Simulation of Call Options Premiums Using the Black-Scholes Model in Estimating Returns on Covered Call & Dividend Hedge Capture As Alternative Strategies Applied to Cash Management

CONSULTATION PAPER

Prepared as a requirement to obtain the Magister Management degree

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UNIVERSITY OF INDONESIA
FACULTY OF ECONOMICS
MAGISTER MANAGEMENT
JAKARTA
AUGUST 2008

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DEWAN PENGUJI

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Tanggal : 22 Agustus 2008

"Be strong and courageous. Do not be afraid or terrified because of them, for the LORD your God goes with you; He will never leave you nor forsake you."

(Deuteronomy 31:6)

ACKNOWLEDGEMENT

It has been an exhilarating experience in completing this thesis. One enriched with experience and knowledge. Nothing left to say but to praise and thank God Almighty as my source of inspiration, strength, and purpose in life. This thesis provides a media to reach out and serve His purpose for the good of millions of people.

By completing this thesis I would like to dedicate this thesis especially for my father who is in heaven, Prof. Dr. Victor Purba, S.H., LLM., M.Sc., who parted during my first quarter in MMUI (August 2, 2007). His spirit and lifework lives on today.

My studies in MMUI besides the completion of this thesis would not possible without the following, and I would like to express my deepest gratitude to these persons:

1. Dr. Adler Haymans Manurung, M.Com, as my adviser who endlessly and tirelessly dedicated his time and effort for guidance and source of knowledge and insights.
2. My family, My Beloved Mother, Eto, and Ande who have supported me in achieving the best in my studies.
3. My former employer, Alvin Lim, CFP, Chief Executive Officer of BIPtrade, for giving me a direction in life by employing me and giving me numerous training, insights and experience in relation to stocks and investments in the US markets.
4. My classmates in A064 MMUI for struggling together: Pa Andi, Alfian, Andini, Andry Rihardika, Andry Yusuf, Arjo, Aulia, Ayu, Bogi, Begin, Dian, Ucok, Emmanuel, Erny, Fanny, Ferry, Fajar H, Pa Fikra, Siska, Irwan, Hadean, Hasis, Mas Haris, Jusep, and Jerry.

Also my classmates in KP064 MMUI: Mas Mifta, Russel, Romy, Tinur, Eko, Maulina, Nadine, Yona, Kania, Rahmadhani, Rizal, and Yudha

5. KGB-ers Kantin FEUI after just celebrating eight years of friendship and togetherness: Lambok, Gepenk, Abank, Atenk, Ucok, Aseng, Jendril, Guswandi, Helman, Jamal, Bejo, Ferry, Celeng, Johnsen, Yunada, Mok-mok, Giri, Max, Mille, Denny, Stephen, eMPe, Alex, Timo, Onto,. Ce-Monk, Barkah, Aldi, Dewa, Adhiet, Batara, Rinto, Dodi, Ayam, Jibenk, Rusag, Isso, dan Muky.

Not to forget all the people whose name can not be mentioned one-by-one in MMUI for making it happen.

Thank You! God Bless You All!

August 2008

ABSTRACT

With the dawn of options trading in Indonesia, firms, as well as investors, in Indonesia can enjoy a broadening of their investment horizons and possibilities. This thesis intends to explore some of the possibilities that investors can expect to have at their disposal. The alternative strategies: covered calls and dividend hedge capture strategies should provide the investor an alternative vehicle of investment in facing problem of optimizing returns in any given market situation. But, the strategy must be understood in all aspects pertaining to returns as well as their risks. This strategy is not one that guarantees returns but one that provides possibilities and should be also be used with patience and perseverance. The firm as the main initiator of the alternative strategies, highlighted in this thesis must consider the choices available to them as well as their constraints in choosing the alternative strategies. But the results obtained should enlighten the firms returns on their excess corporate cash holdings.

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CHAPTER 1
INTRODUCTION

1.1. Background

The options market has existed for some time in numerous countries around the world. As regulations and mechanisms surrounding options trading today have become more simplified, fast, and efficient, this condition has allowed options products to evolve and expand to meet a growing number of investment scenarios. Besides that options have provided numerous types of investors, especially those with low risk tolerance, access to the higher returns yielding stock markets. One specific type of investors are firms that are looking for alternative investment strategies that will provide them optimal returns on their excess cash holdings.

This scenario was not thought of until recently in the 1980s where a growing number of companies have employed options based hedge strategies on their cash holding investments. This is made possible due to options and its features where it provides a source of price movement protection giving flexibility to investors in terms of the structure and payouts.

For Indonesia particularly in 2003, regulations of the options market had just been finalized by the Jakarta Stock Exchange, now known as the Indonesian Stock Exchange (Sembiring, 2003). But the mechanisms carrying out options trading itself is still very limited in terms of the availability, which makes options available through joint broker ventures, at relatively affordable prices in comparison with foreign options markets counterparts. The future for options trading in Indonesia remains bright and promising as long as the options market is established and developed to better suit the needs and circumstances of all types of investors.

As for the corporate investor, options based hedge strategies is a unique investment strategy which can be applied in Indonesian firms. But the treatment and nature of these strategies functions differently for corporate investors compared to individual (non-corporate) investors there are constraints that must be taken into consideration when planning to employ these alternative strategies. These considerations must weigh the risks as well as the returns compared to other relatively (risk-free) investments, and the time constraints that a typical corporate investor has.

1.2. Statement of Problem

For a typical firm, a part of short-term finance and planning is determining how much and where to put idle cash to work for the company, i.e. optimizing cash holdings. When the firm does set the amount which it can use to seek other relatively higher returns, often the question of how much and where to put its money for short-term investments in real-life is difficult to figure out. Difficult because of numerous possibilities of investments, from risk-free to high-risk, which may yield attractive returns for the company. But for the cash management end, the possibilities are limited to relatively low to no risk, which implies also low to no returns.

For a company it is out of common sense that the cash it has should not sit idle, obtaining no returns. Therefore constrained by low to no risk choices, traditionally a company takes up positions in risk free securities such as certificate of deposits (CDs), commercial paper, or SBIs as a source of returns.

In times of economic recessions or even in the face of a depression, bonds tend to outperform stocks because of their risk-free nature. During these times investments in companies tend to lag and be diverted away because of the high degree of instability and uncertainty provided by the economic condition. But when economic conditions bounce back, return to normal, and expand, stocks tend to outperform bonds for reasons of the investments that made its way back to companies and the economy as a whole.

This does not imply totally that marketable securities, certificate of deposits (CDs), commercial paper, or Treasury bills, are at all not worth the wait. But there is a time when the company must take into account other investments to obtain maximum gains when bonds and the like are outperformed by stocks by a high margin.

1.3. Objective of Study and Writing

The traditional cash conversion cycle analysis had been an analysis where firms can optimize its working capital (current assets-current liabilities) by way of: better collection policies for accounts receivables, better management of inventories for inventory, and better management of payment for accounts payables. But another way in which firms can make available higher levels of working capital would be to optimize better returns on its cash holdings, which would be a component of the current accounts part in working capital.

This is where the overall purpose of this study is to provide for an alternative investment strategy which is safe enough and can yield relatively more higher returns on corporate cash holdings. The alternative strategies should be:

1. The covered call strategy, which is a strategy employing the purchase of a number of stocks and simultaneously selling (writing) a number of call options contracts covering the position.
2. The dividend hedge capture strategy, which is a strategy used to obtain dividends on stock holdings, which pays out dividends, through hedging against ex dividend date price declines by writing a call option on the stock holdings.

Therefore the objective of this study overall is to explain and analyze how would alternative strategies: the covered call and dividend hedge capture strategies yield better returns on coporate cash holdings. This should be done by way of analyzing the pricing of premiums as well as estimating the thoretical premiums on options, which makes up the returns on these types of investments.

Second, this study explores the essence of deriving the price (premiums) of call options and analyzes the Binomial Pricing and Black-Scholes pricing models to determine the theoretical price of options, which provides the hypothetical returns if those options on 10 stocks of the LQ-45 were to exist and be traded.

Third, this study is expected to provide a comparison study of the options market in the US and give a sense of what is needed to further develop the options markets in Indonesia.

1.4. Scope and Context of Study and Writing

The analysis of deriving the price (premiums) on options mainly uses the Black-Scholes pricing model to arrive at the theoretical price of options. The Binomial Pricing model will provide a benchmark and a comparison of the derivation of call options premiums. The reason for the main usage of the Black-Scholes Pricing model is that the Binomial Pricing model tends to converge into the Black-Scholes as the strike price and the stock price difference tends to be in-the-money and nearing expiration. Thus the Black-Scholes Pricing model should provide for the lower-level of premiums on call options.

1.5. Method of Analysis

The method of analysis used in this thesis combines theory and research to provide a simulation of premiums required to compare the alternative strategy to the traditional strategy of investments.

Theory pertains to the pricing of options derived using the Binomial Pricing and Black-Scholes Pricing model. While reasearch is based on estimating the historic volatility of options using the daily closing prices of 10 stocks on the LQ-45. This historic volatility then is inputted into the Black Scholes Pricing model to derive the theoretical price of options.

Simulations of returns is used by generating a historical situation where hypothetically a firm invests in covered call and dividend hedge capture strategies and then compared to the risk-free rate to determine the favorability of the alternative investment strategies.

1.6. Organization of Thesis and Content

This thesis is arranged in the following order:

CHAPTER 1 Introduction

This chapter introduces the background, problem, and objectives as well as the scope of study and writing governing the structure and analysis of this thesis.

CHAPTER 2 Options and Corporate Cash Management

This chapter provides for the history of the development of options which explains the evolution and establishment of how the options market trades today. The chapter continues with the determination of call premiums beginning with the essence and underlying factors in its pricing. Options pricing is further explained by the Binomial Pricing and Black-Scholes Pricing Models which provides the underlying analysis in deriving the price of premiums of 10 (ten) LQ-45 stocks. Besides that, this chapter also explains the mechanisms of an options trade which provides the strategies which are essential to alternative corporate cash management strategies.

CHAPTER 3 Theoretical Pricing of Options

This chapter provides the methodology of obtaining the theoretical pricing of call options premiums employing the Binomial Pricing and Black-Scholes model quantified. The theoretical pricing of call options premiums is also employed in obtaining a simulation of a hypothetical condition as if firms had employed the alternative strategies in numerous cases.

CHAPTER 4 Evaluation of Covered Call & Dividend Hedge Capture Strategy

This chapter evaluates the returns on the alternative strategies compared to the traditional strategies of corporate cash holding optimizing. In evaluating the results the Sharpe ratio as well as statistical tests, t-test and Wilcoxon signed ranked test, are used.

CHAPTER 5. Conclusion & Recommendation

This chapter provides the conclusion and recommendations pertaining to the alternative strategies which can be implemented by firms and the future of the options markets in Indonesia.

CHAPTER 2
OPTIONS AND CORPORATE CASH MANAGEMENT

2.1. Options and Options Trading

In order to understand the full extent of options and how it pertains to the further growth of its trading in the Indonesian stock market for the forthcoming future, we should examine the history, the structure of the options market as well as the mechanism that shape options trading in America. This should be important in adopting both structure and mechanism of options trading for Indonesia.

2.1.1. Brief History of Options

Options actually have been around for quite a long time. It is not know precisely where and when the first option contract was traded. History had dated options as far as ancient times when the Romans and even the Phoenicians used similar contracts in shipping. Historical evidence also points out that Thales (G. E. R. Lloyd, 1971) a mathematician and philosopher in ancient Greece, employed options in order to secure a low price for olive presses in advance of the harvest. Thales had a method of predicting a typical olive harvest would be particularly strong in one season and weak in another season. With this information at his disposal then Thales when it was the off-season and demand for olive presses was critically low, would acquire rights, at a very low cost, to use the presses the following spring. Later on, when the olive harvest on again for the season, Thales exercised his option and proceeded to rent the equipment to others at a much higher price.

In America, options first became known around at the time stocks also began trading. In the beginning of the 19th century, call and put options contracts, at that time was known as privileges, were not traded on formal exchange. Because of the differing terms of each contract held by each investor, it was difficult and painstaking for buyers and sellers to find each other and reach an agreement. For the coming several decades, growth of option trading remain growing at a slow pace. This was due to the cumbersome and illiquid early over-the-counter options failing to attract investors. Without a formal exchange, all trades were executed via phone. In addition, investors had no way of knowing what the real market price of a given options contract was.

2.1.2. The role of Chicago Board of Trade in development of options

Near the end of the 1960s, Joseph W. Sullivan, Vice President of Planning for the CBOT, studied the over-the-counter option market and concluded that two key features for success were missing (www.optionsxpress.com).

First, Sullivan believed that existing options had too many variables. To correct this, he proposed standardizing the strike price, expiration, size, and other relevant contract terms.

Second, Sullivan recommended the creation of an intermediary to issue contracts and guarantee settlement and performance. This intermediary is now known as the Options Clearing Corporation[1].

To standardize and replace the put-call dealers, who served only as intermediaries, the CBOT created a system in which market makers were required to provide two-sided markets both for puts and calls. At the same time, the presence of these multiple market makers made for a competitive atmosphere in which buyers and sellers both could be assured of receiving the best possible price.

2.1.3. Establishment of Chicago Board Options Exchange (CBOE)

To further carry out improvements in the options markets, the Chicago Board of Trade established the Chicago Board Options Exchange (CBOE). At that time the CBOE began trading listed call options on 16 stocks on April 26, 1973. The first-day of trading for the CBOE generated a volume of merely 911 contracts, but this number gradually increased and the average daily volume skyrocketed to over 20,000 the following year.

[1] Later explained in 2.1.4

The number of underlying stocks with listed options had doubled to 32, while the exchange membership doubled from 284 to 567. In addition at that time, new laws opened the door for banks and insurance companies to include options in their portfolios. Because of that, option volume continued to grow rapidly. By the end of 1974, average daily volume exceeded 200,000 contracts.

2.1.4. Options Clearing Corporation

Exchange-traded options are not issued by the companies themselves. Instead, they are issued by the Options Clearing Corporation (OCC). By centralizing and standardizing options trading, the OCC has created a more liquid market. The OCC was founded in 1973 as directed by the CBOT Vice President of Planning in order to make options trading much more liquid and practicable for investors. The OCC functions as a intermediary for buyers and sellers of call and put options. This would mean that the OCC act as a guarantor, ensuring that the obligations of the contracts clears are fulfilled (www.theocc.com).

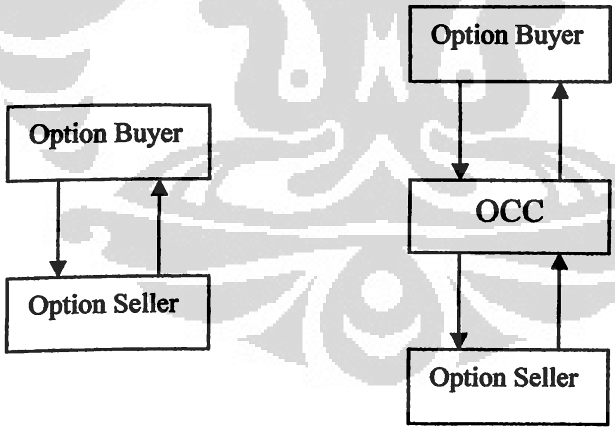


Figure 2.1. Diagram OCC as a clearinghouse

Overseeing OCC is a clearing member dominated by board of directors. OCC operates as an industry utility and receives most of its revenue from clearing fees charged to its members. OCC offers volume discounts on fees and, as applicable, refund excess fees to its clearing members.

OCC's participant exchanges include: international and national exchanges e.g. NASDAQ Options Market, American Stock Exchange, Chicago Board Options Exchange, International Securities Exchange, NYSE Arca, and regional exchanges e.g. Philadelphia Stock Exchange, and the Boston Stock Exchange. Its clearing members serve both professional traders and public customers and comprise approximately 130 of the largest U.S. broker-dealers, futures commission merchants and non-U.S. securities firms. OCC's goal is to service clearing members and the exchanges through an operating plan that emphasizes timely, reliable and cost-efficient clearing operations.

OCC also serves other markets, including those trading commodity futures, commodity options, and security futures. OCC clears commodity contracts traded on CBOE Futures Exchange and Philadelphia Board of Trade, respectively, as well as security futures contracts traded on OneChicago.

2.1.5. Mechanism of An Options Trade

Unless otherwise specified for, a typical options contract controls 100 shares of stock. Its strike price has also been pre-specified according to the particular stock price. In general, the strike price is determined at a $5 fold. A Call options for Apple Computer shares (AAPL) would be quoted with the following strike price.

Table 2.1. Example of AAPL options quote

Strike	Symbol	Last	Chg	Bid	Ask	Vol	Open Int
90.00	QAAHR.X	75.20	0.00	72.05	72.35	21	91
95.00	QAAHS.X	69.95	0.00	67.05	67.35	10	51
100.00	QAAHT.X	60.80	3.10	62.10	62.35	2	73
105.00	QAAHA.X	56.40	3.60	57.10	57.40	2	96

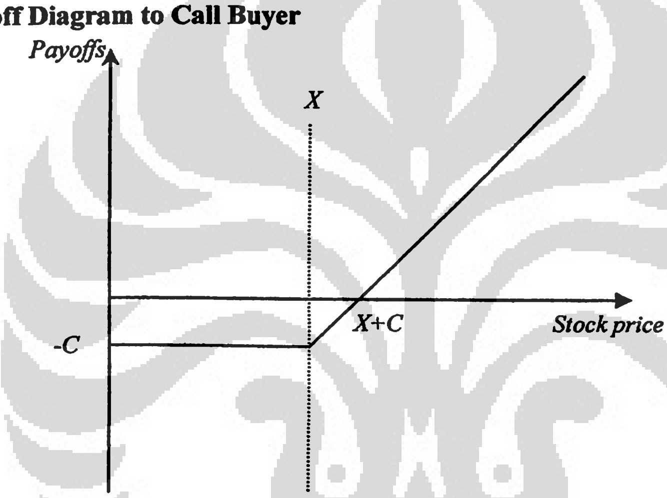
Source: finance.yahoo.com

In its simplest terms, an option holder has the right, but not the obligation, to buy (for calls) or sell (for puts) a particular stock at a set price (strike) on or before the day of expiration. The expiration date set by the OCC for all options is the third Friday for which month the option trades. For the example of Apple Computer shares options above, the August call options expires on Friday, August 15, 2008, which is the third Friday for that month.

For options (Chance, 2004), a typical investor can either buy or sell (write) an option (call or put).

