock for a NeXstar's common stock. Thus one share of NeXstar was exchanged for Gilead stock worth approximately $21.05 ($55.6125 × 0.3786 = $21.05). Exhibit 3 illustrates the payoff to the target firm's shareholder over the average acquiring firm's closing stock price.

HYPOTHESES

These various deal structures and relevant expected wealth protection levels suggest several hypotheses

EXHIBIT 2

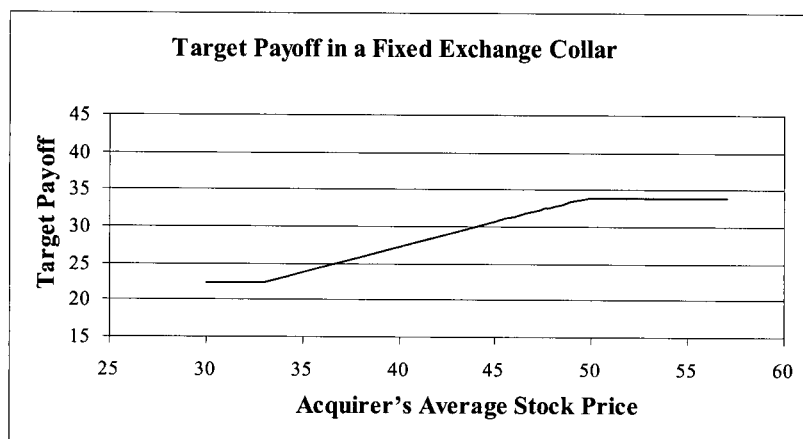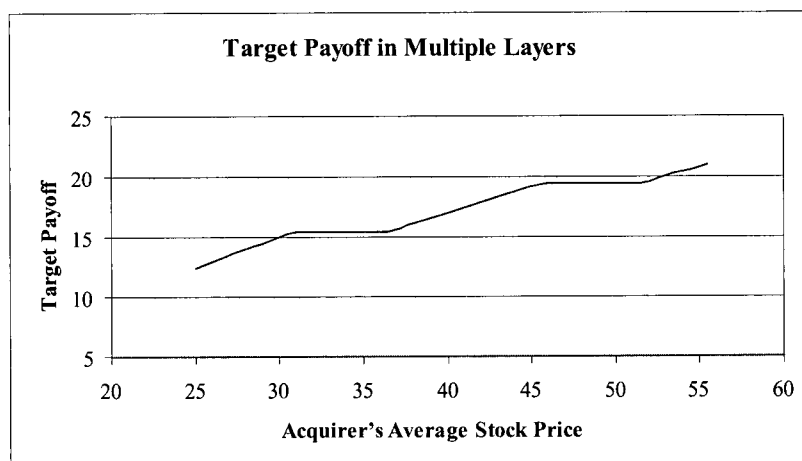**Payoff for a Target Firm's Stock (Medco) in a Merger Attempt of Medco and King Pharmaceutical in 1999**

Target Payoff in a Fixed Exchange Collar

EXHIBIT 3
Payoff for a Target Firm's Stock (NeXstar) in a Merger Attempt of Gilead Science and NeXstar in 1999

Target Payoff in Multiple Layers

regarding the performance of merger/risk arbitrage or the chance of merger completion. Specifically, enhanced wealth protection for the target shareholders would signal greater certainty for the value of the target, the profitability of the merger attempt to the acquiring firm, and the promised offer premium to the target shareholders, thereby tending to improve the target firms' stock prices and the chance of merger completion. Thus the level of wealth protection generated by combinations of deal components would positively relate to the performance of merger/risk arbitrage and/or the chance of merger completion. In order to explore the protection argument, we first hypothesize the impacts of deal components supposedly associated with wealth protection and then the level of wealth protection resulting from the combinations of those deal components. Lastly, we explore a hypothesis regarding the selecting of either a fixed payment collar offer or a fixed exchange collar offer.

Fixed dollar amount payment. In a fixed payment collar offer, the final exchange ratio is structured to provide a prespecified dollar amount for a target firm's stock, as long as the acquiring firm's average stock price is within the pre-specified range. Such a fixed dollar amount would generally provide substantially more effective protection for the target firm shareholders' wealth, compared to a fixed exchange ratio. Recall that with a fixed exchange collar offer, the wealth of target shareholders would vary over the acquirer's stock price movement. Thus we expect that *compared to a fixed exchange (collar offer), a fixed payment (collar offer) would tend to improve the performance of*

merger/risk arbitrage trading positions and/or the chance of merger completion.

Termination fees. Officer [2003] contends that in a merger attempt, the existence of a termination fee would make one party's withdrawal from the merger deal costly, thereby improving the probability of merger completion. This argument implies that the existence of a termination fee would provide protection for the offered premium and the target shareholders' wealth. On the other hand, the target shareholders are less likely to benefit from potential merger auction when a termination fee stands in the way. On balance, however, we expect the termination fee to provide valuable wealth protection to the target shareholders. Thus: we expect *the existence of a termination fee to improve the performance of merger/risk arbitrage strategies or the chance of merger completion.*

Up and down-ranges. The range of up or down boundary prices for the acquiring firm's average stock price may reveal various levels of wealth protection for the target shareholders, depending on the type of collar offer. In a fixed payment collar offer, a wide range up to the boundary price from the acquiring firm's current stock price ("up-range") would help protect the acquiring firm from overpaying for a target. But simultaneously it would increase the chance that the target firm's shareholders would be underpaid. However, a wide range down to the boundary from the acquiring firm's stock price ("down-range") would tend to provide substantial protection for the target firm's shareholders from the risk of being underpaid in stock payment. However, in a fixed exchange

collar offer, a wide down-range would provide less protection to the wealth of target shareholders, increasing the chance of being underpaid and/or a failure of the takeover attempt. On the other hand, a wide up-range would benefit the target shareholder's wealth only over the range where the acquiring firm's stock price is increasing. These considerations suggest that: *In terms of wealth protection rather than benefits from the increasing acquirer's stock price, a relatively wide down-range in a fixed payment collar offer would improve wealth protection for the target firm's shareholder and thus tend to improve the performance of merger/risk arbitrage or the chance of merger completion.*

Due to coexistence of fixed payments and fixed exchange ratios with sub-layers, the existence of multiple layers could provide more or less wealth protection over changing the acquirers' stock prices. Thus, the presence of multiple layers will not be considered herein as a deal component directly relevant to wealth protection.

Protection index. Under the protection argument, an increasing level of wealth protection is expected to improve the profitability of merger/risk arbitrage and/or the chance of merger completion. In order to measure the level of wealth protection in each merger offer, we develop a protection index which is a combination/summation of dummy variables for above deal components; a fixed (dollar amount) payment, the existence of termination fee and wider down-range than up-range in a fixed payment collar offer. The higher the protection index, the better the wealth protection for the target shareholders. For example, a deal with a fixed payment (collar) and a termination fee option may provide better wealth protection levels (protection index: 2), compared to a deal with a fixed exchange ratio and no termination fee option (protection index: 0). Thus: *the protection index (the level of wealth protection) should be positively related to the performance of merger/risk arbitrage and/or the chance of merger completion.*

Selecting a fixed payment collar. Houston and Ryngaert [1997] and Officer [2004] find that pre-merger announcement correlations or market risk exposures of the target and acquiring firms' stock prices influence the choice of deal type—stock swap or collar mergers. We also believe that those variables as well as the growth potential of the target firm may impact the choice between the fixed (dollar amount) payment collar and the fixed exchange collar (fixed exchange ratio). In collar offers, the acquiring firm's stock is the typical form of payment, though sometimes a cash payment component is also

included. A high correlation implies that the target and bidder's price is likely to have similar risk factors that could reduce the wealth of the target shareholders during or after the merger attempt. The target shareholders may not want to carry the risk factors into their wealth through stock payment in collar offers. Furthermore, if the target's growth potential has been highly evaluated in the market, the target may prefer a fixed (dollar amount) payment regardless of the risk factors. Thus the acquiring firm may propose a fixed dollar amount in order to improve the chance of merger completion. However, among the risk factors, high volatility of stock price or market risk may cause the overpayment risk or the risk of diluted ownership for the acquirer. Accordingly, the acquirer may prefer a fixed exchange collar merger. Thus: *a high volatility or systematic risk (beta) for the acquirer would negatively relate to the chance of choosing a fixed (dollar amount) payment collar offer, whereas the return correlation and the growth potential of the target would positively relate to the chance of choosing a fixed payment collar.*