1. When that investor chooses to buy a call option, she chooses to hold the right by buying a call options contract for *C*, of buying a particular stock at a specific price, let say *X*. We can draw up her payoff in the following diagram with no transaction costs:

Figure 2.2. Payoff Diagram to Call Buyer

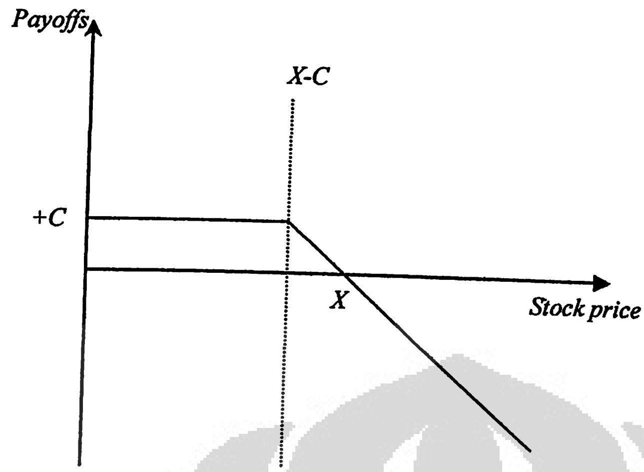


Source: Bodie, Zvi, Alex Kane, Alan J. Marcus. (2007)

As long as the stock price trades at below the strike price, *X*, then the investor has not gained but still endures a loss from the option price of *C*. The investor's payoff starts to rise as the stock price surpasses the strike price reaching a break-even payoffs at *X+C*, or the point where the stock price exceeds the strike price and just about covers the premium paid for the contract. From then on then the investor gains as the stock price continues to rise adding to her payoff.

2. In contrast, when an investor chooses to write (sell) a call option, she chooses to forgo the right to buy a particular stock at a specific price, *X*, and is awarded a premium of *C*. We can draw up her payoff in the following diagram with no transaction costs:

Figure 2.3 Payoff Diagram to Call Writer

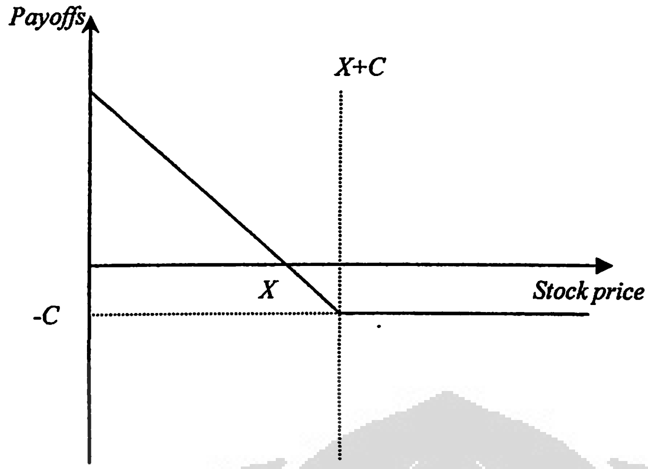


Source: Bodie, Zvi, Alex Kane, Alan J. Marcus. (2007)

As long as the stock price trades at below the strike price, *X*, then the investor has gained the premium of *C*. The investor's payoff starts to decline as the stock price surpasses the point where *X-C* and breaks even at *X*, or the point where the stock price starts to exceed the strike price and the premium received for the contract disappears and would have to be closed out (bought back) at higher prices. From then on then the investor continues to suffer losses as the stock price continues to rise.

3. When an investor chooses to buy a put option, she chooses to hold the right to sell a particular stock at a specific price, *X*, and pays the premium of *C*. We can draw up her payoff in the following diagram with no transaction costs:

Figure 2.4. Payoff Diagram to Put Buyer

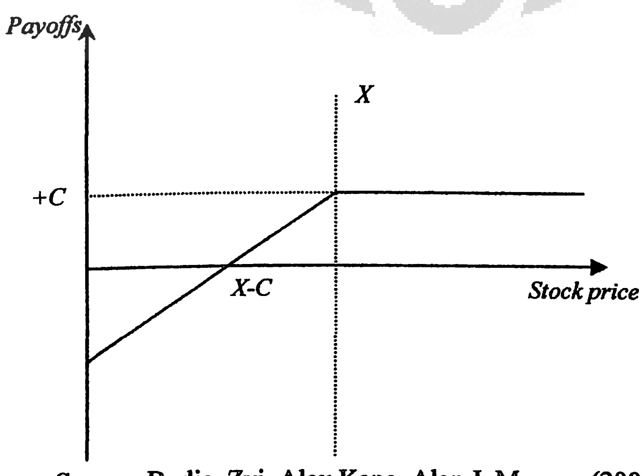


Source: Bodie, Zvi, Alex Kane, Alan J. Marcus. (2007)

When the stock price trades at below the strike price, *X*, then the investor gains from premium larger than *C*. The investor's payoff starts to decline as the stock price increases and breaks even at *X*. By reaching *X+C*, the investor suffers a maximum loss of the premium paid, *C*.

4. When an investor chooses to write a put option, she chooses to forgo the right to sell a particular stock at a specific price, *X*, and is compensated a premium of *C*. We can draw up her payoff in the following diagram with no transaction costs:

Figure 2.5. Payoff Diagram to Put Writer



Source: Bodie, Zvi, Alex Kane, Alan J. Marcus. (2007)

When the stock price trades at below the strike price, *X*, the investor suffers losses larger than *C*, as the investor would have to close out (buy back) at a higher premium. The investor's payoff starts to rise as the stock price increases and breaks even at *X-C*, at X the investor fully collects premiums of *C*.

2.2. Fair Price of An Option

Determining the value of an option is related to determining the possibilities of future outcomes prices (of an underlying) can have. In other words if we could add up all the possible individual pay-offs and weight them according to their individual probabilities, then that sum would *be* the price of an option at expiration. Then the price of the option at today would then be the *present value* of that sum at expiration (Ward, 2004).

Determining the possibilities would be to list all the possible outcomes pertinent to an underlying stock's price movement, in this case it is *up* or *down*. But the problem persists that not only the direction (up or down), but by how much within the given period it is valid. In listing all possibilities of the direction and amount to which the underlying will move we should obtain a distribution of the possibilities in consistent with the normal distribution, which is the key to understanding the Black-Scholes Pricing Model.

To further explain (Ward, 2004), we should consider a definite possibility of one outcome of a certain stock, say ABC. Shares of ABC trade at $100 at the opening and there is no uncertainty that the shares will close at $110 at the end of the day. Then the options of ABC with a strike price of $100 should be priced at $10 ($110-100), strike price of 90 priced at $20, strike price of $80 at $30, and so on. The reason for the pricing, of $10 at strike price $100, is that because everyone knows that the shares of ABC will close at $110. Then no one would be willing to pay for more than $10 or sell for below $10. The distribution of this no uncertainty scenario of shares of ABC would then be:

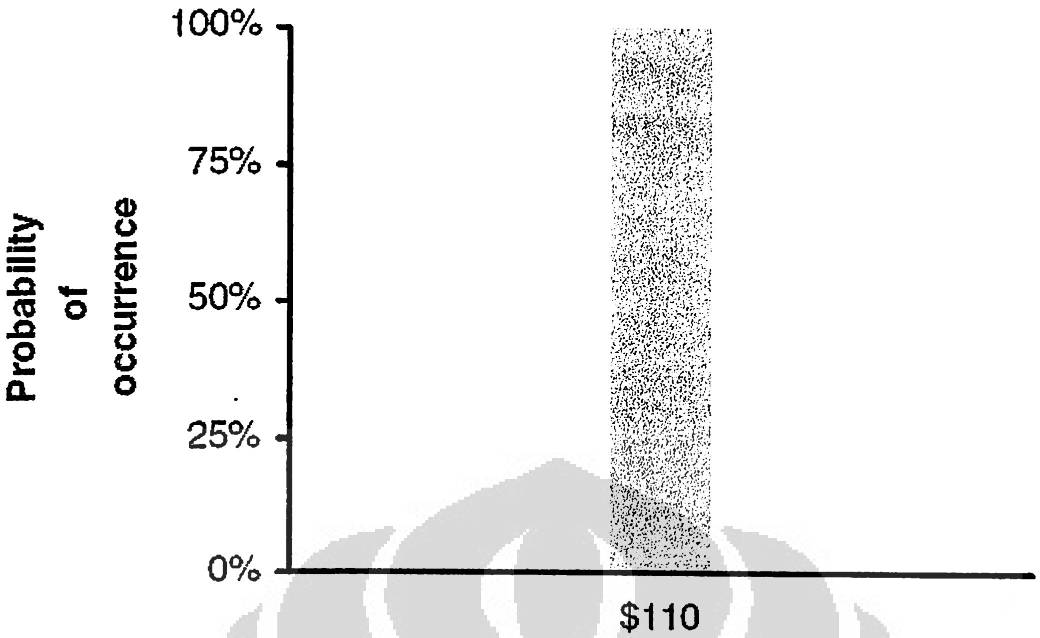


Figure 2.6. Distribution with no uncertainty
Source: Ward (2004), Options and Options Trading

The next scenario calls for two possibilities of the closing price of ABC shares: the price remains unchanged at $100 or the price goes up to $110. Then the fair price of a call option strike price of $100 is the sum of: 50% chance of ABC remaining at $100 and 50% chance of ABC closing at $110, or rewritten as: $\{50\% \times (\$100 - 100)\} + \{50\% \times (\$110 - 100)\}$ equaling to $5.

The distribution of the two possible outcomes scenario would then be:

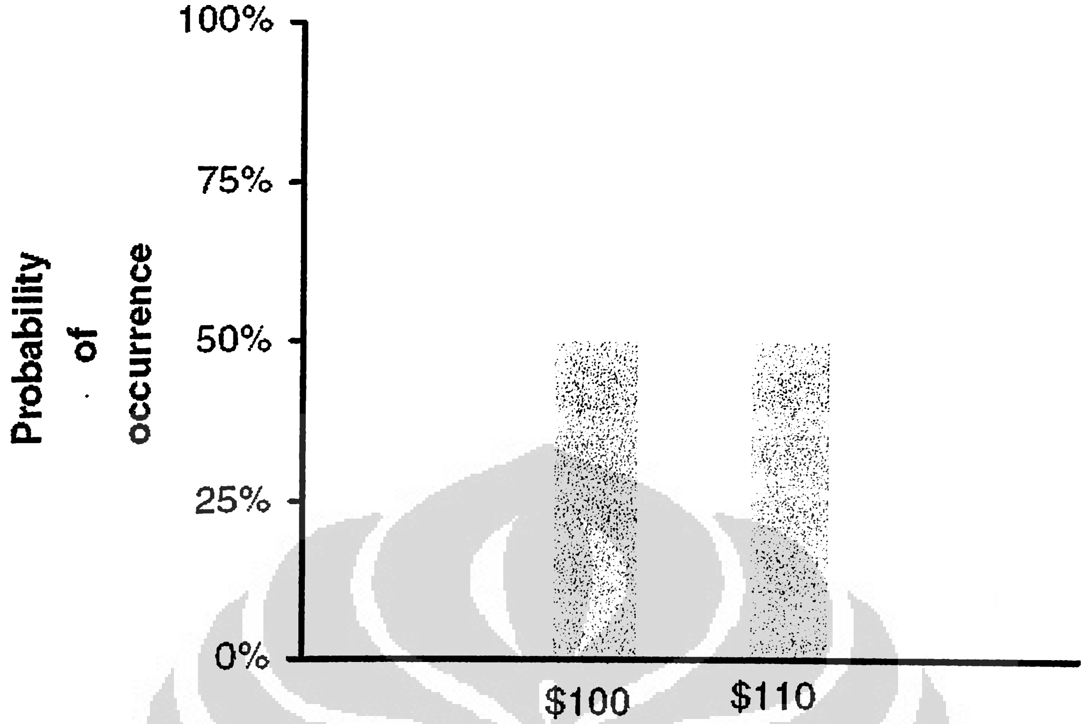


Figure 2.7. Distribution with 2 possibilities
Source: Ward (2004), Options and Options Trading

The scenarios continue for numerous possibilities where the price of ABC share would close at therefore generating the normally distributed form with 5 possibilities where the price of ABC shares would be expected to close.

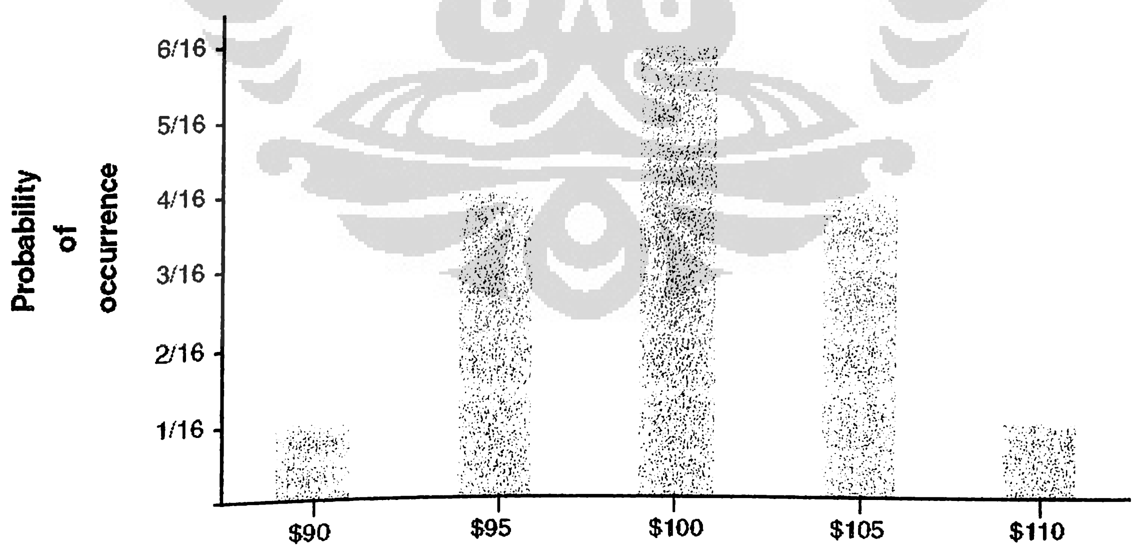


Figure 2.8. Distribution with 5 possibilities
Source: Ward (2004), Options and Options Trading

The possibilities of ABC closing at $90, $95, $100, $105, and $110 will generate the fair price of our call option strike price of $100 amounting to:

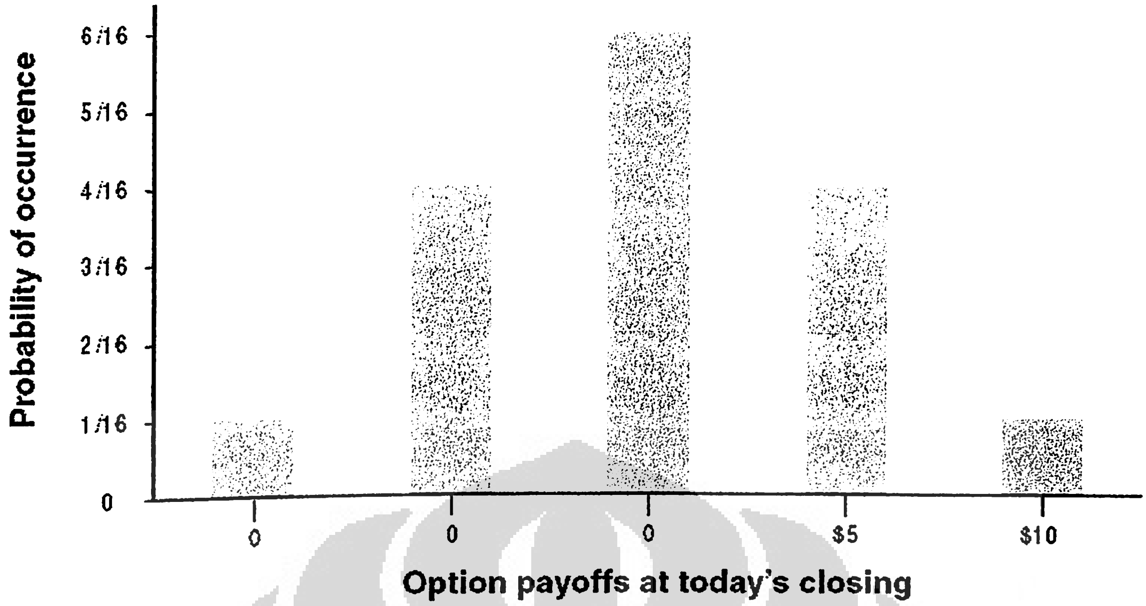


Figure 2.8a. Distribution with payoffs of 5 possibilities
Source: Ward (2004), Options and Options Trading

$$\left(\frac{1}{16}\times \$0\right)+\left(\frac{4}{16}\times \$0\right)+\left(\frac{6}{16}\times \$0\right)+\left(\frac{4}{16}\times \$5\right)+\left(\frac{1}{16}\$10\right)=\frac{\$30}{16}=\$1.875$$

At this *fair* price, it would mean if we had bought this call option 16 times we would get a break-even of $30. This $30 is simply: $5 payoff received 4 times, and $10 payoff received once.

As the number of scenarios continue holding greater numbers of possibilities of where the price of ABC shares will close. Then the distribution becomes one of the *smooth* normal distribution curve below. This smooth curve holds all the possibilities of where the stock price will close given the amount of time available for the investor.

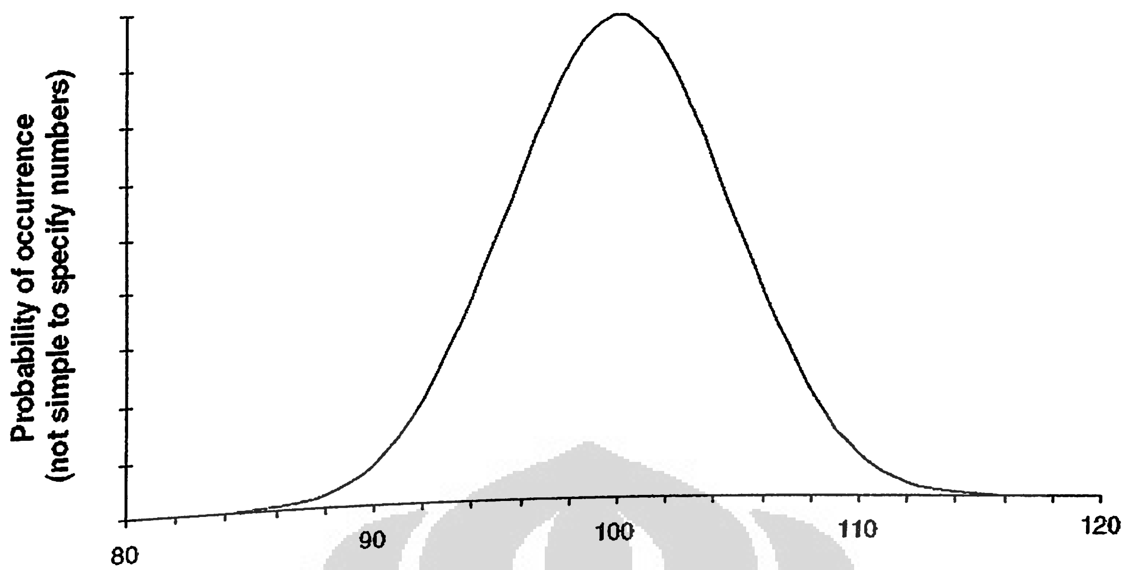


Figure 2.9. Distribution with numerous possibilities- The Normal Distribution
Source: Ward (2004), Options and Options Trading

2.3. Binomial Options Pricing Model

The binomial model (Hull, 1998) breaks down the time to expiration into potentially a very large number of time intervals, or steps. A tree of stock prices is initially produced working forward from the present to expiration. The tree represents all the possible paths that the stock price could take during the life of the option.