DATA AND MERGER/RISK ARBITRAGE RETURN

We have collected collar merger offer information from SDC (Security Data Corporation) for the 1993 to 2003 period. Information regarding the types of collar merger offers, the range of exchange ratios, up and down boundaries of the acquiring firm's stock price and the final exchange ratio estimation mechanism were collected directly from 8-Ks, 10-Ks, Proxy Statements of target or acquiring firms in SEC electronic files, or Lexis and Nexis. Stock price and accounting information of the target and acquiring firms were obtained from CompuStat and CRSP. These collection procedures have generated useable information on 185 complete collar merger offers for the 1993 to 2003 period.

Exhibit 4 contains information on the characteristics of our sample's collar deal architecture. The average transaction value of our 185 collar mergers was $883.59 million. Fixed payment and fixed exchange collar mergers have average transaction values of $994.69 million and $566.51 million respectively. An average of 139 days was required to complete these collar merger offers. Fixed payment and fixed exchange collar mergers took an average of 144 and 120 days, respectively, to reach completion. One day after the merger announcement date, the average range of the up boundary ("up-range") was 15.8 % above

EXHIBIT 4

Data Description for Collar Offers during the Period of 1993 to 2003

	All	Fixed Payment	Fixed Exchange
Transaction Value	$883.59	$994.69	$566.51
	(1644.38)	(1656.16)	(1744.44)
Merger Duration	139	144	120
	(77)	(83)	(57)
Up-Range	0.158	0.176	0.105
	(0.339)	(0.375)	(0.195)
Down-Range	0.102	0.087	0.144
	(0.177)	(0.182)	(0.157)
Multi-Layer	0.173	0.117	0.333
Inclusion of Cash Payment	0.081	0.109	0.000
Termination Fee	0.708	0.737	0.625
Target	0.692	0.723	0.604
Bidder	0.162	0.168	0.146
Merger Auction	0.038	0.029	0.063
Merger Success	0.930	0.942	0.896
Protection Index	1.557	1.737	1.000
	(0.597)	(0.442)	(0.667)
Sample Size	185	137	48

1) Standard errors are in parentheses.

the market price of the acquiring firm's stock.[2] The average range of the down boundary ("down-range") was 10.2 % below the market price of the acquiring firm's stock price. The up-ranges of fixed payment and fixed exchange collar mergers were 17.6% and 10.5% respectively. The down-ranges were 8.7% and 14.4% respectively. 17.3% of fixed payment and exchange collar offers were found to have multiple-layers within up and down boundaries. Fixed exchange collar mergers had more multiple-layers inside than fixed payment collar mergers. Cash payments were largely restricted to being a portion of the payment in fixed payment collar mergers. 73.7% of fixed payment collar offers and 62.5% of fixed exchange collar offers had termination fee options. Target firms (69.2%) were found more likely to be required to pay a termination fee than acquiring firms (16.2%) if the merger attempt is terminated. Both fixed payment and fixed exchange collar offers were found to have low percentages of merger auctions. Collar offers had an average takeover success rate of 93%. Fixed payment collar offers (94.2%) showed a somewhat higher takeover success rate than fixed exchange collar offers (89.6%).

We use collected deal component information to measure the plausible level of the target's shareholder wealth protection in each collar offer and construct a protection index. The protection index is a summation of three dummy variables which are supposed to provide better protection regardless of the acquiring firm's stock price change: 1) fixed payment (collar), 2) termination fee option, and 3) down-range wider than up-range in the fixed payment collars. Thus the index is expected to be positively related to the level of protection for the wealth of target shareholders. Overall, the average protection index of collar offers was 1.557. The average of protection index of fixed payment collar offers was 1.737 and that of fixed exchange collar offers was 1.00. The descriptions for plausible combinations of deal components in collar mergers and relevant protection index values are shown in Exhibit 5.