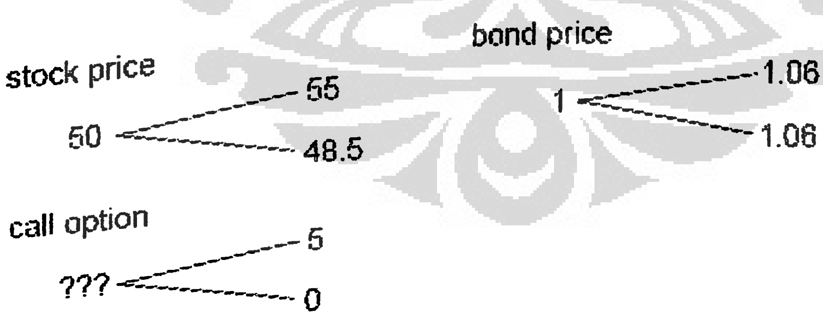


Figure 2.10. Diagram of Binomial Options Pricing Model
Source: Ward (2004), Options and Options Trading

At each step it is assumed that the stock price will move up or down by an amount calculated using volatility and time to expiration. This produces a binomial distribution, or recombining tree, of underlying stock prices.

On the expiration of the option, which would be the end of the tree, all the terminal option prices for each of the final possible stock prices are simply equaling their intrinsic values. Next the option prices at each step of the tree are calculated working back from expiration to the present. The option prices at each step are used to derive the option prices at the next step of the tree using risk neutral valuation based on the probabilities of the stock prices moving up or down, the risk free rate and the time interval of each step. Any adjustments to stock prices (at an ex-dividend date) or option prices (as a result of early exercise of American options) are worked into the calculations at the required point in time. The end result of the top of the tree would be the one option price.

The method for deriving the price of the call option will be simplified employing the following equations:

The stock price movement of either, Su or Sd, is in alignment with the options price of either, Cu or Cd.

With the binomial up parameter:

$$u = e^{\sigma\sqrt{T/n}} \qquad \textbf{Equation 2.1.}$$

and a binomial down parameter:

$$d = \frac{1}{u} \qquad \textbf{Equation 2.2.}$$

and risk free rate component in binomial model:

$$r = (1+R)^{T/n} \qquad \textbf{Equation 2.3.}$$

Both d and u as well as r will be input for determining p:

$$p = \frac{r-d}{u-d} \qquad \textbf{Equation 2.4.}$$

Thus, the notation for this tree would be:

Cu = Max (0, Su-X)

Cd = Max (0, Sd-X)

Which then we can obtain for the price of the call from the following equation:

$$C = \frac{pCu + (1-p)Cd}{1+r} \qquad \textbf{Equation 2.5.}$$

2.4. Black-Scholes Options Pricing Model

A breakthrough in option price determination in 1973 was the Black-Scholes Model (Black & Scholes, 1973), the Black-Scholes model states that the value of a call option depends on the price of its underlying stock, time to expiration, and the variables taken as known constants.

$$C = SN(d_1) - Ee^{-Rt}N(d_2)$$ **Equation 2.6.**

where

$$d_1 = [\ln(S/E) + (R + \sigma^2/2)t] / \sqrt{(\sigma^2 t)}$$ **Equation 2.7.**

$$d_2 = d_1 - \sqrt{(\sigma^2 t)}$$ **Equation 2.8.**

invloving five parameters:

1. S = current stock price
2. E = exercise price of call
3. R = annual risk-free rate of return, continously compounded
4. σ^2 = variance (per year) of the continuous return on the stock
5. t = time (in years) to expiration date

with a statistical concept that:

N(d) = probability that a standardized, normally distributed, random variable will be less than or equal to d

The first part, N(d1), derives the expected benefit from acquiring a stock outright. This is found by multiplying stock price, S, by the change in the call premium with respect to a change in the underlying stock price, which is N(d1). The second part of the model, $Ee^{-rt}N(d2)$, gives the present value of paying the exercise price on the expiration day. The fair market value of the call option is then calculated by taking the difference between these two parts.

Assumptions of the Black-Scholes Model:

1. *The stock pays no dividends during the option's life*

Dividend payments seem as a serious limitation to the model considering the observation that higher dividend yields elicit lower call premiums. A common way of adjusting the model for this situation is to use an adjusted stock price which dividends are subtracted from.

2. *Exercise terms are those of European Options*

European exercise terms stipulates that the option can only be exercised on the expiration date, while its counterpart's, American options, exercise term allows the option to be exercised at any time during the life of the option, making American options more valuable due to their greater flexibility. This assumption which gives rise to limitations is not a major concern because in reality very few calls are ever exercised before the last few days of their life. Because when a call is exercised early, we forfeit the remaining time value on the call and collect the intrinsic value. Towards the end of the life of a call, the remaining time value is very small, but the intrinsic value is the same.

3. *Markets are efficient*

This assumption relates to the fact which it states that people cannot consistently predict the direction of the market or an individual stock and in the process obtain abnormal returns.

4. *No transaction costs, e.g. taxes, commissions and fees, are charged*

In reality, market participants *do* have to pay a commission to buy or sell options. Even floor traders pay some kind of fee, but it is usually very small. What should be considered here are the fees that an individual investor pays is more substantial and can often distort the output of the model.

5. *Interest rates remain constant and known*

The Black-Scholes model uses the risk-free rate to the extent that it is a constant and a known rate. In reality there is no such thing as the risk-free rate, but the discount rate on U.S. Government Treasury Bills with 30 days left until maturity can be used as a proxy. During periods of rapidly changing interest rates, these 30 day rates are often subject to change, thereby violating one of the assumptions of way of adjusting the model for this situation is to use an adjusted stock price which dividends are subtracted from.

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6. *Stock returns are lognormally distributed*

This assumption suggests, returns on the underlying stock are normally distributed, which is reasonable for most assets that offer options. Further explanation of this assumption had been addressed in the previous part (2.2).

2.5. Theory of Corporate Cash Management

Companies face a major issue in determining the optimal amounts of cash to hold. Myers & Majluf (1984) determined that costly external finance and potential constraints make it important for firms to maintain a liquid cash reserve so positive NPV projects can continue to be funded, or in a strategic view, the firm thus can exploit or respond to sudden changes in its external environment as well as competition.

The covered call strategy is an alternative strategy that will be available to Indonesian firms facing problem with better returns on idle cash holdings or problem with undertaking negative NPV projects. The strategy should prove beneficial for firms, but employing it, firms will have to meet several requirements and stipulations in order for the strategy to yield optimal returns in the face of firm specific and market risk. This would then lead to the determination of how much and for how long should firms allocate cash holding in order to obtain perceived higher returns

It is deemed favorable for a firm to have excess cash holding in order to dedicated an amount to the covered call strategy. But overall the company must take into consideration risks that relates to excess cash holding, we can identify the most related risks (Beltz & Frank, 1996) are:

1. Risks due to fluctuations of operating cash flows, in that availability is most crucial but in the other hand this resource must not be underutilized

2. Risk of interest rates, as seen in the standard deviation of interest rates, where in times where interest rates are high then excess cash holding is undesirable, whereas when interest rates are low then excess cash holdings will be desirable. This excess cash holding will give way to other high-yielding returns on those excess cash.
3. Agency risks, relating to the amount of cash available to a firm as well as the number of investment opportunities also available. When firms hold excess cash and very little investment opportunities are available to them, or even negative NPV yielding investments are only available, them the agency motive holds that managers will most likely invest in those negative NPV investments or increase payouts to shareholders. Both of which should affect the value of the firm detrimentally.

2.5.1. Cash Conversion Cycle

In determining this limited investment period, we must examine closely a firm's cash conversion cycle (operating cycle). The cash conversion cycle, indicates how cash is moving through a company in terms of duration. This ratio is vital because the cycle represents the number of days a firm's cash remains tied up within the operations of the business. In examining the cash conversion cycle we must examine closely: a firm's inventory, receivables and payables in the form of its respective turnovers.

$$\frac{COGS}{Inventory/360} = \text{Average Inventory Collection Period} + \quad \textbf{Equation 2.9.}$$

$$\frac{Sales}{AR/360} = \text{Average Receivables Processing Period} - \quad \textbf{Equation 2.10.}$$

$$\frac{COGS}{AP/360} = \text{Average Payables Period} \quad \textbf{Equation 2.11.}$$

$$= \quad \text{Cash Conversion Cycle}$$

The cash conversion cycle indicates the duration of time it takes the firm to convert its activities that are requiring cash into cash returns. The faster, meaning less days required, a firm can generate cash within its cash conversion cycle the more beneficial it becomes for the firm. In other words, *a downward trend in this cycle is a positive signal while an upward trend is a negative signal.*

When the cash conversion cycle shortens, cash becomes free for other uses such as investing in new capital, spending on equipment and infrastructure, as well as preparing for possible share buybacks down the road. On the other hand, when the cash conversion cycle lengthens, cash remains tied up in the firm's core operations, leaving smaller range of choices available for other uses of its cash flow. Each business seeks to obtain a proper mix between the amount of resources deployed to working capital and those to capital investments. Thus, an ongoing trade-off between operational decisions to lengthen the cash conversion cycle (which increases the liquidity required) and financial decisions to shorten the cycle (which decreases the liquidity required).

2.5.2. Analysis of Traditional Cash Management

For a company, traditionally, it is deemed important for them to have sufficient working capital- that is current assets minus current liabilities- in order to support its day to day operations as well as pursue opportunities in terms of growth and competition stipulated by the company's external environment. For a typical working capital management scheme, the viewpoint has always been to maintain or increase working capital by three general ways (Buchamann, 2008):

1. Inventory, by reducing inventory firm will free tied up cash in the form of excess inventory
2. Receivables, by speeding up receivables collection firms will have ready cash. This can be achieved through incurring down payments from customers and setting up a series of payments to ensure the collectivity of receivables.

3. Payables, firms should benchmark terms and conditions against industry best practices and eliminate early payments, except when attractive discounts are offered.

The three viewpoints mentioned above are both from a current asset and current liabilities standpoint. In that another component of current assets is often forgotten and that is cash and cash equivalents as well as marketable securities. These components of current assets is also important and when optimized and used to generate an even higher return can prove beneficial of the firm combined with inventory, receivables, and payables in generating sufficient and even higher levels of working capital for the firm.

In optimizing company cash holdings the typical strategy that a company employs involves instruments with high liquidity: money-markets, deposits, bank savings with lower levels of risk. In some cases firms also employ the use of mutual fund in optimizing their cash holdings and generating yields. The question then are these instruments currently employed optimal for firms, in that they generate the highest returns possible at lower levels of risk adequate for corporate cash holdings.

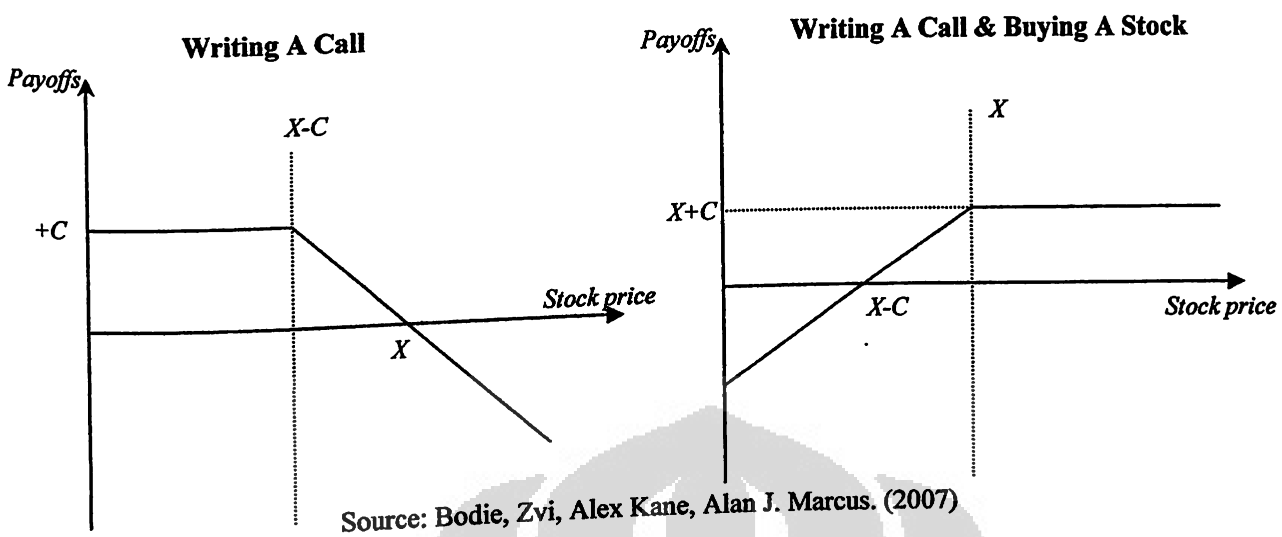
2.6. Alternative Strategies to Today's Corporate Cash Management

The mechanism of an option trade makes it possible for investors to derive numerous hedge strategies that generate returns in any market condition for a lower level of risk. Two of the strategies that is related to this thesis is the covered call strategy and the dividend hedge capture strategy which is seen fit to be employed on corporate cash management.

2.6.1. Covered Call Strategy

The covered call strategy is a short-term hedge strategy employing the writing (sale) of call options of an underlying stock for the number of that stock's holdings. The idea here is that an investor can gain premiums while having the stock holdings to ensure the premiums received (Bodie, Kane & Marcus, 2002).

Figure 2.11. Payoff Diagram to Covered Call Strategy



Source: Bodie, Zvi, Alex Kane, Alan J. Marcus. (2007)

The payoffs received by an investor would be the premiums at an initial sale of call options as much as C. As the stock prices increases, the investor if had not held the stock then would have to cover her trade at a much higher premium resulting in a total negative payoff. But because of the covered call strategy the investor simply delivers her stock holding and retains the premiums from her selling the call options.

As we can see from Figure 2.6. the investor employing the covered call strategy by writing call options enjoys downside protection up to *X-C*. When the stock is trading at prices lower than its exercise

This strategy is one that can be used for yielding higher returns on corporate cash holdings because of the short-term length and its risk protection property. When employing a covered call strategy for corporate cash uses, it is recommended that the option written for is one that is *in-the-money* or even *deep-in-the-money*. The reason for this is for a more guaranteed exercise of the option, rather than it be at-the-money or out-of-the-money which is much more riskier, especially for corporate cash management, in that the option is not exercised and the company's cash is exposed to additional unwanted risk as it continues to hold the stocks unexercised at a lower price.

In the case of when the stock price declines to a point where the options remain unexercised, a typical exit scenario would be to hold on to the stocks and options as it is unexercised an expires but still generating an income from the premiums obtained. Then for the next trading options month sell call options again but for a lower exercise price, one that would guarantee an exercise at an even lower price.

2.6.2. Dividend Hedge Capture Strategy

This strategy is employed in order to capture the dividends paid out from a typical stock while being protected from price declines as a result. When a stock pays out dividends, either quarterly, annually or even one time, the stock price will be corrected to the amount of the dividends the stock will pay out. This is done to reflect the value of the shares of a company with cash flowing out from the company, thus producing the lower price. When this happens, an investor can not just buy the stock just before it pays out the dividends, expect to receive the dividends and sells the stock afterward. She will suffer a price decrease on her holdings. To resolve this situation, options are then employed creating a hedge that will protect the stock holdings while she receives dividends.

The dividend hedge capture strategy employs a put option in order to maintain a selling price for the holder that is higher than the market price after the price correction. When a company wants to pay out dividends on its shares, the company usually makes an announcement of this matter. In the announcement, the company specifies (Bodie, Kane & Marcus, 2007):

1. ***Ex-date or Ex-dividend date***– on this date henceforth shares of a company paying dividends is corrected to a lower price of the amount of dividends paid out.
2. ***Date of record***– at this date the company will look at its records to see who the shareholders of the company are. For an investor wanting to receive dividends, she must be listed as a holder of record.
3. ***Date of payment (payable date)*** – at this date the company actually pays out the dividend to the holder of record. This date is generally a week or more

after the date of record so that the company has sufficient time to ensure that it accurately pays all those who are entitled.

	Ex-Dividend Date		Date of Record	
Monday	Tuesday	Wednesday	Thursday	Friday
5th	6th	7th	8th	9th

Figure 2.12. Dividend dates

To put all these dates together, we can see from the above diagram that the date of record falls on Thursday the 8th. To benefit from the dividend hedge capture strategy, an investor must be recognized as a holder or record at that date. This would mean the investor must purchase the stock on Monday 5th and simultaneously establish a hedge with writing a call for the number of stock holding, thus receiving premiums for the call. The investor on the ex-dividend date then can buy back her call options at an obviously lower price and sell of her stock position at the decreased price. In the process overall the investor obtains the dividend paid out on her stock holding as is also hedged against a price depreciation as a result of ex-dividend date.

2.6.3. Previous Related Studies

The covered call strategy as well as the dividend hedge capture strategy have been applied to cash management for some time in the U.S. Their application have been renowned since the 1970s and a number of research and studies have followed the development of both strategies throughout the years and have shown favorable results pertaining to both strategies applied to cash management. The studies are listed below and identified in which topic they relate and provide empirical support and application, as well as the conclusion obtained from each individual study.

Table 2.2. A Number of Previous Related Studies

Studies	***Related Topic***	***Conclusion***
st of the Applicability of The Black les Call Option Pricing Model: ing S&P 100 Index Call Options n Robertson Burckel, 1989)	Validation of the Application of the Black-Scholes Model	The research concludes that the B-S model accurately estimates the S&P 100 index call options.
ication of Option-Pricing Theory: nty-Five Years Later (Merton, 1998)	Validation of the Application of the Black-Scholes Model	The study concludes that the Black-Scholes as a mathematical model have become mainstream to practitioners in financial institutions and markets around the world.
ned Benefit Pension Plan: Covered Option Accounting (Griffith, 1982)	Empirical test of applying the covered call to corporate use	The study concludes that the recognition of the covered call may signal the future acceptability of other types of options instruments investments.
h Management Implications of a ged Dividend Capture Strategy wn & Lummer, 1984)	Empirical test of applying the dividend hedge capture strategy to corporate use	The study concludes that the annualized returns pertaining to dividend hedge capture strategy yields impressive returns for corporate investors.
eexamination of the Covered Call ion Strategy for Corporate Cash agement (Brown & Lummer, 1984)	Empirical test and reevaluation of the covered call option strategy for corporate use	The study concludes that the dividend hedge capture as well as the covered call strategy is still a valuable tool for the short-term corporate investor.
ancing Stock Returns Using Hedged idend Capture (Zivny, Ledbetter & an, 2006)	Empirical test of the dividend hedge capture strategy to corporate use	This paper concludes that the slight incentive received by investors can be enhanced through a form of dividend hedge capture.

Source: compiled by the author

CHAPTER 3
PRICING OF OPTIONS PREMIUMS

3.1.Deriving the Price of Options on 10 Stocks of the LQ-45

In applying the covered call strategy as well as the dividend hedge capture we must know how much we will receive as premiums in order to validate the strategy as one that generates returns.

In order to estimate all parameters needed to obtain the theoretical premiums of a call option, data used was available data of a number of issues' stock prices from 2004-2008. This period was chosen due to the appreciation of the Indonesian Stock Exchange to new highs followed by a correction of more than 8%, which should provide volatility in conditions of positive and negative returns of stocks.

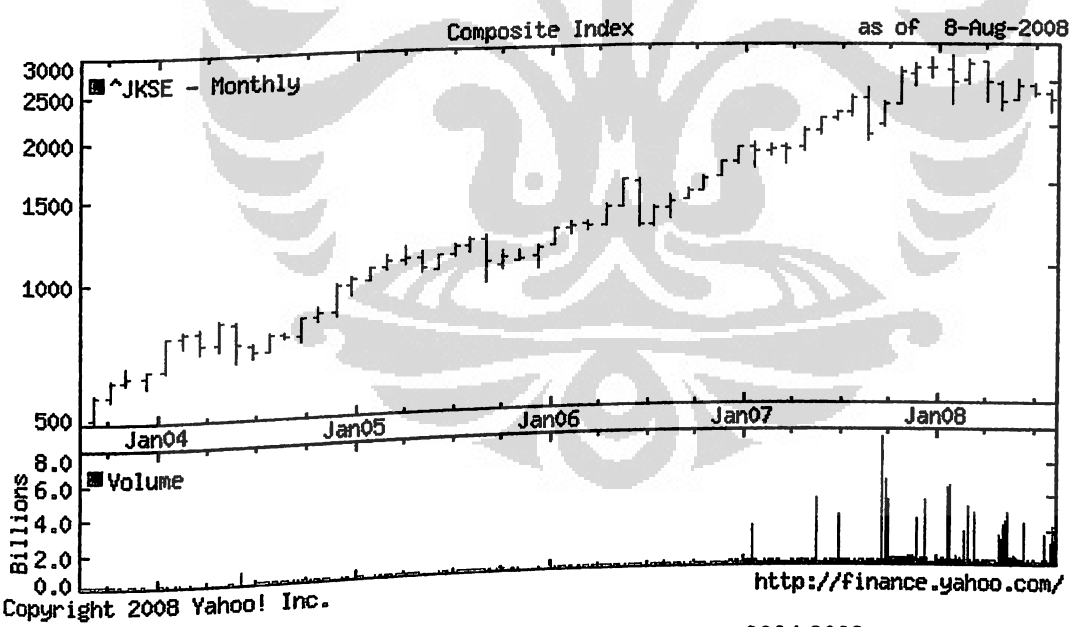


Figure 3.1. The Indonesian Exchange 2004-2008

Further assumptions used as inputs for the models used are:

1. Trading days in 1 year equals to 250 days
2. Call options trading for one particular month, in this case for July only, has 31 day, and on average 21 trading days until its expiration
3. Strike prices are given and set at the same price of each stocks as of July 4, 2008

These issues was also used as input for simulating the dividend hedge capture strategy, where a number of the chosen issues paid out regular dividends.

The premiums estimated are for issues or company stocks in Indonesia listed at the Indonesian Stock Exchange meeting the following criteria stipulated by the exchange:

1. The recent year minimum average monthly transaction of 2000 shares traded
2. The market price of the underlying stock must be above Rp 500,-
3. The minimum monthly price volatility of 10%
4. The stock should have a large market capitalization

In order to conduct the study of generating premiums on covered calls then the following issues have been selected in conformance with the criteria set.

Table 3.1. Comparison of 10 stocks of LQ-45

Issue	Market Price	Monthly Price Volatility	Average Monthly Transaction
TLKM	7,350	11.22%	22,956,600
ANTM	3,100	23.24%	40,606,800
ASII	19,300	13.73%	6,752,970
BBNI	1,230	14.21%	21,557,800
INDF	2,300	15.14%	15,550,800
ISAT	6,500	13.71%	19,681,500
AALI	28,000	14.41%	2,395,760
BBRI	5,400	13.87%	19,983,400
UNSP	1,730	17.69%	60,197,100
PGAS	12,500	17.31%	10.892.000

Source: finance.yahoo.com

These issues from Table 3.1. are selected due to their heavy volume and high monthly volatility which provides a better calculation of premiums compared to issues non-conforming with the requirements mentioned above. We can relate that the criteria stipulated implies that in order for stocks to have options it should be heavily traded which in turn generates high volatility, and in the end have high (worthwhile) premiums. From Table 3.1. for stocks of ANTM, which is heavily traded at more than 40 million shares exchanged monthly, the volatility is high at around 23%. The same goes for UNSP, with heavy volume at around 60 millions shares traded monthly, having volatility of 17.31%.

But not all the issues have heavy volumes in relation to high volatility, some like TLKM do have heavy volumes but come at relatively low volatility. This is because TLKM has a float (shares availably traded) that is limited, being that TLKM share are in majority owned by the Indonesian government.

3.1.1. Price of Call Option of TLKM

From the previous explanation pertaining to estimations of premiums (price of call options) we can determine the premiums using the Black-Scholes options pricing model for all 10 chosen stocks of the LQ-45, beginning with TLKM:

$$\sigma = \sqrt{\frac{0.381603 - \frac{(-0.57763)^2}{939}}{938}}$$

$$\sigma = 0.02016$$

$$\text{Annualized Volatility} = 0.318597$$

The σ we have estimated can be used as input into the Black-Scholes Model involving five parameters:

1. S = current stock price of TLKM = 7350
2. E = exercise price of call of TLKM-O = 7350
3. R = risk-free rate of return = 8.75%
4. σ = volatility of the continuous return on the stock = 0.318597
5. t = time (in years) to expiration date = 31/365 = 0.0849315

Where:

$$d1 = \frac{\ln(7350/7350) + \left\{(0.0875) + \frac{(0.318597)^2}{2}\right\}\frac{1}{12}}{0.318597\sqrt{\frac{1}{12}}} = 0.1252677$$

N(0.1252677) = 0.549844

$$d2 = 0.1252677 - 0.318597\sqrt{\frac{1}{12}} = 0.033297$$

$$N(0.217239) = 0.513281$$

$$C = (7350 \times 0.549844) - 7350(e^{-0.0875/12}) \times 0.513281$$

$$C = 4041.3534 - 3745.207$$

$$C = 296.15$$

From the Black-Scholes options pricing model, a premium of 296.15 is estimated, meaning that an *at-the-money* call options would be worth that much. This price given that the exercise price (strike price) equal to the stock price would mean that 296.15 is actually the time value of the call options, being that TLKM-O has one month's time to expire. The price of 296.15 is approximately 4% of TLKM market price of 7350, which would be a valid percentage compared in terms of stock price.

Using the same input used in the Black-Scholes Model the we can count for the Call premium using the Binomial Pricing Model with:

T = time to expiration = 31/365 = 0.0849

- ✓ n = 1
- ✓ r (risk-free rate) = $(1 + 0.0875)^{0.0849/1}$ -1 = 0.715%
- ✓ $u = e^{0.318597\sqrt{0.0849/1}} = 1.0973$
- ✓ $d = \frac{1}{1.0973} = 0.91135$

- ✓ Su= 7350 x 1.0973 = 8065.155
- ✓ Sd= 7350 x 0.91135 = 6698.40

- ✓ Cu = Max (0, 8065.155 – 7350) = 715.155
- ✓ Cd = Max (0,6698.40 -7350) = 0

✓ $p = \frac{1.00715 - 0.91135}{1.0973 - 0.91135} = 0.5152$

✓ $1 - p = 0.4848$

$$C = \frac{\sum_{j=0}^{1} \frac{1!}{(1-j)!} 0.5152^{j} \times (0.4848)^{(1-j)} Max\left[0,7350 \times 1.0973^{j} x 0.9^{1-j} - 7350\right]}{1.00715^{1}}$$

$$C = \frac{715.155(0.5152) + 0.00(0.4848)}{1.00715} = 365.83$$

The Binomial options pricing model would confirm that an *at-the-money* call options for TLKM would be around 365.83. This price is 23.52% larger than the price estimated with the Black-Scholes options pricing model, and that the price is approximately 5% of the market price of TLKM.

3.1.2. Price of Call Option on ANTM

The observation continues with the simulation of the theoretical premiums of call options using the Black-Scholes options pricing model to estimate the premiums for ANTM as the following:

$$\sigma = \sqrt{\frac{0.413127 - \frac{(-1.5684)^2}{231}}{231}}$$

$$\sigma = 0.042376$$

Annualized volatility = 0.67

The σ we have estimated can be used as input into the Black-Scholes Model involving five parameters:

1. S = current stock price of ANTM = 3100
2. E = exercise price of call of ANTM-O = 3100
3. R = risk-free rate of return = 8.75%
4. σ = volatility of the continuous return on the stock = 0.67
5. t = time (in years) to expiration date = 31/365 = 0.0849315

Where:

$$d1 = \frac{\ln(3100/3100) + \left\{(0.0875) + \frac{(0.67)^2}{2}\right\}\frac{1}{12}}{0.67\sqrt{\frac{1}{12}}} =$$

N(0.090053) = 0.535877

$$d2 = 0.090053 - 0.67\sqrt{\frac{1}{12}} = -0.100336$$

N(-0.100336) = 0.460039

$$C = (3100 \times 0.535877) - 3100(e^{-0.0875/12}) \times 0.460039$$
$$C = 1661.2187 - 1415.76$$
$$C = 245.459$$

The premiums estimated of 245.459 makes up approximately 8% of the market price of ANTM shares. This price also the same with TLKM, in that being *at-the-money*, is also the time value for one month prior to expiration.

Using the same input used in the Black-Scholes Model the we can count for the Call premium using the Binomial Pricing Model with:

T = time to expiration =31/365 = 0.0849

- ✓ n = 1
- ✓ r (risk-free rate) = $(1 + 0.0875)^{0.0849/1}$ -1 = 0.715%
- ✓ $u = e^{0.67\sqrt{0.0849/1}} = 1.2156$
- ✓ $d = \frac{1}{1.2156} = 0.8227$

- ✓ Su= 3100 x 1.2156 = 3768.36
- ✓ Sd= 3100 x 0.8227 = 2550.37

- ✓ Cu = Max (0, 3768.36 – 3100) = 668.36
- ✓ Cd = Max (0,2550.37 -3100) = 0

✓ $p = \frac{1.00715 - 0.8227}{1.2156 - 0.8227} = 0.4695$

✓ $1 - p = 0.5305$

$$C = \frac{\sum_{j=0}^{1} \frac{1!}{(1-j)!} 0.4695^{j} \times (0.5305)^{(1-j)} Max\left[0,3100 \times 1.2156^{j} x 0.9^{1-j} - 3100\right]}{1.00715^{1}}$$

$$C = \frac{668.36(0.4695) + 0.00(0.5305)}{1.00715} = 311.567$$

The Binomial options pricing model estimates that the theoretical premiums of one moth call options prior to expiration is 311.567, which is around 10% of the market price of ANTM. This price is also 27% greater than the price estimated using the Black-Scholes options pricing model.

3.1.3. Price of Call Option on ASII

Using the Black-Scholes options pricing model, we can estimate the theoretical premiums of ASII-O as the following:

$$\sigma = \sqrt{\frac{0.571157 - \frac{(-1.05056)^2}{939}}{938}}$$

$$\sigma = 0.024664$$

Annualized Volatility = 0.39

The σ we have estimated can be input into the Black-Scholes Model:

involving five parameters:

1. S = current stock price of ASII = 19300
2. E = exercise price of call of ASII-O = 19300
3. R = risk-free rate of return = 8.75%
4. σ = volatility of the continuous return on the stock

   = 0.39

5. t = time (in years) to expiration date = 31/365 = 0.0849315

Where:

$$d1 = \frac{\ln(19300/19300) + \left\{(0.0875) + \frac{(0.39)^2}{2}\right\}\frac{1}{12}}{0.39\sqrt{\frac{1}{12}}} = 0.121069$$

N(0.121069) = 0.548182

$$d2 = 0.121069 - 0.39\sqrt{\frac{1}{12}} = 0.00849$$

N(0.00849) = 0.503387

$$C = (19300 \times 0.548182) - 19300(e^{-0.0875/12}) \times 0.503387$$

$$C = 10579.9126 - 9644.7855$$

$$C = 935.127$$

The premiums of 935.127 makes up 4.84% of the market price for ASII shares. This price is the time value of the call options being that ASII-O has one month prior to expiration, being that the option is *at-the-money*.

Using the same input used in the Black-Scholes Model the we can count for the Call premium using the Binomial Pricing Model with:

T = time to expiration =31/365 = 0.0849

- ✓ n = 1
- ✓ r (risk-free rate) = $(1 + 0.0875)^{0.0849/1}$ -1 = 0.715%
- ✓ $u = e^{0.39\sqrt{0.0849/1}} = 1.1203$
- ✓ $d = \frac{1}{1.1203} = 0.8926$

- ✓ Su= 19300 x 1.1203 = 21621.79
- ✓ Sd= 19300 x 0.8926 = 17227.18

✓ Cu = Max (0, 21621.79 – 19300) = 2321.79

✓ Cd = Max (0, 17227.18 -19300) = 0

✓ $$p = \frac{1.00715 - 0.8926}{1.1203 - 0.8926} = 0.50307$$

✓ $$1 - p = 0.4969$$

$$C = \frac{\sum_{j=0}^{1} \frac{1!}{(1-j)!} 0.50307^{j} \times (0.4969)^{(1-j)} Max\left[0, 19300 \times 1.1203^{j} x 0.9^{1-j} - 19300\right]}{1.00715^{1}}$$

$$C = \frac{2321.79(0.50307) + 0.00(0.4969)}{1.00715} = 1159.73$$

The Binomial options pricing model has established premiums amounting to 1159.73 which makes up 6% of the market price of ASII shares. This amount is also 24% greater than the premiums estimated with the Black-Scholes options pricing model.

3.1.4. Price of Call Option on BBNI

The next step for the simulation is to estimate the price (premiums) of call options using the Black-Scholes options pricing model for BBNI-O:

$$\sigma = \sqrt{\frac{0.606333 - \frac{(0.035932)^2}{939}}{938}}$$

$$\sigma = 0.02552$$

Annualized Volatility = 0.4035

The σ we have estimated can be input into the Black-Scholes Model involving five parameters:

1. S = current stock price of BBNI = 1230
2. E = exercise price of call of BBNI-O = 1230
3. R = risk-free rate of return = 8.75%
4. σ = volatility of the continuous return on the stock = 0.4035

5. t = time (in years) to expiration date = 31/365 = 0.0849315

Where:

$$d1 = \frac{\ln(1230/1230) + \left\{(0.0875) + \frac{(0.4035)^2}{2}\right\}\frac{1}{12}}{0.4035\sqrt{\frac{1}{12}}} = 0.12084$$

N(0.12084) = 0.548091

$$d2 = 0.12084 - 0.4035\sqrt{\frac{1}{12}} = 0.0043596$$

N(0.0043596) = 0.501739

$$C = (1230 \times 0.548091) - 1230(e^{-0.0875/12}) \times 0.501739$$
$$C = 674.152 - 612.655$$
$$C = 61.497$$

The premium of 61.497 is approximately 5% of the market price of BBNI shares. With BBNI-O having one month's time prior to expiration, the at-the-money call options would be priced to be comprised of the time value.

Using the same input used in the Black-Scholes Model the we can count for the Call premium using the Binomial Pricing Model with:

T = time to expiration =31/365 = 0.0849

- ✓ n = 1
- ✓ r (risk-free rate) = $(1 + 0.0875)^{0.0849/1}$ -1 = 0.715%
- ✓ $u = e^{0.4035\sqrt{0.0849/1}} = 1.12477$
- ✓ $d = \frac{1}{1.12477} = 0.889$
- ✓ Su= 1230 x 1.12477 = 1383.47
- ✓ Sd= 1230 x 0.889 = 1093.47

- ✓ Cu = Max (0, 1383.47 – 1230) = 153.47
- ✓ Cd = Max (0, 1093.47 - 1230) = 0
- ✓ $p = \frac{1.00715 - 0.889}{1.12477 - 0.889} = 0.5011$
- ✓ $1 - p = 0.49888$

$$C = \frac{\sum_{j=0}^{1} \frac{1!}{(1-j)!} 0.5011^{j} \times (0.49888)^{(1-j)} Max\left[0{,}1230 \times 1.12477^{j} x 0.9^{1-j} - 1230\right]}{1.00715^{1}}$$

$$C = \frac{153.47(0.5011) + 0.00(0.49888)}{1.00715} = 76.358$$

The Binomial options pricing model estimates that a call option with one month prior to expiration is priced at 76.358. This price makes up 6.2% of the market price of BBNI, and that the price is approximately 24% greater than the call options premium estimated using the Black-Scholes options pricing model.