We see in Exhibit 6 that the collar merger offers in our sample had an average initial spread of 8.9% one day after a collar merger announcement.[3] Fixed payment collars (9.5%) generated higher spreads than fixed exchange collar offers (7.2%). Successful fixed payment collar offers

EXHIBIT 5
Deal Component Combinations and Protection Index

Protection Index	3	2	1	0
Deal component combinations	Fixed payment collar, Termination fee option and Down range wider than Up range in the fixed payment collar.	Fixed payment collar, Termination fee option and Down range narrower than or equal to Up range in fixed payment.	Fixed payment collar, No Termination fee option and Down range narrower than or equal to Up range in the fixed payment collar.	Fixed exchange collar, No Termination fee option and Various Down and Up ranges in the fixed exchange collar.
Deal component combinations		Fixed payment collar, No termination fee option and Down range wider than up range in the fixed payment collar.	Fixed exchange collar, Termination fee option and Various Down and Up ranges in the fixed exchange collar.	

generated an average initial spread of 9.1%, whereas successful fixed exchange collar offers generated an average initial spread of 7.3%. Failed fixed payment collar offers had an average initial spread of 14.5%, whereas failed fixed exchange collar offers produced an average initial spread of 6.8%.

Mitchell and Pulvino [2001]; Baker and Savasoglu [2002]; and Hsieh and Walkling [2005] introduce two types of merger/risk arbitrage return measurements, depending on the payment methods—cash or stock payment. In a cash offer, merger/risk arbitrageurs are assumed to set up only a long position in the targets' stocks. In a stock offer, merger/risk arbitrageurs are assumed to set up a long position in the target's stocks and a short (hedging) position in the acquirers' stocks. Here, we follow Hsieh and Walkling's merger/risk arbitrage return measurement.[4] We

EXHIBIT 6
Initial Spread Between an Offer Price and A Market Price One Day After a Collar Offer Announcement

	All	Fixed Payment	Fixed Exchange
Collar Offers	0.089*	0.095*	0.072*
	(0.136)	(0.127)	(0.193)
Successful Collar Offers	0.086*	0.091*	0.073*
	(0.136)	(0.117)	(0.184)
Failed Collar Offers	0.116*	0.145*	0.068
	(0.135)	(0.139)	(0.128)

1) *Standard errors are in parentheses.*

2) ** and ** indicate statistical significance with 95% and 90% confidence intervals.*

assume that the trading position is set up one day after the takeover announcement and held until the consummation or termination date. At first we estimate daily returns of merger/risk arbitrage for fixed payment collar offers (Equation (1)) or fixed exchange collar offers (Equation (2)).[5] Then a daily compounded return during one day after the takeover announcement through the consummation or termination date is estimated (Equation (3)).

$$r_{it} = \frac{P_{it}^T + D_{it}^T}{P_{it-1}^T} - 1 - r_{fi} \tag{1}$$

Where r_{it} is a daily return of merger/risk arbitrage for a takeover attempt i at time t; P_{it}^T is a target's stock price in a takeover attempt i at time t. P_{it-1}^T is a target's stock price in a takeover attempt i at time t -1; D_{it}^T is a dividend payment for a target's stock in a takeover attempt i at time t; r_{fi} is a three month T-bill rate/365.

$$r_{it} = \frac{P_{it}^T + D_{it}^T}{P_{it-1}^T} - 1 - r_{fi} - \left(\frac{P_{it}^A + D_{it}^A}{P_{it-1}^A} - 1 - r_{fi} \right) \delta \frac{P_{it-1}^A}{P_{it-1}^T} \tag{2}$$

Where P_{it}^A is an acquirer's stock price in a takeover attempt i at time t; P_{it-1}^A is an acquirer's stock price in a takeover attempt i at time t-1; D_{it}^A is a dividend payment for an acquirer's stock in a takeover attempt i at time t; δ is an exchange ratio.

$$r_i = \left(\prod_{t=1}^{E} [1 + r_{it}] - 1 \right) \tag{3}$$

Where r_i is a daily compounded merger/risk arbitrage return for a takeover attempt i; E is the number of dates until a consummation date or termination date one day after a collar merger announcement.

From Exhibit 7, we see that the merger/risk arbitrage trading positions in our sample had an average return of 6.7%.[6] Fixed payment collar offers produced an average return of 8.8% for our sample, considerably higher than the return of 0.6% for fixed exchange collar offers. Successful fixed payment collar takeovers generated an average return of 9.6%, substantially higher than an average return of 2.4% for successful fixed exchange collar takeovers. Failed fixed payment collar offers produced an average return of –3.8%, higher than the average return of –14.6% in failed fixed exchange collar offers.

TEST RESULTS

Wealth protection and performance. We explore the ability of our protection arguments to explain the performance of merger/risk arbitrage using OLS regressions (Equation (4) to (7)). An annualized return (ANR = Equation (3) × 365/Merger Period) is used as a dependent variable. In Equations (4) to (6), we explore the relationships of each deal component thought to be involved in the target shareholders' wealth protection to the performance of merger/risk arbitrage. We expect that deal components such as a fixed (dollar) payment (FP), a termination fee option (TF) and a down-range wider than the up-range in a fixed payment collar offer (FP × DR) will have positive and significant coefficients. In Equation (7), we directly test the protection argument, using

EXHIBIT 7
Merger/Risk Arbitrage Returns

	All	Fixed Payment	Fixed Exchange
Collar Offers	0.067*	0.088*	0.006
	(0.174)	(0.168)	(0.180)
Successful Collar	0.078*	0.096*	0.024
Offers	(0.156)	(0.162)	(0.121)
Failed Collar Offers	-0.079	-0.038	-0.146
	(0.309)	(0.219)	(0.439)

1) *Standard errors are in parentheses.*
2) ** and ** indicate statistical significance with 95% and 90% confidence intervals.*

our protection index (the level of wealth protection). The protection index (PI) is expected to have a positive and significant coefficient. Various conditional variables as of the time of the bid are also considered. Hansen [1987] argues that the larger the relative size of the target firm to the acquiring firm (SI), the greater the degree of information asymmetry. As a result, the deal may have an increasing chance of failure, negatively impacting the performance of merger/risk arbitrage. Barclay, Watts and Smith [1997] argue that a high market-to-book ratio suggests that the market sees attractive growth opportunities for the firm, that superior growth potential is likely to enhance the stock price. Thus the growth potential of the target would be expected to influence the performance of merger/risk arbitrage.

Branch and Yang [2003 and 2006] find that the more certain value signaled by the use of a cash payment positively impacts both the chance of merger completion and the performance of merger/risk arbitrage. In addition, the volatility of the acquiring firm's stock returns (VAC) is expected to have a negative impact on the wealth of the target firm's shareholders, reducing the chance of merger completion and the profitability of merger/risk arbitrage.

$$ANR = \alpha + \beta_1 \times FP + \beta_5 \times CA + \beta_6 \times SI + \beta_7 \times TMB + \beta_8 \times VAC \quad (4)$$

$$ANR = \alpha + \beta_2 \times TF + \beta_5 \times CA + \beta_6 \times SI + \beta_7 \times TMB + \beta_8 \times VAC \quad (5)$$

$$ANR = \alpha + \beta_3 \times (FP \times DR) + \beta_5 \times CA + \beta_6 \times SI + \beta_7 \times TMB + \beta_8 \times VAC \quad (6)$$

$$ANR = \alpha + \beta_4 \times PI + \beta_5 \times CA + \beta_6 \times SI + \beta_7 \times TMB + \beta_8 \times VAC \quad (7)$$

Where FP is a dummy variable for a fixed payment collar offer (fixed dollar amount); TF is a dummy variable for a termination fee option available to either target or acquiring firms; DR is a dummy variable for relative down-range (1 if absolute value of down-range is higher than absolute value of up-range). Here, down (up) -range = (down (up) boundary acquirer's price—market price of the

acquirer)/market price of the acquirer one day after a merger announcement; PI is Protection Index (= FP + TF + (FP × DR)); SI is LN (a ratio of total asset of the target to total asset of the acquirer) prior to the merger announcement; TMB is a ratio of the market price to the book value of the target prior to the merger announcement; CA is a dummy variable for an inclusion of cash payment; VAC is a standard deviation of the acquirer stock returns for days (t-51 to t-200) days prior to the merger announcement. Here "t" refers to the date of the merger offer announcement.