3.1.5. Price of Call Option on INDF

The next observation is to simulate the premiums for options of INDF using the Black-Scholes options pricing model, as the following:

$$\sigma = \sqrt{\frac{0.693551 - \frac{(-1.15449)^{2}}{939}}{938}}$$

$$\sigma = 0.027193$$

Annualized Volatility = 0.43

The σ we have estimated can be input into the Black-Scholes Model involving five parameters:

1. S = current stock price of INDF = 2300
2. E = exercise price of call of INDF-O = 2300
3. R = risk-free rate of return = 8.75%

4. σ = volatility of the continuous return on the stock = 0.43

5. t = time (in years) to expiration date = 31/365 = 0.0849315

Where:

$$d1 = \frac{\ln(2300/2300) + \left\{(0.0875) + \frac{(0.43)^2}{2}\right\}\frac{1}{12}}{0.43\sqrt{\frac{1}{12}}} = 0.120809$$

N(0.120809) = 0.548079

$$d2 = 0.120809 - 0.43\sqrt{\frac{1}{12}} = -0.0033213$$

N(-0.033213) = 0.498675

$$C = (2300 \times 0.548079) - 2300(e^{-0.0875/12}) \times 0.498675$$

$$C = 1260.5817 - 1138.62$$

$$C = 121.962$$

The call options premiums estimated equals to 121.962, which is approximately 5.3% of the market price of INDF. This price represents the time value of INDF-O options, being that INDF-O having one month prior to expiration.

Using the same input used in the Black-Scholes Model the we can count for the Call premium using the Binomial Pricing Model with:

T = time to expiration = 31/365 = 0.0849

- ✓ n = 1
- ✓ r (risk-free rate) = $(1 + 0.0875)^{0.0849/1}$ -1 = 0.715%
- ✓ $u = e^{0.43\sqrt{0.0849/1}} = 1.1335$
- ✓ $d = \frac{1}{1.1335} = 0.8822$
- ✓ Su= 2300 x 1.1335 = 2607.05
- ✓ Sd= 2300 x 0.8822 = 2029.06

- ✓ Cu = Max (0, 2607.05 – 2300) = 307.05
- ✓ Cd = Max (0, 2029.06 - 2300) = 0
- ✓ $p = \frac{1.00715 - 0.8822}{1.1335 - 0.8822} = 0.4972$
- ✓ $1 - p = 0.5028$

$$C = \frac{\sum_{j=0}^{1} \frac{1!}{(1-j)!} 0.4972^{j} \times (0.5028)^{(1-j)} Max\left[0{,}2300 \times 1.1335^{j} x 0.9^{1-j} - 2300\right]}{1.00715^{1}}$$

$$C = \frac{307.05(0.4972) + 0.00(0.5028)}{1.00715} = 151.58$$

The Binomial options pricing model estimates premiums for INDF-O around 151.58 which is 6.59% of the market price of INDF shares. This premium generated by the Binomial options pricing model is 24.28% larger than premiums generated by the Black-Scholes options pricing model.

3.1.6. Price of Call Option on ISAT

Next is to simulate the theoretical premiums of ISAT-O with one month's time prior to expiration employing the Black-Scholes options pricing model:

$$\sigma = \sqrt{\frac{0.568722 - \frac{(-0.50534)^2}{939}}{938}}$$

$$\sigma = 0.024631$$

Annualized volatility = 0.39

The σ we have estimated can be input into the Black-Scholes Model involving five parameters:

1. S = current stock price of ISAT = 6500
2. E = exercise price of call of ISAT-O = 6500
3. R = risk-free rate of return = 8.75%

4. σ = volatility of the continuous return on the stock = 0.39

5. t = time (in years) to expiration date = 31/365 = 0.0849315

Where:

$$d1 = \frac{\ln(6500/6500) + \left\{(0.0875) + \frac{(0.39)^2}{2}\right\}\frac{1}{12}}{0.39\sqrt{\frac{1}{12}}} = 0.121057$$

N(0.121057) = 0.548177

$$d2 = 0.121057 - 0.39\sqrt{\frac{1}{12}} = 0.008474$$

N(0.008474) = 0.503381

$$C = (6500 \times 0.548177) - 6500(e^{-0.0875/12}) \times 0.503381$$
$$C = 3563.15 - 3248.205$$
$$C = 314.945$$

The call options premiums estimated by the Black-Scholes model amounts to 314.945 which is 4.84% of the market price of ISAT shares. This premium represents the time value of the options due to the *at-the-money* properties this option has.

Using the same input used in the Black-Scholes Model the we can count for the Call premium using the Binomial Pricing Model with:

T = time to expiration =31/365 = 0.0849

- ✓ n = 1
- ✓ r (risk-free rate) = $(1 + 0.0875)^{0.0849/1}$ -1 = 0.715%
- ✓ $u = e^{0.39\sqrt{0.0849/1}} = 1.120344$
- ✓ $d = \frac{1}{1.120344} = 0.8926$
- ✓ Su = 6500 x 1.120344 = 7282.236
- ✓ Sd = 6500 x 0.8926 = 5801.90

- ✓ Cu = Max (0, 7282.236 – 6500) = 782.236

- ✓ Cd = Max (0, 5801.90 – 6500) = 0

- ✓ $p = \frac{1.00715 - 0.8926}{1.120344 - 0.8926} = 0.50298$

- ✓ $1 - p = 0.497$

$$C = \frac{\sum_{j=0}^{1} \frac{1!}{(1-j)!} 0.50298^{j} \times (0.497)^{(1-j)} Max\left[0, 6500 \times 1.120344^{j} x 0.9^{1-j} - 6500\right]}{1.00715^{1}}$$

$$C = \frac{782.236(0.50298) + 0.00(0.497)}{1.00715} = 390.66$$

The Binomial options pricing model generates premiums of 390.66 for ISAT-O which is approximately 6% of the market price for ISAT shares. The premiums generated is 24% larger than the premiums obtained from the Black-Scholes options pricing model estimation.

3.1.7. Price of Call Option on AALI

For AALI-O the call options premiums can be estimated using the Black-Scholes options pricing model as the following:

$$\sigma = \sqrt{\frac{0.634533 - \frac{(-2.55338)^2}{939}}{938}}$$

$$\sigma = 0.02588$$

$$\text{Annualized Volatility} = 0.4092$$

The σ we have estimated can be input into the Black-Scholes Model involving five parameters:

1. S = current stock price of AALI = 28000
2. E = exercise price of call of AALI-O = 28000
3. R = risk-free rate of return = 8.75%
4. σ = volatility of the continuous return on the stock = 0.4092
5. t = time (in years) to expiration date = 31/365 = 0.0849315

Where:

$$d1 = \frac{\ln(28000/28000) + \left\{(0.0875) + \frac{(0.4092)^2}{2}\right\}\frac{1}{12}}{0.4092\sqrt{\frac{1}{12}}} = 0.120791$$

N(0.120791) = 0.548072

$$d2 = 0.120791 - 0.4092\sqrt{\frac{1}{12}} = 0.002665$$

N(0.002665) = 0.501063

$$C = (28000 \times 0.548072) - 28000(e^{-0.0875/12}) \times 0.501063$$

$$C = 15346.016 - 13927.8357$$

$$C = 1418.18$$

The call options premiums estimated amounts to 1418.18 which is about 5% of the market price for AALI shares. This amount also is the time value of AALI-O being that the call option having one month's time prior to expiration.

Using the same input used in the Black-Scholes Model the we can count for the Call premium using the Binomial Pricing Model with:

T = time to expiration =31/365 = 0.0849

- ✓ n = 1
- ✓ r (risk-free rate) = $(1 + 0.0875)^{0.0849/1}$ -1 = 0.715%
- ✓ $u = e^{0.4092\sqrt{0.0849/1}} = 1.1266$

✓ $d = \frac{1}{1.1266} = 0.8876$

✓ Su= 28000 x 1.1266 = 31544.8

✓ Sd= 28000 x 0.8876 = 24852.8

✓ Cu = Max (0, 31544.8 – 28000) = 3544.8

✓ Cd = Max (0, 24852.8 - 28000) = 0

✓ $p = \frac{1.00715 - 0.8876}{1.1266 - 0.8876} = 0.5$

✓ $1 - p = 0.5$

$$C = \frac{\sum_{j=0}^{1} \frac{1!}{(1-j)!} 0.5^{j} \times (0.5)^{(1-j)} Max\left[0, 28000 \times 1.1266^{j} x 0.9^{1-j} - 28000\right]}{1.00715^{1}}$$

$$C = \frac{3544.8(0.5) + 0.00(0.5)}{1.00715} = 1759.82$$

The Binomial options pricing model estimates that call options having one month's time prior to expirations is priced at 1759.82. This amount is 6.29% of the market price of AALI shares. The premiums generated by the Binomial options pricing model is 24.09% higher than the premiums generated by the Black Scholes options pricing model.

3.1.8. Price of Call Option on BBRI

The next stock on the list is BBRI which we can obtain the premiums of BBRI-O using the Black-Scholes options pricing model as the following:

$$\sigma = \sqrt{\frac{0.583137 - \frac{(-1.12928)^2}{939}}{938}}$$

$$\sigma = 0.024918$$

Annualized Volatility = 0.394

The σ we have estimated can be input into the Black-Scholes Model involving five parameters:

1. S = current stock price of BBRI = 5400
2. E = exercise price of call of BBRI-O = 5400
3. R = risk-free rate of return = 8.75%
4. σ = volatility of the continuous return on the stock = 0.394
5. t = time (in years) to expiration date = 31/365 = 0.0849315

Where:

$$d1 = \frac{\ln(5400/5400) + \left\{(0.0875) + \frac{(0.394)^2}{2}\right\}\frac{1}{12}}{0.394\sqrt{\frac{1}{12}}} = 0.120978$$

N(0.120978) = 0.548146

$$d2 = 0.120978 - 0.394\sqrt{\frac{1}{12}} = 0.007234$$

N(0.007234) = 0.502886

$$C = (5400 \times 0.548146) - 5400(e^{-0.0875/12}) \times 0.502886$$
$$C = 2959.99 - 2695.86$$
$$C = 264.135$$

The options premiums generated by the Black-Scholes options pricing model amounts to 264.135 which is 4.89% of the market price of BBRI shares. This premium is actually the time value of BBRI-O being that the option still has one moth prior to expiration.

Using the same input used in the Black-Scholes Model the we can count for the Call premium using the Binomial Pricing Model with:

T = time to expiration = 31/365 = 0.0849

- ✓ n = 1

- ✓ r (risk-free rate) = $(1 + 0.0875)^{0.0849/1} - 1 = 0.715\%$
- ✓ $u = e^{0.394\sqrt{0.0849/1}} = 1.12165$
- ✓ $d = \frac{1}{1.12165} = 0.8915$

- ✓ Su= 5400 x 1.12165 = 6056.91
- ✓ Sd= 5400 x 0.8915 = 4814.10

- ✓ Cu = Max (0, 6056.91 – 5400) = 656.91
- ✓ Cd = Max (0, 4814.10 -5400) = 0

- ✓ $p = \frac{1.00715 - 0.8915}{1.12165 - 0.8915} = 0.5025$

- ✓ $1 - p = 0.4975$

$$C = \frac{\sum_{j=0}^{1} \frac{1!}{(1-j)!} 0.5025^{j} \times (0.4975)^{(1-j)} Max\left[0,5400 \times 1.12165^{j} x 0.9^{1-j} - 5400\right]}{1.00715^{1}}$$

$$C = \frac{656.91(0.5025) + 0.00(0.4975)}{1.00715} = 327.75$$

The Binomial options pricing model estimates for premium of BBRI-O amounting to 327.75 which is approximately 6% of the market price for BBRI shares. This amount is also 24.08% greater than the premiums estimated using the Black-Scholes options pricing model.

3.1.9. Price of Call Option on UNSP

The premiums for UNSP-O can be estimated using the Black-Scholes options pricing model as the following:

$$\sigma = \sqrt{\frac{0.92208 - \frac{(-1.42707)^2}{939}}{938}}$$

$$\sigma = 0.031776$$

Annualized volatility = 0.5024

The σ we have estimated can be input into the Black-Scholes Model involving five parameters:

1. S = current stock price of UNSP = 1730
2. E = exercise price of call of UNSP-O = 1730
3. R = risk-free rate of return = 8.75%
4. σ = volatility of the continuous return on the stock = 0.5024
5. t = time (in years) to expiration date = 31/365 = 0.0849315

Where:

$$d1 = \frac{\ln(1730/1730) + \left\{(0.0875) + \frac{(0.5024)^2}{2}\right\}\frac{1}{12}}{0.5024\sqrt{\frac{1}{12}}} = 0.122795$$

N(0.122795) = 0.548865

$$d2 = 0.122795 - 0.5024\sqrt{\frac{1}{12}} = -0.022235$$

N(-0.022235) = 0.49113

$$C = (1730 \times 0.548865) - 1730(e^{-0.0875/12}) \times 0.49113$$
$$C = 949.536 - 843.48$$
$$C = 106.054$$

The premiums obtained from the Black-Scholes options pricing model amounts to 106.054 which is 6.13% of the market price for UNSP shares. This amount also represents the time value of the options in that expiration is still in one month's time.

Using the same input used in the Black-Scholes Model the we can count for the Call premium using the Binomial Pricing Model with:

T = time to expiration = 31/365 = 0.0849

- ✓ n = 1
- ✓ r (risk-free rate) = $(1 + 0.0875)^{0.0849/1} - 1 = 0.715\%$
- ✓ $u = e^{0.5024\sqrt{0.0849/1}} = 1.157$
- ✓ $d = \frac{1}{1.0973} = 0.864$
- ✓ Su= 1730 x 1.157 = 2001.61
- ✓ Sd= 1730 x 0.864 = 1494.72
- ✓ Cu = Max (0, 2001.61 – 1730) = 271.61
- ✓ Cd = Max (0, 1494.72 - 1730) = 0
- ✓ $p = \frac{1.00715 - 0.864}{1.157 - 0.864} = 0.4886$
- ✓ $1 - p = 0.511$

$$C = \frac{\sum_{j=0}^{1} \frac{1!}{(1-j)!} 0.4886^j \times (0.511)^{(1-j)} Max\left[0, 1730 \times 1.157^j x 0.9^{1-j} - 1730\right]}{1.00715^1}$$

$$C = \frac{271.61(0.4886) + 0.00(0.511)}{1.00715} = 132.71$$

The call options premiums obtained from the Binomial options pricing model amounts to 132.71 which is 7.67% of the market price of UNSP. This premium is approximately 25% higher than the premiums obtained from the Black-Scholes options pricing model.

3.1.10. Price of Call Option on PGAS

The last step in our simulation is to estimate the premiums using the Black-Scholes options pricing model as the following:

$$\sigma = \sqrt{\frac{0.909936 - \frac{(-2.43445)^2}{936}}{935}}$$

$$\sigma = 0.031087$$

$$\text{Annualized volatility} = 0.4915$$

The σ we have estimated can be input into the Black-Scholes Model involving five parameters:

1. S = current stock price of PGAS = 12500
2. E = exercise price of call of PGAS-O = 12500
3. R = risk-free rate of return = 8.75%
4. σ = volatility of the continuous return on the stock = 0.4915
5. t = time (in years) to expiration date = 31/365 = 0.0849315

Where:

$$d1 = \frac{\ln(12500/12500) + \left\{(0.0875) + \frac{(0.4915)^2}{2}\right\}\frac{1}{12}}{0.4915\sqrt{\frac{1}{12}}} = 0.12234$$

$N(0.12234) = 0.548685$

$$d2 = 0.12234 - 0.4915\sqrt{\frac{1}{12}} = -0.019544$$

$N(-0.019544) = 0.4922$

$$C = (12500 \times 0.548685) - 12500(e^{-0.0875/12}) \times 0.4922$$
$$C = 6858.56 - 6107.80$$
$$C = 750.76$$

The 750.76 amount of premiums is actually the time value of PGAS-O being that the option is *at-the-money* and still has one month's time until expiration. This amount is also 6% of the market price of PGAS shares.

Using the same input used in the Black-Scholes Model the we can count for the Call premium using the Binomial Pricing Model with:

T = time to expiration = 31/365 = 0.0849

- ✓ n = 1
- ✓ r (risk-free rate) = $(1 + 0.0875)^{0.0849/1}$ -1 = 0.715%
- ✓ $u = e^{0.4915\sqrt{0.0849/1}} = 1.154$
- ✓ $d = \frac{1}{1.154} = 0.8666$
- ✓ Su= 12500 x 1.154 = 14425
- ✓ Sd= 12500 x 0.8666 = 10832.14
- ✓ Cu = Max (0, 14425 – 12500) = 1925
- ✓ Cd = Max (0, 10832.14 - 12500) = 0
- ✓ $p = \frac{1.00715 - 0.8666}{1.154 - 0.8666} = 0.489$
- ✓ $1 - p = 0.511$

$$C = \frac{\sum_{j=0}^{1} \frac{1!}{(1-j)!} 0.489^{j} \times (0.511)^{(1-j)} Max\left[0,12500 \times 1.154^{j} x0.9^{1-j} - 12500\right]}{1.00715^{1}}$$

$$C = \frac{1925(0.489) + 0.00(0.511)}{1.00715} = 934.64$$

The premiums obtained from the Binomial options pricing model amounts to 934.64 which is approximately 7.5% of the market price of PGAS shares. This amount also is 24.5% higher than the premiums obtained from the Black-Scholes options pricing model.

Overall results of simulating the theoretical price (premiums) of call options obtained from both the Black-Scholes and Binomial options pricing models are:

The premiums in percentage of the market price of each issue comes in at 4-10%.

The Binomial options pricing model yields a much higher premium than the Black-Scholes options pricing model, in that the premiums were about 24% slightly higher than the premiums. But the price then will tend to converge as the option nears expiration, making the Black-Scholes options pricing model.

.2. Covered Call Simulation Results

The mechanism of the covered call options strategy involves a simultaneous olding of stock and writing call options covering all of the holdings of stock. To implify in order to obtain the returns and annualized returns we will assume:

1. Purchase 100 shares of an individual issue
2. Writing one July Call options contract representing 100 shares
3. No transactions costs for both the purchase of stock holdings and call write
4. No taxes of capital gains

Table 3.2. Comparison of Returns of Covered Calls on 10 stocks of LQ-45

	July Call Option Premium (in Rupiah)		Returns		Annualized Returns	
	BS Model	Binomial	BS Model	Binomial	BS Model	Binomial
I-O	296.15	365.83	4.03%	4.97%	47.44%	58.60%
I-O	245.46	311.57	7.92%	10.05%	93.25%	118.33%
)	935.13	1159.73	4.85%	6.01%	57.05%	70.75%
O	61.50	76.36	5.00%	6.03%	86.9%	73.09%
O	121.96	151.58	5.3%	6.59%	62.43%	77.60%
O	314.95	390.66	4.85%	6.01%	57.05%	70.76%
O	1418.18	1759.82	5.07%	6.29%	59.64%	74.00%
O	264.135	327.75	4.89%	6.07%	57.59%	71.46%
-O	106.05	132.71	6.13%	7.67%	72.18%	90.31%
-O	750.76	934.64	6.01%	7.48%	70.71%	88.04%

Source: calculated by the author

The analysis of the implementation of the covered call strategy will continue with generating a simulation of returns of the covered call on corporate cash holding using the theoretical premiums on call options with the following steps:

1. Estimating one month's volatility based on the preceding month's volatility of stock prices. This step is done for every month from data of stock prices 2004-2008 giving us 46 data sample of the return of covered calls, unless the issue has just recently went public or data of preceding years cease to exist.
2. Each month call options premium is estimated using the Black-Scholes model with assumption that there are on average 21 days prior to expiration, which is the third Friday of every month, and there are 250 trading days in one year.
3. The covered call strategy is executed, by establishing (buy) stock holdings and simultaneously writing (sell) call options contracts, at every beginning contract month where premiums of in-the-money strike prices are still high at the given stock price.
4. Because of the usage of in-the-money strike prices, the covered call position is assumed to be liquidated by way of exercise thus leaving the firm with just premiums and no stock holdings.
5. It is assumed that there are no transaction costs and capital gains tax.

Results of the calculations of the covered call on each 10 stocks of the LQ-45 using simulated theoretical premiums of call option can be seen in the Appendix.

3.3. Simulation of Dividend Hedge Capture Strategy Using Theoretical Premium of Calls

The dividend hedge capture strategy will also employ the theoretical premiums of options. In that the strategy which can be employed by firms is one that allows firms to obtain dividends paid out by a certain issue while in the process is hedge from price depreciation as a result of the ex-dividend date. In obtaining the results of the dividend hedge capture strategy we will pertain to the following steps:

1. Estimation of volatility is done on one day before as well as on the ex-dividend date, which would be the cum-date with 21 days of stock price data prior to that one day and the ex-dividend day.
2. The cum date premium is estimated using the Black-Scholes model with on average 21 days prior to expiration and 250 trading days in one year.
3. The dividend hedge capture strategy is executed one day before the ex-dividend date, in order for the firm to be qualified as a record stockholder, by buying the stock, which will pay out dividends, and simultaneously writing an in-the-money call options contract covering the stock position.
4. The positions are the liquidated on the ex-dividend date, by selling the stock position at a lower price, buying back the call options contract at a lower premium giving a profit, difference in higher premiums sold and lower premiums bought.
5. The firm employing this strategy will have qualified to receive dividends.
6. It is assumed that there are no transaction costs, dividends tax and capital gains tax.

Results of the calculations of the dividend hedge capture strategy on each 10 stocks of the LQ-45 using simulated theoretical premiums of call option can be seen in the Appendix.

CHAPTER 4

EVALUATION OF COVERED CALL & DIVIDEND HEDGE CAPTURE STRATEGY

4.1. Evaluation of Alternative Cash Management Strategy

In order to analyze and get and understanding of how both the covered call strategy and the dividend hedge capture strategy is more effective in optimizing corporate cash holdings for obtaining relatively higher returns, we should then employ the Sharpe ratio to give us a clearer Figure. The Sharpe ratio is a ratio of a measure of return that is risk-adjusted. This ratio is often used to evaluate the performance of a portfolio by making the performance of one portfolio comparable to that of another portfolio with an adjustment for risk. For some insight of this ratio the given portfolio must generate a positive number being 1 or better to be considered good and the higher the number then the better.

The Sharpe ratio is considered to be quite simple with three main components: the returns, risk-free return and standard deviation of return.

$$S(x) = \frac{(r_{(x)} - r_f)}{Std.dev(x)}$$ **Equation 4.1.**

From the equation above after calculating the excess return (how much more returns is the portfolio generating compare to the risk free rate), then the excess return is divided by the standard deviation of the risky asset to get its Sharpe ratio.

4.1.1. Sharpe Ratios of the Covered Call Strategy

The Sharpe ratios obtained for all samples of the covered call strategy on 10 different issues on the LQ-45 have shown a rather favorable result in that the strategy is beneficial for corporate cash holdings for the most part. The excess returns compared to the volatility (standard deviation) have shown a positive as well as a large number, in some exceeding 1.

In some cases although the returns have not shown a favorable result where the Sharpe ratios have resulted in a negative number, meaning that the returns on premiums have not exceeded the risk free returns. This would mean that the covered call strategy is unfavorable given the pertaining conditions at those times in the different cases. The reason for this unfavorable result must be seen on a case-by-case basis which relates to the properties of each underlying issue which the premiums are derived. Overall, we can see identify some conditions in those cases as the following:

1. For issues INDF, UNSP, and BBNI for the most part of 2004-2008 had traded in a narrow range making the availability of strike prices limited as well as the size of premiums smaller due to investors knowing the likelihood of the underlying price movement, in that premiums should be priced definitely lower.
2. In those cases which are unfavorable, for deep in-the-money covered calls, which is done to ensure the exercise of the options, have generated very little returns due to loss on deep in-the-money strike prices which is not compensated enough with premiums from the underlying issues.
3. Interest rates are in a relatively high point making it unfavorable for returns in some cases with respect to the Sharpe ratio, which in turn yields a negative number.

4.1.2. Sharpe Ratios of the Dividend Hedge Capture Strategy

The Sharpe ratios for the dividend hedge capture strategy have shown a favorable result in that the company implementing this strategy can hope for excess returns for a reasonable amount of risk for the most part.

For this strategy to be worthwhile for the investor from the cases obtained from past data 2004-2008 and data on amounts of dividends and ex-dates the conditions met must meet the following requirements:

1. Liquidity of the equity being bought and sold as well as the options of the underlying provides large differences of premiums as a result of the stock's price depreciation on the ex-dividend date.
2. The amount of dividends must be large enough, in terms of its dividend yield, to cover interest lost on capital required for the dividend hedge capture strategy that should have been invested at the risk-free rate.
3. Availability of in the money strike prices as well as premiums to produce the hedge at the current stock price in anticipation of a price depreciation on ex-dividend date.

4.2. Statistical Evaluation of Covered Call & Dividend Hedge Capture Strategy

For the purpose of evaluating the statistical aspects of comparing the before and after effects of implementing the alternative strategies for corporate cash management we will employ the t-test and the Wilcoxon signed rank test to obtain a statistical justification of the results.

The reason behind using the t-test and Wilcoxon signed rank test are the following:

1. Limited availability of data which in turn had generated a limited number of cases. This circumstance provides a condition stipulating both tests.
2. We assume that the firm *hypothetically* employs one of the alternative strategies which would be the 'after' scenario being compared to the 'before' scenario of just employing risk-free strategies.
3. The before and after effects are best shown in the outputs of both tests.

4.2.1. Covered Call Strategy

The excerpts of output of the t-test generated using SPSS 12.0 can be seen as the following:

4.2.1.1. Results of covered calls on AALI

The output for AALI in Table 4.1.a shows an increase in returns from 'before' with risk free returns amounting from 0.79% to 3.79% with the use of covered calls on AALI.

Table. 4.1.a. Statistical Results for AALI

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Risk-free returns	.0079091	44	.00158194	.00023849
	AALI	.0379902	44	.02072209	.00312397

From Table 4.1.b below the mean difference of 3% is said to be located, with 95% confidence, within the intervals of 3.65% and 2.37%, with the absence of 0 (zero) within the interval provides strong evidence that the means are different.

With further analysis pertaining to the statistical hypothesis:

Ho : $\mu_{rf} = \mu_{CCAALI}$

Hi : $\mu_{rf} < \mu_{CCAALI}$

The t-count of -9.483, also from Table 4.1.b, combined with the significance of 0.000 which comes below the 0.05 significance level provides the basis of Ho rejection. This means that Hi stands indicating that the returns of covered calls on AALI are higher than the risk-free returns.

Table. 4.1.b. Statistical Testing of Results for AALI

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference: Lower	95% Confidence Interval of the Difference: Upper			
Pair 1	Risk-free returns - AALI	-.030081	.02104058	.00317199	-.036478	-.023684	-9.483	43	.000

4.2.1.2. Results of covered calls on ANTM

Output from Table 4.2.a.are the results for ANTM which shows an increase in returns from 0.68% to 4.5% with employing the covered call strategy on ANTM.

Table. 4.2.a. Statistical Results for ANTM
Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Risk-free	.0068030	11	.00018553	.00005594
	ANTM	.0450000	11	.02376826	.00716640

From the mean difference of 3.82% which is located within the intervals 5.41% and 2.22% with the absence of 0 (zero) provides strong evidence that the means are different.

With the statistical hypothesis:

Ho : $\mu_{rf} = \mu_{CCANTM}$

Hi : $\mu_{rf} < \mu_{CCANTM}$

The t-count of -5.334 combined with the significance of 0.000 which comes below the 0.05 significance level provides the basis of Ho rejection. This means that Hi stands indicating that the returns of covered calls on ANTM are higher than the risk-free returns.

Table. 4.2.b. Statistical Testing of Results for ANTM
Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
1 Risk-free - ANTM	-.038197	.02374948	.00716074	-.054152	-.022242	-5.334	10	.000

4.2.1.3. Results of covered calls on ASII

The returns of covered calls on ASII indicated in Table 4.3.a shows an increase from 'before' of 0.78% to an 'after' of 3.6%.

Table. 4.3.a. Statistical Results for ASII

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Risk-free returns	.0078857	45	.00157238	.00023440
	ASII	.0360842	45	.00804511	.00119929

From Table 4.3.b the mean difference of 2.82% compared to the mean difference intervals 3.06% and 2.58%, with an absence of 0 (zero) shows that the mean difference provides strong evidence that the means are different.

Further analysis of the output with the statistical hypothesis:

Ho : $\mu_{rf} = \mu_{CCASII}$

Hi : $\mu_{rf} < \mu_{CCASII}$

Also from Table 4.3.b, the t-count of -23.975 combined with the significance of 0.000 which comes below the 0.05 significance level provides the basis of Ho rejection. This means that Hi stands indicating that the returns of covered calls on ASII are higher than the risk-free returns.

Table. 4.3.b. Statistical Testing of Results for ASII

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
ir 1	Risk-free returns - ASII	-.028198	.00788981	.00117614	-.030569	-.025828	-23.975	44	.000

4.2.1.4. Results of covered calls on BBNI

For BBNI the output from Table 4.4.a shows a slight increase of 0.765% from 0.79091% to 1.55%.

Table. 4.4.a. Statistical Results for BBNI

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Risk-free	.0079091	44	.00158194	.00023849
	BBNI	.0155595	44	.01342174	.00202340

From Table 4.4.b the mean difference of 0.765% compared to the intervals of 1.18% and 0.35% and in the absence of 0 (zero) within the intervals shows that the mean difference provides strong evidence that the means are different.

With the statistical hypothesis:

Ho : $\mu_{rf} = \mu_{CCBBNI}$

Hi : $\mu_{rf} < \mu_{CCBBNI}$

The t-count of -3.72, obtained from the output from Table 4.4.b, combined with the significance of 0.000 which comes below the 0.05 significance level provides the basis of Ho rejection. This means that Hi stands, indicating that the returns of covered calls on BBNI are higher than the risk-free returns.

Table. 4.4.b. Statistical Testing of Results for BBNI

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Risk-free - BBNI	-.007650	.01364000	.00205631	-.011797	-.003504	-3.720	43	.001

4.2.1.5. Results of covered calls on BBRI

Covered calls on BBRI, which can be seen from Table 4.5.a shows an increase in returns from 0.79% to 2.92%

Table. 4.5.a. Statistical Results for BBRI

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Risk-free returns	.0079091	44	.00158194	.00023849
	BBRI	.0291675	44	.01731335	.00261009

From Table 4.5.b the mean difference of 2.13% compared to the mean difference intervals of 2.65% and 1.59% and with the absence of 0 (zero) shows that the mean difference provides strong evidence that the means are different.

With the statistical hypothesis:

Ho : $\mu_{rf} = \mu_{CCBBRI}$

Hi : $\mu_{rf} < \mu_{CCBBRI}$

The t-count of -8.128, also from Table 4.5.b, combined with the significance of 0.000 which comes below the 0.05 significance level provides the basis of Ho rejection. This means that Hi stands, indicating that the returns of covered calls on BBRI are higher than the risk-free returns.

Table. 4.5.b. Statistical Testing of Results for BBRI

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference: Lower	95% Confidence Interval of the Difference: Upper			
Risk-free returns - BBRI	-.021258	.01734797	.00261530	-.026533	-.015984	-8.128	43	.000

4.2.1.6. Results of covered calls on INDF

For INDF as seen in Table 4.6.a the increase was as much as 1.8% from 0.79% to 2.63%.

Table. 4.6.a. Statistical Results for INDF

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Risk-free rate	.0079091	44	.00158194	.00023849
	INDF	.0262686	44	.03190620	.00481004

From Table 4.6.b the mean difference of 1.84% which is located within the difference intervals of 2.8% and 0.87% with the absence of 0 (zero) within the interval provides strong evidence that the means are different.

Further analysis with the statistical hypothesis:

Ho : $\mu_{rf} = \mu_{CCINDF}$

Hi : $\mu_{rf} < \mu_{CCINDF}$

From Table 4.6.b shows the t-count of -3.822 combined with the significance of 0.000 which comes below the 0.05 significance level provides the basis of Ho rejection. This means that Hi stands, indicating that the returns of covered calls on BBRI are higher than the risk-free returns.

Table. 4.6.b. Statistical Testing of Results for INDF

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
1 Risk-free rate - INDF	-.018360	.03186217	.00480340	-.028047	-.008673	-3.822	43	.000

4.2.1.7. Results of covered calls on ISAT

Table 4.7.a shows that ISAT sought an increase of 3.7% on its covered calls as it increased from 0.79% to 4.48%.

Table. 4.7.a. Statistical Results for ISAT

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Risk-free returns	.0079091	44	.00158194	.00023849
	ISAT	.0448434	44	.03445704	.00519459

From Table 4.7.b, the mean difference of 3.69% which would be located within the intervals of 4.75% and 2.63%, and in the absence of 0 (zero) within the interval shows that the mean difference provides strong evidence that the means are different.

As we can see with the statistical hypothesis:

Ho : $\mu_{rf} = \mu_{CCISAT}$

Hi : $\mu_{rf} < \mu_{CCISAT}$

The t-count of -7.038, obtained from Table 4.7.b, combined with the significance of 0.000 which comes below the 0.05 significance level provides the basis of Ho rejection. This means that Hi stands, indicating that the returns of covered calls on BBRI are higher than the risk-free returns.

Table. 4.7.b. Statistical Testing of Results for ISAT

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Risk-free returns - ISAT	-.036934	.03481033	.00524785	-.047518	-.026351	-7.038	43	.000

4.2.1.8. Results of covered calls on PGAS

From the output shown in Table 4.8.a. the increase in returns of the covered call strategy on PGAS was as much as 3.43%.

Table. 4.8.a. Statistical Results for PGAS

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Risk-free returns	.0079091	44	.00158194	.00023849
	PGAS	.0422048	44	.02425586	.00365671

From Table 4.8.a the mean difference of 3.43% which is located within the intervals of 4.16% and 2.69% with the absence of 0 (zero) within the intervals shows that the mean difference provides strong evidence that the means are completely different.

With further analysis pertaining to the statistical hypothesis:

Ho : $\mu_{rf} = \mu_{CCPGAS}$

Hi : $\mu_{rf} < \mu_{CCPGAS}$

Table 4.8.b shows that the t-count of -9.464 combined with the significance of 0.000 which comes below the 0.05 significance level provides the basis of Ho rejection. This means that Hi stands, indicating that the returns of covered calls on PGAS are higher than the risk-free returns.

Table. 4.8.b. Statistical Testing of Results for PGAS

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
1	Risk-free returns - PGAS	-.034296	.02403757	.00362380	-.041604	-.026988	-9.464	43	.000

4.2.1.9. Results of covered calls on TLKM

The returns on covered calls on TLKM, are shown in the output of Table 4.9.a, had increase by 2.13%.

Table. 4.9.a. Statistical Results for TLKM

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Risk-free returns	.0079091	44	.00158194	.00023849
	TLKM	.0292195	44	.01180888	.00178026

From Table 4.9.b the mean difference of 2.13% which is located within the intervals of 2.48% and 1.77% and with the absence of 0 (zero) shows that the mean difference provides strong evidence that the means are different.

As we can see from the statistical hypothesis:

Ho : $\mu_{rf} = \mu_{CCTLKM}$

Hi : $\mu_{rf} < \mu_{CCTLKM}$

Given the output from Table 4.9.b the t-count of -12.117 combined with the significance of 0.000 which comes below the 0.05 significance level provides the basis of Ho rejection. This means that Hi stands, indicating that the returns of covered calls on TLKM are higher than the risk-free returns.

Table. 4.9.b. Statistical Testing of Results for TLKM

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Risk-free returns - TLKM	-.021310	.01166593	.00175870	-.024857	-.017764	-12.117	43	.000

.2.1.10. Results of covered calls on UNSP

he results of returns on the covered call on UNSP increased by 0.956%, from .808% to 1.765%, as seen in Table4.10.a.

Table. 4.10.a. Statistical Results for UNSP

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Risk-free returns	.0080828	29	.00149494	.00027760
	UNSP	.0176499	29	.01590482	.00295345

rom the mean difference of 0.96% which is located within the intervals of .58% and 0.33% and in the absence of 0 (zero) shows that the mean difference rovides strong evidence that the means are different.

urther analysis shows that with the statistical hypothesis:

Io : $\mu_{rf} = \mu_{CCUNSP}$

Ii : $\mu_{rf} < \mu_{CCUNSP}$

The t-count of -3.152, from Table 4.10.b, combined with the significance of 0.004 which comes below the 0.05 significance level provides the basis of Ho rejection. This means that Hi stands, indicating that the returns of covered calls on UNSP are higher than the risk-free returns.

Table. 4.10.b. Statistical Testing of Results for UNSP

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference: Lower	Upper			
isk-free returns - UNSP	-.009567	.01634284	.00303479	-.015784	-.003351	-3.152	28	.004

From a statistical standpoint, we can see generally there has been an increase in average returns from before with risk free returns to an even larger average returns with the covered call strategy from premiums on each issue.

4.2.2. Dividend Hedge Capture Strategy

For all 31 cases of the dividend hedge capture strategy we can statistically test its significance using both the t-test and Wilcoxon signed ranked test.