The results from Equation (4) to (7) are shown in Exhibit 8. We see that the fixed payment (FP, $\beta = 0.3422$) and the termination fee option (TF, $\beta = 0.3529$) have significantly positive impacts on the performance of merger/risk arbitrage trading positions. Though not statistically significant, the interaction variable for the fixed payment collar and down-range wider than up-range (FP × DR, $\beta = 0.1579$) appears to tend to enhance the performance of merger/risk arbitrage positions. The result from Equation (7) shows a positive and significant coefficient for the protection index (PI, $\beta = 0.1893$). These results support the protection argument that the wealth protection for target shareholders is positively related to the performance of merger/risk arbitrage in collar merger offers.[7] Among conditional variables, the volatility of the acquirer is found to have a significantly positive impact on the performance, as not expected.

Wealth protection and merger completion. Next we explore the relationships of the protection argument to the probability of takeover completion. We believe that, unless a new offer is received, protecting the target's shareholders' wealth would reduce the resistance of the target and thereby enhance the likelihood of takeover completion. Thus, we expect the level of wealth protection for the target firm's shareholders to be positively related to the probability of merger success (S). To test this argument, we estimate logistic regressions. In Equations (8), (9) and (10), the impacts of deal components supposedly relating to wealth protection are explored. We expect that coefficients of a fixed payment (FP), the existence of termination fees (TF), and wider down-range than up-range in a fixed payment collar offer (FP × DR) would be significantly positive. In Equation (11), using the impact of level of wealth protection (PI), we directly test the protection argument. We expect that the coefficient of protection index (PI) is significantly positive. In addition to conditional variables used in the previous

EXHIBIT 8
Wealth Protection and Performance of Merger/Risk Arbitrage

	Equation 4	Equation 5	Equation 6	Equation 7
Intercept	-0.4454*	-0.3321**	-0.2133	-0.4621*
	(0.2213)	(0.1980)	(0.1930)	(0.2127)
FP	0.3422*			
	(0.1468)			
TF		0.3529*		
		(0.1431)		
FP×DR			0.1579	
			(0.1382)	
PI				0.1893*
				(0.0671)
CA	-0.0295	0.0278	0.0390	-0.0073
	(0.2312)	(0.2289)	(0.2319)	(0.2283)
SI	-0.0644	-0.0476	-0.0582	-0.0533
	(0.4490)	(0.0451)	(0.0454)	(0.0446)
TMB	0.0002	-0.0051	0.0004	-0.0051
	(0.0215)	(0.0217)	(0.0218)	(0.0215)
VAC	11.1722*	8.8650**	10.3534*	10.1812*
	(4.7881)	(4.7938)	(4.8263)	(4.7382)
R^2	0.0609	0.0642	0.0393	0.0736
Sample	185	185	185	185

1) Values in bracket are standard errors.

2) * and ** indicate statistical significance with 95% and 90% confidence intervals.

section, initial spreads and a friendly attitude which have been found significant in determining merger completion in the literature are also included. Also the volatility of the target firm's returns, which is expected to have a negative impact on the probability of merger completion, is considered.

$$S = \alpha + \beta_1 \times FP + \beta_5 \times IS + \beta_6 \times CA + \beta_7 \times SI$$
$$+ \beta_8 \times TMB + \beta_9 \times VAC + \beta_{10} \times VTA \qquad (8)$$
$$+ \beta_{11} \times ATT$$

$$S = \alpha + \beta_2 \times TF + \beta_5 \times IS + \beta_6 \times CA + \beta_7 \times SI$$
$$+ \beta_8 \times TMB + \beta_9 \times VAC + \beta_{10} \times VTA \qquad (9)$$
$$+ \beta_{11} \times ATT$$

$$S = \alpha + \beta_3 \times (FP \times DR) + \beta_5 \times IS + \beta_6 \times CA$$
$$+ \beta_7 \times SI + \beta_8 \times TMB + \beta_9 \times VAC \qquad (10)$$
$$+ \beta_{10} \times VTA + \beta_{11} \times AT$$

$$S = \alpha + \beta_4 \times PI + \beta_5 \times IS + \beta_6 \times CA + \beta_7 \times SI$$
$$+ \beta_8 \times TMB + \beta_9 \times VAC \qquad (11)$$
$$+ \beta_{10} \times VTA + \beta_{11} \times ATT$$

Where S is a dummy variable for merger completion (1 for merger completion); IS (initial spread) is a ratio of (offer price—market price of a target stock one day after the merger announcement) to market price of a target stock one day after the merger announcement; VTA is a standard deviation of the target stock returns for days (t-51 to t-200) prior to the merger announcement. Here "t" means a date of merger announcement; ATT is a dummy variable for target's attitude to the takeover offer (1 for a friendly attitude classified by SDC data channel).

Logistic regression test results of Equations (8), (9), (10) and (11) in Exhibit 9 show a positive and significant coefficient for a fixed payment (FP, $\beta = 1.2943$) at $\alpha = 10\%$ but insignificant for the termination fee (TF, $\beta = 0.7879$) and (FP × DR, $\beta = 1.9042$). However, the

EXHIBIT 9

Wealth Protection and Merger Completion

	Equation 8	Equation 9	Equation 10	Equation 11
Intercept	-3.6193*	-2.2916	-2.8397**	-3.7245*
	(1.7234)	(1.4846)	(1.6880)	(1.8009)
FP	1.2943**			
	(0.7308)			
TF		0.7879		
		(0.6631)		
FP×DR			1.9042	
			(1.1894)	
PI				0.8286*
				(0.3803)
IS	-6.3453*	-5.2743**	-4.5944	-5.8268*
	(3.0307)	(2.9209)	(3.1594)	(3.1323)
CA	12.1632	12.5957	12.4216	12.3608
	(312.7)	(309.0)	(316.9)	(303.1)
SI	-0.8074*	-0.7394*	-0.7217*	-0.7793*
	(0.3134)	(0.3009)	(0.2996)	(0.3138)
TMB	0.1188	0.0632	0.1012	3.0831
	(0.1706)	(0.1649)	(0.1733)	(27.3427)
VTA	-3.5234	-6.9674	-2.8765	3.0831
	(25.9115)	(24.7300)	(26.3346)	(27.3427)
VAC	57.0805**	49.8439	48.3365	46.8502
	(32.6513)	(32.6249)	(33.3440)	(31.9030)
ATT	3.1752*	2.5775*	3.0484**	3.0076**
	(1.4370)	(1.4429)	(1.6225)	(1.5667)
R^2	0.3224	0.3017	0.3311	0.3472
Sample	185	185	185	185

1) Values in bracket are standard errors.

coefficient of protection index (PI, β = 0.8286) is significantly positive.[8] These findings imply that the level of wealth protection in a deal has positive and significant impacts on the likelihood of merger completion even though individual expected wealth protection associated with deal components may have limited impacts. Among the conditional variables, the relative size of the target compared to the acquirer negatively impacts the chance of merger completion, supporting the negative role of information asymmetry. As found in the relevant literature, the existence of a friendly attitude is shown to have a positive impact on the likelihood of merger completion.

Selecting a fixed payment collar. Our results show that compared to the fixed exchange collar offer structure, the fixed payment collar structure tends to enhance the

returns for merger/risk arbitrage and the chance of merger completion. Accordingly, in this section, we explore the determinants of the selection of the fixed payment collar offer versus the fixed exchange collar offer.

Using logistic regressions—Equation (12) and Equation (13)—we test the roles of return correlation, growth potential of the target, volatility of the acquiring firm's return and systematic risk of the acquiring firm in selecting fixed payment collar offers, considering variables used in the previous section and other variables (e.g., error terms in the market model, etc.) used in Officer's tests [2004]. Here, the growth potential of the target is measured by the difference between the target's market to book ratio and the acquirer's market to book ratio prior to the merger announcement.

$$FP = \alpha + \beta_1 \times COR + \beta_3 \times ABETA$$
$$+ \beta_4 \times VAC + \beta_9 \times (TMB - AMB) \quad (12)$$

$$FP = \alpha + \beta_1 \times COR + \beta_2 \times TBETA$$
$$+ \beta_3 \times ABETA + \beta_4 \times VAC + \beta_5$$
$$\times ATMST + \beta_6 \times TDEBT \quad (13)$$
$$+ \beta_7 \times SI + \beta_8 \times ATT$$
$$+ \beta_9 \times (TMB - AMB)$$

Where FP is a dummy variable for a fixed payment collar offer (fixed dollar amount); COR is a correlation of returns between the target and the acquirer during t-51 to t-200. Here "t" refers to the date of the merger offer announcement; TBETA is a systematic risk of the target measured during t-51 to t-200 (using a market model and value-weighted CRSP market index, the systematic risk is measured); ABETA is a systematic risk of the acquirer measured during t-51 to t-200 (using a market model and value-weighted CRSP market index, the systematic risk is measured); ATMST is the difference between standard deviations of the target returns and the acquirer returns not explained by the market model (error terms) during t-51 to t-200; TDEBT is a ratio of total debt to asset of the target prior to a merger announcement; TMB − AMB is the difference between market to book ratios of the target and the acquirer prior to a merger announcement.