The output of the T-test generated using SPSS 12.0 can be seen as the following:

Table. 4.11.a. Statistical Results for Div. Hedge

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Risk-free Rate	.0948903	31	.01802183	.00323682
	Dividend Hedge	.2457447	31	.20452030	.03673293

Table 4.11.a shows that the dividend hedge capture strategy yields additional returns above the risk-free returns amounting to an increase of 15.08%

Table. 4.11.b. Statistical Testing of Results for Div. Hedge

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Risk-free Rate - Dividend Hedge	-.150854	.20403378	.03664555	-.225695	-.076014	-4.117	30	.000

The mean difference of 15.09% comes within the interval of 22.57% and 7.6% and with in the absence of 0 (zero) shows that the returns for the dividend hedge capture strategy are completely different than the risk free returns.

Table. 4.12.a. Statistical Results of Wilcoxon Signed Ranks Test for Div. Hedge

Ranks

		N	Mean Rank	Sum of Ranks
Dividend Hedge - Risk-free Rate	Negative Ranks	9[a]	8.78	79.00
	Positive Ranks	22[b]	18.95	417.00
	Ties	0[c]		
	Total	31		

a. Dividend Hedge < Risk-free Rate

b. Dividend Hedge > Risk-free Rate

c. Dividend Hedge = Risk-free Rate

The statistical results of the Wilcoxon signed rank test indicates that approximately 71% of the cases came with results of the dividend hedge capture strategy exceeding the risk free rate, while 39% of the cases in favor of higher risk-free returns than the returns of the dividend hedge capture strategy.

Table. 4.12.b. Statistical Testing of Results for Div. Hedge

Test Statistics[b]

	Dividend Hedge - Risk-free Rate
Z	-3.312[a]
Asymp. Sig. (2-tailed)	.001

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

The hypothesis for all 31 cases are:

Ho : $\mu_{rf} = \mu_{Div.Hedge}$

Hi : $\mu_{rf} < \mu_{Div.Hedge}$

Due to the alternative hypothesis being that the returns on the dividend hedge are greater than the risk free returns then we should employ a one-tailed test. Therefore from the output obtained above shows that:

1. The t obtained amounting to -4.117 as well as the z equaling to -3.312 is located outside of the Ho reception area in that Ho is rejected.
2. The probabilities (Sig. (2-tailed)) of both t-tests and Wilcoxon shows a number smaller than the significance level $\alpha = 0.05$ meaning that Ho is rejected.

The rejection of Ho at the significance level of 95% concludes that the dividend hedge capture strategy yields returns much greater than the risk-free returns.

4.3. Analysis of Overall Results

As we can see from all cases in both strategies, covered call and dividend hedge capture, above both yield a surprising increase in returns. This would mean that both strategies are indeed favorable for firms that are looking for alternative strategies replacing or even diversifying from the risk-free nature of current conventional investment strategies.

The overall results of both the covered call strategy and the dividend hedge capture strategy have both shown an increase in returns coupled with a proportionate increase in risk. To put in at another angle, for the firm implementing one or both strategies on their corporate cash holdings their increased return on investments is met by an increasing but tolerable degree of risk. This implies that in order for the firm to implement the strategies they must be willing or even have to adapt their current risk profiles pertaining to their operational and growth needs.

CHAPTER 5
CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

The simulation of both the covered call and dividend hedge capture strategies have been applied in this study thus creating a hypothetical situation in which the alternative strategy had been applied to historical situations pertaining to corporate cash management generating an 'after' scenario compared to a 'before' scenario which pertains to traditional cash management involving risk free investments.

A majority of the cases, comparing 'after' and 'before' scenarios, relating to the alternative strategies have shown returns that are favorable measured in terms of the Sharpe ratio and statistically comparable cases of traditional ('before') compared to alternative investment strategies ('after'). The favorability is greatly due to premiums which provide the necessary returns making the alternative strategies being worthwhile compared to interest returns on traditional strategies such as money markets, certificates of deposits, commercial papers and other tend-to-be-safe investments.

In estimating the premiums for the covered call strategy as well as the dividend hedge capture strategy, a number of variables directly affect the premiums of call options:

a. Volatility, which is estimated using the historical volatility based on the individual stock prices for 2004-2008. This variable affects the premiums in a way that as the volatility of the underlying tends to increase then the premium will also increase.
b. Position of the strike price relative to the stock price. Which in this matter both *at-the-money* and *in-the-money* provides for a higher amount of premiums relative to *out-of-the-money*. As the covered call position tends to be deeper *in-the-money* the investor must consider between the higher

possibility of the stock holding being exercised as well as the amount of premiums received to cover the losses from an exercise price that is much deeper.

c. Risk-free rate, in that as it becomes larger then the premium on call options also becomes larger. But in respect to the Sharpe ratio, at a high rate this variable tends to offset returns of the covered call making the Sharpe ratio negative in extreme cases.

In obtaining greater returns of the alternative strategies, external market conditions are important considerations and give constraints to the real world application of the strategies. The current condition the stock markets, as well as the options market in Indonesia is still viewed as *illiquid* compared to the markets in the U.S. This is seen in terms of the market participant and the regulations relating to trading in the Indonesian Stock Exchange.

From the market participant standpoint, the Indonesian Exchange had only just recently experienced a height in volume and market participants. As for regulations that relates to the Indonesian Exchange, constraints such as transaction costs and taxes levied on capital gains and dividends is still relatively higher than its counterparts in the U.S. These conditions should hamper the returns of the alternative strategies, thus reducing its returns or even worse eliminate them all completely.

5.2. Recommendations

In optimizing corporate cash holdings by way of the alternative strategies provided, the firm needs to take into account factors that form constraints as well as individual firm risk profiles. Factors that affect the firm in implementing the alternative strategies are:

a. Risk free rate, which provides firms a traditional source of returns on cash holdings and will set the benchmark for returns comparing to alternative strategies, which are covered call and dividend hedge strategy.

b. Cash conversion cycle, which provides the basic constraint for a typical firms in which its operations must be prioritized. The cash conversion cycle then should provide us a clue to begin with in determining whether a company is seen fit in employing the alternative strategies. As the cash conversion cycle is improved meaning that it trends downward for a firm from period to period and relatively more idle cash is generated.

c. Risk profiles of firms, being important in that the covered call and dividend hedge capture strategy must suit the risk preferences of a typical firm. Here it is deemed important that as the alternative strategies, seen by its respective positive Sharpe ratio, yield worthwhile returns on investments other circumstances must be taken into consideration such as subjective and rigid management policy and bureaucracy that judges the alternative strategy not fit with the firm's strategy.

d. The firm should thoroughly train its cash management division or even form a specialized team, which must cover all aspects pertaining to both strategies in order to deploy the covered call and dividend hedge capture strategy successfully and efficiently.

e. The firm *still* needs to diversify funds and not allocate all in one investment strategy.

With favorable results yielded in alternative strategies it shows that the strategy overall is fit and should be beneficial in broadening the firm's investment horizon. In a wider view, options provides flexibility and possibilities not explored further in this thesis. The possibilities continue to add up for investors as well as for firms in optimizing returns on corporate cash. For firms in Indonesia with the advent of options into the Indonesian Stock Exchange, the further growth and development of options in the future should broaden investment choices for investors and firms. But before this to happen other conditions must be met first, they are:

a. The market mechanisms coordinating and regulating options trading similar to options trading in other countries e.g. the US, must be designed and well established. In that a clearing institution similar to the Options Clearing Corporation (OCC) should be present to regulate the flow of call and put options to and from buyers and writers. Besides that also the institution should be the one regulating exercise and delivery of options. With this requirement met then the full extent of benefits that options have to offer is benefited by investors alike.

b. All forms of costs on transactions of options, as well as stocks, in the future for the Indonesian stock market should be minimized in order to achieve a larger growing number of market participants and to make returns from all market related investments even greater for investors.

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Appendix

Covered Calls on AALI

Date	Annualized Volatility σ	(√250)	(σ√250)	Stock Price 1	Strike Price 2	Premiums 3	Outflows 4	Inflows 5	Returns 6	Annualized (6) 7	SBI Rate 1 mo. 8	Sharpe Ratio
6/23/2008	0.0272	0.0632	0.4299	29300	29000	1706.06	2930000	140606.09	0.0480	0.5650	0.0869	1.1121
5/19/2008	0.0229	0.0632	0.3614	26000	26000	1169.18	2600000	116917.95	0.0450	0.5295	0.0824	1.2371
4/21/2008	0.0437	0.0632	0.6903	25100	25000	2117.19	2510000	201719.45	0.0804	0.9462	0.0798	1.2552
3/25/2008	0.0402	0.0632	0.6352	25950	25500	2198.22	2595000	174821.89	0.0674	0.7932	0.0794	1.1238
2/18/2008	0.0422	0.0632	0.6677	30500	30500	2435.98	3050000	243597.83	0.0799	0.9404	0.0795	1.2894
1/21/2008	0.0450	0.0632	0.7118	29100	29000	2518.52	2910000	241852.33	0.0831	0.9786	0.08	1.2624
12/26/2007	0.0343	0.0632	0.5423	25050	25000	1666.59	2505000	161659.34	0.0645	0.7598	0.08	1.2536
11/19/2007	0.0345	0.0632	0.5447	22600	22500	1539.04	2260000	143904.34	0.0637	0.7497	0.0825	1.2249
10/22/2007	0.0244	0.0632	0.3854	17800	17500	1008.09	1780000	70809.24	0.0398	0.4684	0.0825	1.0013
9/24/2007	0.0255	0.0632	0.4038	16950	16500	1088.52	1695000	63851.64	0.0377	0.4435	0.0825	0.8941
8/20/2007	0.0424	0.0632	0.6707	13000	13000	1044.33	1300000	104432.93	0.0803	0.9459	0.0825	1.2872
7/23/2007	0.0184	0.0632	0.2906	14950	14500	813.75	1495000	36375.15	0.0243	0.2865	0.0825	0.7019
6/15/2007	0.0211	0.0632	0.3336	13700	13500	681.35	1370000	48134.57	0.0351	0.4137	0.085	0.9853
5/21/2007	0.0313	0.0632	0.4953	14300	14000	1020.26	1430000	72025.94	0.0504	0.5930	0.0875	1.0207
4/23/2007	0.0221	0.0632	0.3492	14300	14000	791.86	1430000	49185.68	0.0344	0.4050	0.09	0.9019
3/20/2007	0.0174	0.0632	0.2749	11850	11500	626.37	1185000	27636.85	0.0233	0.2746	0.09	0.6716
2/20/2007	0.0241	0.0632	0.3813	13050	13000	647.49	1305000	59749.22	0.0458	0.5391	0.0925	1.1713
1/22/2007	0.0306	0.0632	0.4844	14000	14000	833.76	1400000	83375.68	0.0596	0.7012	0.095	1.2514
12/18/2006	0.0252	0.0632	0.3986	11100	11000	605.08	1110000	50508.37	0.0455	0.5358	0.0975	1.0994
11/20/2006	0.0204	0.0632	0.3230	10250	10000	566.03	1025000	31602.62	0.0308	0.3630	0.1025	0.8065
10/30/2006	0.0198	0.0632	0.3133	9400	9000	624.49	940000	22448.90	0.0239	0.2812	0.1075	0.5544
9/18/2006	0.0265	0.0632	0.4185	8800	8500	631.65	880000	33165.31	0.0377	0.4437	0.1125	0.7915
8/22/2006	0.0282	0.0632	0.4463	8300	8000	632.49	830000	33248.90	0.0401	0.4717	0.1175	0.7936
7/24/2006	0.0203	0.0632	0.3211	7500	7500	315.63	750000	31563.20	0.0421	0.4955	0.1225	1.1615
6/19/2006	0.0408	0.0632	0.6446	6450	6000	759.73	645000	30973.04	0.0480	0.5654	0.125	0.6832
5/22/2006	0.0277	0.0632	0.4383	6200	6000	454.84	620000	25484.12	0.0411	0.4840	0.125	0.8191
4/24/2006	0.0161	0.0632	0.2543	6350	6000	457.23	635000	10722.51	0.0169	0.1988	0.1274	0.2808
3/20/2006	0.0247	0.0632	0.3911	6100	6000	360.41	610000	26040.89	0.0427	0.5026	0.1274	0.9594

2/20/2006	0.0232	0.0632	**0.3668**	**6000**	**6000**	**284.99**	600000	28498.51	0.0475	0.5592	0.1275	1.1770
1/23/2006	0.0166	0.0632	**0.2631**	**4900**	**4500**	**465.07**	490000	6507.48	0.0133	0.1564	0.1275	0.1097
12/19/2005	0.0217	0.0632	**0.3434**	**5450**	**5000**	**547.65**	545000	9764.62	0.0179	0.2110	0.1275	0.2430
11/21/2005	0.0108	0.0632	**0.1715**	**5250**	**5000**	**315.17**	525000	6517.47	0.0124	0.1462	0.1225	0.1380
10/24/2005	0.0275	0.0632	**0.4351**	**5400**	**5000**	**540.61**	540000	14061.49	0.0260	0.3066	0.11	0.4518
9/19/2005	0.0239	0.0632	**0.3772**	**4575**	**4500**	**257.44**	457500	18244.18	0.0399	0.4695	0.1	0.9798
8/22/2005	0.0147	0.0632	**0.2321**	**3750**	**3500**	**290.68**	375000	4068.24	0.0108	0.1277	0.0871	0.1751
7/18/2005	0.0154	0.0632	**0.2430**	**3950**	**3500**	**478.02**	395000	2801.60	0.0071	0.0835	0.0844	-0.0037
6/20/2005	0.0143	0.0632	**0.2267**	**3750**	**3500**	**287.79**	375000	3778.70	0.0101	0.1186	0.0802	0.1696
5/23/2005	0.0187	0.0632	**0.2953**	**3475**	**3000**	**498.51**	347500	2351.49	0.0068	0.0797	0.0787	0.0033
4/18/2005	0.0275	0.0632	**0.4349**	**3900**	**3500**	**467.07**	390000	6706.84	0.0172	0.2025	0.0744	0.2945
3/21/2005	0.0324	0.0632	**0.5122**	**3975**	**3500**	**551.48**	397500	7647.95	0.0192	0.2265	0.0743	0.2972
2/21/2005	0.0187	0.0632	**0.2955**	**3000**	**3000**	**111.27**	300000	11127.46	0.0371	0.4367	0.0742	1.2267
1/24/2005	0.0144	0.0632	**0.2282**	**3000**	**3000**	**88.17**	300000	8817.21	0.0294	0.3461	0.0742	1.1914
12/20/2004	0.0188	0.0632	**0.2968**	**3150**	**3000**	**209.81**	315000	5981.06	0.0190	0.2236	0.0741	0.5036
11/22/2004	0.0150	0.0632	**0.2364**	**3025**	**3000**	**105.33**	302500	8032.93	0.0266	0.3127	0.0741	1.0090

Covered Calls on ANTM

Date	Annualized Volatility			Stock Price	Strike Price	Premiums	Outflows	Inflows	Returns	Annualized (6)	SBI Rate 1 mo.	Sharpe Ratio
	σ	(√250)	(σ√250)	1	2	3	4	5	6	7	8	
6/23/2008	0.0301	0.0632	**0.4753**	**3100**	**3000**	**234.17**	13417.43	310000	0.0433	0.5096	0.0869	0.8894
5/19/2008	0.0192	0.0632	**0.3043**	**3750**	**3500**	**308.21**	5820.51	375000	0.0155	0.1828	0.0824	0.3300
4/21/2008	0.0435	0.0632	**0.6880**	**3450**	**3000**	**555.06**	10506.08	345000	0.0305	0.3586	0.0798	0.4052
3/25/2008	0.0276	0.0632	**0.4360**	**3250**	**3000**	**326.83**	7682.91	325000	0.0236	0.2783	0.0794	0.4562
2/18/2008	0.0752	0.0632	**1.1883**	**3950**	**3000**	**1104.82**	15481.84	395000	0.0392	0.4615	0.0795	0.3215
1/21/2008	0.0447	0.0632	**0.7063**	**3225**	**3000**	**392.99**	16799.39	322500	0.0521	0.6133	0.08	0.7550
12/26/2007	0.0364	0.0632	**0.5748**	**4050**	**4000**	**305.29**	25528.54	405000	0.063	0.7422	0.08	1.1521
11/19/2007	0.0471	0.0632	**0.7440**	**4175**	**4000**	**458.84**	28384.39	417500	0.068	0.8005	0.0825	0.9650
10/22/2007	0.0402	0.0632	**0.6360**	**2975**	**2500**	**534.80**	5979.88	297500	0.0201	0.2367	0.0825	0.2424
9/24/2007	0.0426	0.0632	**0.6735**	**2725**	**2500**	**345.30**	12030.01	272500	0.0442	0.5198	0.0825	0.6493
8/20/2007	0.0523	0.0632	**0.8272**	**2010**	**2000**	**201.98**	19197.69	201000	0.0955	1.1246	0.0825	1.2598