Logistic test results are reported in Exhibit 10. In Equations (12) and (13), the selection of a fixed payment collar merger offer relates positively to the correlation of target and acquiring firms' stock prices (β = 3.2374 and 3.6098) and better growth potential for the target firm than of the acquiring firm prior to the merger announcement (β = 0.1116 and 0.1221).[9] On the other hand, the use of a fixed payment collar offer is negatively but insignificantly associated with the volatility and the market risk of the acquiring firm's stock prior to the merger announcement. These findings and the positive impact of the fixed payment on the chance of merger completion in the previous section show that if the target firm's growth potential has been well known and both target and acquiring firms' stock prices have similar risk factors, the acquiring firm would be likely to need to provide protection for the wealth of the target firm's shareholders, using a fixed dollar rather than using a fixed exchange ratio offer, in order to improve the chance of merger completion.

Exhibit 10
Selection of Deal Structure: Selecting a Fixed Payment Collar

	Equation 12	Equation 13
Intercept	1.4556*	14.8653
	(0.3491)	(823.4)
COR	3.2374*	3.6098*
	(1.5810)	(1.7190)
TBETA		0.0862
		(0.4116)
ABETA	-0.5700	-0.7569**
	(0.3686)	(0.4379)
VAC	-1.3817	0.0820
	(13.2852)	(14.8378)
ATMST		34.2397
		(28.6767)
TDEBT		0.0910
		(0.5758)
SI		-0.0303
		(0.1315)
ATT		-13.5754
		(823.4)
TMB-AMB	0.1116*	0.1221*
	(0.0559)	(0.0581)
R^2	0.1052	0.1421
Sample	185	185

1) Values in bracket are standard errors.

2) * and ** indicates statistical significance with 95% and 90% confidence intervals.

CONCLUSION

In this article, we explore the relationship of target shareholders' wealth protection to the profitability of the merge/risk arbitrage trading strategy and the chance of merger completion, using deal components and their combinations. We find that the level of wealth protection for the target firm's shareholders is likely to improve both the performance of merger/risk arbitrage trading positions and the chance of merger completion. The selection of a fixed payment (fixed dollar amount) collar offer is positively and significantly related to the growth potential of the target firm and the level of correlation between target and acquiring firms' stock prices. These findings imply that merger/risk arbitrageurs may need to consider each merger deal's potential wealth protection for the target shareholder when setting up their merger/risk arbitrage portfolio positions. For the acquiring firm, if the acquirer and the target have the similar risk factors and the target's growth potential is well known, it would be better to offer

a fixed payment (as opposed to a fixed exchange) in order to improve the chance of merger completion.

ENDNOTES

[1]We follow Officer [2004]'s classification: Fixed payment collar and fixed exchange collar.

[2]Up (down)-range = (up (down) boundary acquirer's price—market price of the acquirer)/market price of the acquirer price one day after a merger announcement.

[3]Spread = (offer price—market price of the target)/market price of the target one day after merger announcement. Though not shown here, 6.5% of the collar offer sample generated negative spreads one day after a collar merger announcement. T-test results revealed that spread differences between fixed payment collar offers and fixed exchange collar offers are statistically insignificant at α =5%.

[4]They assumed to borrow money at risk free rate to set up a long position.

[5]Here, fixed payment collars are considered like cash offers and fixed exchange offers are considered like stock offers regardless of the existence of multiple-layers.

[6]T-test results revealed that for all or successful collar offers, return differences between fixed payment collars and fixed exchange collars are statistically significant at α = 5%.

[7]For robustness, we rerun the test considering the wealth elasticity measure by Officer [2004]. The test result was consistent. Correlation coefficients among independent variables were not so high as to worry multicollinearity.

[8]Correlation coefficients among variables do not indicate serious multicollinearity problems.

[9]Correlation coefficients among variables do not indicate serious multicollinearity problems.

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