Covered Calls on ASII

Date	Annualized Volatility σ	(√250)	(σ√250)	Stock Price 1	Strike Price 2	Premiums 3	Outflows 4	Inflows 5	Returns 6	Annualized (6) 7	SBI Rate 1 mo. 8	Sharpe Ratio
6/20/2008	0.0220	0.0632	0.3486	19700	19500	965.83	76583.28	1970000	0.0389	0.4577	0.0869	1.0637
5/16/2008	0.0246	0.0632	0.3884	21450	21000	1272.05	82205.27	2145000	0.0383	0.4512	0.0824	0.9496
4/18/2008	0.0413	0.0632	0.6535	20150	20000	1649.04	149904	2015000	0.0744	0.8759	0.0798	1.2183
3/19/2008	0.0276	0.0632	0.4362	22750	22500	1342.43	109242.6	2275000	0.0480	0.5654	0.0794	1.1141
2/15/2008	0.0475	0.0632	0.7505	27250	27000	2552.60	230259.8	2725000	0.0845	0.9949	0.0795	1.2197
1/18/2008	0.0332	0.0632	0.5254	26900	26500	1913.03	151302.9	2690000	0.0562	0.6623	0.08	1.1082
12/19/2007	0.0332	0.0632	0.5244	26100	26000	1706.55	160654.7	2610000	0.0616	0.7247	0.08	1.2296
11/16/2007	0.0405	0.0632	0.6397	23550	23500	1832.30	178229.7	2355000	0.0757	0.8911	0.0825	1.2640
10/19/2007	0.0259	0.0632	0.4101	22500	22500	1137.19	113718.8	2250000	0.0505	0.5951	0.0825	1.2500
9/21/2007	0.0185	0.0632	0.2928	19300	19000	881.23	58123.27	1930000	0.0301	0.3546	0.0825	0.9292
8/16/2007	0.0289	0.0632	0.4562	15450	15000	1103.19	65318.91	1545000	0.0423	0.4978	0.0825	0.9104
7/20/2007	0.0230	0.0632	0.3642	19250	19000	1003.47	75346.57	1925000	0.0391	0.4609	0.0825	1.0389
6/14/2007	0.0194	0.0632	0.3065	16400	16000	862.44	46244.18	1640000	0.0282	0.3320	0.085	0.8059
5/16/2007	0.0215	0.0632	0.3399	15900	15500	902.27	50227.12	1590000	0.0316	0.3719	0.0875	0.8368
4/20/2007	0.0237	0.0632	0.3746	14000	14000	655.10	65510.5	1400000	0.0468	0.5510	0.09	1.2306
3/16/2007	0.0201	0.0632	0.3177	13450	13000	804.04	35403.7	1345000	0.0263	0.3099	0.09	0.6922
2/16/2007	0.0179	0.0632	0.2833	15000	15000	547.06	54706.19	1500000	0.0365	0.4294	0.0925	1.1894
1/19/2007	0.0216	0.0632	0.3418	16100	16000	748.61	64861.03	1610000	0.0403	0.4743	0.095	1.1098
12/15/2006	0.0218	0.0632	0.3453	15950	15500	952.08	50207.84	1595000	0.0315	0.3706	0.0975	0.7910
11/17/2006	0.0213	0.0632	0.3363	14700	14500	739.22	53922.11	1470000	0.0367	0.4319	0.1025	0.9794
10/20/2006	0.0174	0.0632	0.2749	13500	13500	488.34	48833.83	1350000	0.0362	0.4259	0.1075	1.1581
9/15/2006	0.0226	0.0632	0.3569	11900	11500	774.26	37426.17	1190000	0.0315	0.3703	0.1125	0.7223
8/16/2006	0.0198	0.0632	0.3133	11900	11500	724.70	32469.67	1190000	0.0273	0.3213	0.1175	0.6503
7/21/2006	0.0208	0.0632	0.3285	9500	9500	407.72	40772.16	950000	0.0429	0.5053	0.1225	1.1655
6/16/2006	0.0311	0.0632	0.4923	9500	9500	585.99	58599.43	950000	0.0617	0.7263	0.125	1.2214
5/19/2006	0.0329	0.0632	0.5201	10650	10500	767.40	61740.19	1065000	0.0580	0.6826	0.125	1.0720

4/21/2006	0.0304	0.0632	**0.4808**	**11950**	**11500**	**970.75**	52075.19	1195000	0.0436	0.5131	0.1274	0.8023
3/17/2006	0.0223	0.0632	**0.3522**	**11000**	**11000**	**504.14**	50414.05	1100000	0.0458	0.5396	0.1274	1.1704
2/17/2006	0.0250	0.0632	**0.3948**	**9450**	**9000**	**744.90**	29490.49	945000	0.0312	0.3674	0.1275	0.6078
1/20/2006	0.0184	0.0632	**0.2902**	**10950**	**10500**	**704.97**	25496.51	1095000	0.0233	0.2742	0.1275	0.5053
12/16/2005	0.0223	0.0632	**0.3528**	**10050**	**10000**	**487.56**	43756.1	1005000	0.0435	0.5126	0.1275	1.0917
11/18/2005	0.0215	0.0632	**0.3399**	**9050**	**9000**	**426.56**	37655.5	905000	0.0416	0.4899	0.1225	1.0809
10/21/2005	0.0276	0.0632	**0.4362**	**9400**	**9000**	**740.45**	34044.67	940000	0.0362	0.4264	0.11	0.7254
9/16/2005	0.0323	0.0632	**0.5103**	**10150**	**10000**	**712.87**	56287.13	1015000	0.0555	0.6529	0.1	1.0836
8/19/2005	0.0187	0.0632	**0.2955**	**10300**	**10000**	**561.82**	26181.64	1030000	0.0254	0.2993	0.0871	0.7180
7/15/2005	0.0186	0.0632	**0.2938**	**12200**	**12000**	**565.57**	36557.14	1220000	0.0300	0.3528	0.0844	0.9135
6/17/2005	0.0230	0.0632	**0.3634**	**13150**	**13000**	**671.60**	52159.58	1315000	0.0397	0.4670	0.0802	1.0644
5/20/2005	0.0145	0.0632	**0.2289**	**11050**	**11000**	**354.60**	30460.42	1105000	0.0276	0.3246	0.0787	1.0743
4/15/2005	0.0149	0.0632	**0.2356**	**11000**	**11000**	**332.72**	33272.34	1100000	0.0302	0.3561	0.0744	1.1958
3/18/2005	0.0216	0.0632	**0.3412**	**10950**	**10500**	**726.52**	27651.53	1095000	0.0253	0.2973	0.0743	0.6537
2/18/2005	0.0221	0.0632	**0.3488**	**11200**	**11000**	**591.02**	39101.55	1120000	0.0349	0.4111	0.0742	0.9657
1/21/2005	0.0146	0.0632	**0.2313**	**10450**	**10000**	**600.55**	15055.11	1045000	0.0144	0.1696	0.0742	0.4126
12/17/2004	0.0220	0.0632	**0.3481**	**9650**	**9500**	**495.80**	34580.19	965000	0.0358	0.4219	0.0741	0.9991
11/19/2004	0.0169	0.0632	**0.2672**	**8550**	**8500**	**315.81**	26581.28	855000	0.0311	0.3661	0.0741	1.0926

Covered Calls on BBNI

Date	Annualized Volatility			Stock Price	Strike Price	Premiums	Outflows	Inflows	Returns	Annualized (6)	SBI Rate 1 mo.	Sharpe Ratio
	σ	(√250)	(σ√250)	1	2	3	4	5	6	7	8	
6/23/2008	0.0306	0.0632	**0.4842**	**1210**	**1000**	**222.63**	**1263.28**	**121000**	0.0104	0.1229	0.0869	0.0744
5/16/2008	0.0153	0.0632	**0.2412**	**1220**	**1000**	**226.88**	**687.74**	**122000**	0.0056	0.0664	0.0824	-0.0665
4/18/2008	0.0293	0.0632	**0.4629**	**1250**	**1000**	**259.22**	**922.03**	**125000**	0.0074	0.0868	0.0798	0.0152
3/19/2008	0.0151	0.0632	**0.2385**	**1370**	**1000**	**376.59**	**659.48**	**137000**	0.0048	0.0567	0.0794	-0.0953
2/15/2008	0.0372	0.0632	**0.5881**	**1710**	**1500**	**251.79**	**4179.17**	**171000**	0.0244	0.2878	0.0795	0.3541
1/18/2008	0.0221	0.0632	**0.3493**	**1750**	**1500**	**263.80**	**1379.58**	**175000**	0.0079	0.0928	0.08	0.0367
12/19/2007	0.0223	0.0632	**0.3534**	**1920**	**1500**	**430.33**	**1032.83**	**192000**	0.0054	0.0633	0.08	-0.0472
11/16/2007	0.0253	0.0632	**0.4001**	**1890**	**1500**	**401.67**	**1167.15**	**189000**	0.0062	0.0727	0.0825	-0.0245
10/19/2007	0.0194	0.0632	**0.3073**	**2025**	**2000**	**91.97**	**6697.22**	**202500**	0.0331	0.3894	0.0825	0.9988
9/21/2007	0.0263	0.0632	**0.4155**	**2000**	**2000**	**102.33**	**10233.37**	**200000**	0.0512	0.6024	0.0825	1.2513
8/16/2007	0.0436	0.0632	**0.6901**	**1680**	**1500**	**243.01**	**6300.77**	**168000**	0.0375	0.4416	0.0825	0.5203
7/20/2007	0.0184	0.0632	**0.2913**	**2650**	**2500**	**194.21**	**4421.34**	**265000**	0.0167	0.1964	0.0825	0.3912
6/14/2007	0.0180	0.0632	**0.2842**	**2375**	**2000**	**390.04**	**1503.50**	**237500**	0.0063	0.0745	0.085	-0.0368
5/16/2007	0.0360	0.0632	**0.5689**	**2450**	**2000**	**481.69**	**3168.92**	**245000**	0.0129	0.1523	0.0875	0.1139
4/17/2007	0.0289	0.0632	**0.4570**	**2100**	**2000**	**174.51**	**7450.65**	**210000**	0.0355	0.4177	0.09	0.7172
3/16/2007	0.0298	0.0632	**0.4711**	**1770**	**1500**	**291.85**	**2185.14**	**177000**	0.0123	0.1454	0.09	0.1175
2/16/2007	0.0108	0.0632	**0.1703**	**1780**	**1500**	**291.52**	**1152.07**	**178000**	0.0065	0.0762	0.0925	-0.0957
1/19/2007	0.0233	0.0632	**0.3690**	**1850**	**1500**	**363.16**	**1316.16**	**185000**	0.0071	0.0838	0.095	-0.0304
12/15/2006	0.0263	0.0632	**0.4153**	**1960**	**1500**	**472.89**	**1288.87**	**196000**	0.0066	0.0774	0.0975	-0.0483
11/17/2006	0.0319	0.0632	**0.5036**	**2200**	**2000**	**259.29**	**5928.61**	**220000**	0.0269	0.3173	0.1025	0.4265
10/20/2006	0.0630	0.0632	**0.9959**	**2450**	**2000**	**552.30**	**10230.25**	**245000**	0.0418	0.4916	0.1075	0.3857
9/15/2006	0.0375	0.0632	**0.5935**	**1460**	**1000**	**470.17**	**1016.78**	**146000**	0.0070	0.0820	0.1125	-0.0514
8/16/2006	0.0150	0.0632	**0.2371**	**1150**	**1000**	**160.12**	**1011.66**	**115000**	0.0088	0.1036	0.1175	-0.0587
7/21/2006	0.0286	0.0632	**0.4517**	**1090**	**1000**	**118.24**	**2823.74**	**109000**	0.0259	0.3050	0.1225	0.4040
6/16/2006	0.0268	0.0632	**0.4238**	**1150**	**1000**	**167.27**	**1727.43**	**115000**	0.0150	0.1769	0.125	0.1224
5/19/2006	0.0187	0.0632	**0.2952**	**1220**	**1000**	**230.58**	**1057.76**	**122000**	0.0087	0.1021	0.125	-0.0776
4/21/2006	0.0157	0.0632	**0.2488**	**1420**	**1000**	**430.56**	**1056.05**	**142000**	0.0074	0.0876	0.1274	-0.1601
3/17/2006	0.0131	0.0632	**0.2076**	**1300**	**1000**	**310.56**	**1056.05**	**130000**	0.0081	0.0956	0.1274	-0.1529
2/17/2006	0.0109	0.0632	**0.1722**	**1260**	**1000**	**270.57**	**1056.88**	**126000**	0.0084	0.0988	0.1275	-0.1669
1/20/2006	0.0176	0.0632	**0.2790**	**1320**	**1000**	**330.57**	**1057.27**	**132000**	0.0080	0.0943	0.1275	-0.1190
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0994	0.1275	-0.0789

11/18/2005	0.0346	0.0632	**0.5474**	**1200**	**1000**	**219.44**	**1943.82**	**120000**	0.0162	0.1907	0.1225	0.1246
10/21/2005	0.0147	0.0632	**0.2317**	**1270**	**1000**	**279.13**	**912.66**	**127000**	0.0072	0.0846	0.11	-0.1096
9/16/2005	0.0379	0.0632	**0.5992**	**1550**	**1500**	**138.83**	**8883.07**	**155000**	0.0573	0.6748	0.1	0.9593
8/19/2005	0.0090	0.0632	**0.1427**	**1580**	**1500**	**92.98**	**1297.66**	**158000**	0.0082	0.0967	0.0871	0.0673
7/15/2005	0.0208	0.0632	**0.3285**	**1640**	**1500**	**162.50**	**2250.37**	**164000**	0.0137	0.1616	0.0844	0.2349
6/17/2005	0.0180	0.0632	**0.2846**	**1810**	**1500**	**320.40**	**1039.59**	**181000**	0.0057	0.0676	0.0802	-0.0442
5/20/2005	0.0140	0.0632	**0.2214**	**1670**	**1500**	**181.31**	**1130.98**	**167000**	0.0068	0.0797	0.0787	0.0047
4/15/2005	0.0128	0.0632	**0.2019**	**1710**	**1500**	**219.56**	**956.11**	**171000**	0.0056	0.0658	0.0744	-0.0424
3/18/2005	0.0154	0.0632	**0.2435**	**1820**	**1500**	**329.34**	**933.58**	**182000**	0.0051	0.0604	0.0743	-0.0571
2/18/2005	0.0098	0.0632	**0.1543**	**1710**	**1500**	**219.27**	**926.67**	**171000**	0.0054	0.0638	0.0742	-0.0674
1/21/2005	0.0235	0.0632	**0.3721**	**1620**	**1500**	**150.23**	**3022.83**	**162000**	0.0187	0.2197	0.0742	0.3910
12/17/2004	0.0192	0.0632	**0.3037**	**1500**	**1500**	**57.02**	**5702.41**	**150000**	0.0380	0.4476	0.0741	1.2300
11/19/2004	0.0191	0.0632	**0.3027**	**1550**	**1500**	**87.78**	**3777.70**	**155000**	0.0244	0.2870	0.0741	0.7032

Covered Calls on BBRI

Date	Annualized Volatility			Stock Price	Strike Price	Premiums	Outflows	Inflows	Returns	Annualized (6)	SBI Rate 1 mo.	Sharpe Ratio
	σ	(√250)	(σ√250)	1	2	3	4	5	6	7	8	
6/23/2008	0.0239	0.0632	**0.3784**	**4725**	**4500**	**354.66**	12965.96	472500	0.3231	0.0869	0.0869	0.5494
5/19/2008	0.0415	0.0632	**0.6557**	**6700**	**6500**	**627.68**	42767.7	670000	0.7516	0.0824	0.0824	1.8517
4/21/2008	0.0368	0.0632	**0.5815**	**6350**	**6000**	**635.50**	28550.27	635000	0.5294	0.0798	0.0798	0.6513
3/25/2008	0.0393	0.0632	**0.6207**	**6050**	**6000**	**474.96**	42495.87	605000	0.8270	0.0794	0.0794	1.1770
2/18/2008	0.0312	0.0632	**0.4932**	**7000**	**7000**	**419.52**	41951.52	700000	0.7056	0.0795	0.0795	0.9378
1/21/2008	0.0248	0.0632	**0.3927**	**6750**	**6500**	**467.68**	21768.36	675000	0.3797	0.08	0.08	0.4211
12/26/2007	0.0221	0.0632	**0.3487**	**7350**	**7000**	**527.77**	17776.63	735000	0.2848	0.08	0.08	0.3776
11/19/2007	0.0291	0.0632	**0.4604**	**7850**	**7500**	**637.08**	28707.8	785000	0.4306	0.0825	0.0825	0.6390
10/22/2007	0.0324	0.0632	**0.5123**	**6750**	**6500**	**553.97**	30397.31	675000	0.5302	0.0825	0.0825	1.1618
9/24/2007	0.0198	0.0632	**0.3134**	**6800**	**6500**	**449.82**	14981.52	680000	0.2594	0.0825	0.0825	0.4381
8/20/2007	0.0322	0.0632	**0.5099**	**5550**	**5500**	**368.75**	31875.23	555000	0.6762	0.0825	0.0825	0.8852
7/23/2007	0.0173	0.0632	**0.2732**	**6500**	**6500**	**226.79**	22678.8	650000	0.4108	0.0825	0.0825	1.1297
6/15/2007	0.0234	0.0632	**0.3701**	**5800**	**5500**	**446.35**	14634.95	580000	0.2971	0.085	0.085	0.6358
5/21/2007	0.0244	0.0632	**0.3860**	**6300**	**6000**	**477.82**	17782.33	630000	0.3323	0.0875	0.0875	0.4943
4/23/2007	0.0227	0.0632	**0.3597**	**5500**	**5500**	**248.02**	24801.69	550000	0.5309	0.09	0.09	1.2626
3/20/2007	0.0168	0.0632	**0.2663**	**4925**	**4500**	**476.04**	5104.067	492500	0.1220	0.09	0.09	0.1165
2/20/2007	0.0172	0.0632	**0.2712**	**5000**	**5000**	**175.48**	17548.03	500000	0.4132	0.0925	0.0925	0.8412
1/22/2007	0.0212	0.0632	**0.3346**	**5450**	**5000**	**533.34**	8334.267	545000	0.1801	0.095	0.095	0.1756
12/18/2006	0.0193	0.0632	**0.3049**	**5250**	**5000**	**360.59**	11058.86	525000	0.2480	0.0975	0.0975	0.3776
11/20/2006	0.0195	0.0632	**0.3086**	**5450**	**5000**	**526.64**	7664.476	545000	0.1656	0.1025	0.1025	0.1953
10/30/2006	0.0132	0.0632	**0.2090**	**4900**	**4500**	**447.34**	4733.765	490000	0.1137	0.1075	0.1075	0.0199
9/18/2006	0.0146	0.0632	**0.2303**	**4750**	**4500**	**319.75**	6975.435	475000	0.1729	0.1125	0.1125	0.1443
8/22/2006	0.0238	0.0632	**0.3761**	**4600**	**4500**	**276.26**	17625.9	460000	0.4512	0.1175	0.1175	0.7476
7/24/2006	0.0285	0.0632	**0.4511**	**4000**	**4000**	**227.57**	22756.58	400000	0.6699	0.1225	0.1225	1.7044
6/19/2006	0.0360	0.0632	**0.5695**	**4100**	**4000**	**340.66**	24066.42	410000	0.6911	0.125	0.125	0.8783
5/22/2006	0.0319	0.0632	**0.5049**	**3900**	**3500**	**499.00**	9900.486	390000	0.2989	0.125	0.125	0.3968
4/24/2006	0.0235	0.0632	**0.3713**	**4775**	**4500**	**398.93**	12392.83	477500	0.3056	0.1274	0.1274	0.7007
3/20/2006	0.0264	0.0632	**0.4166**	**4150**	**4000**	**305.42**	15541.85	415000	0.4409	0.1274	0.1274	0.8017

2/20/2006	0.0144	0.0632	**0.2280**	**3375**	**3000**	**408.72**	3372.324	337500	0.1176	0.1275	0.1275	-0.0269
1/23/2006	0.0246	0.0632	**0.3887**	**3200**	**3000**	**283.63**	8363.343	320000	0.3077	0.1275	0.1275	0.6851
12/19/2005	0.0206	0.0632	**0.3254**	**3025**	**3000**	**142.89**	11788.56	302500	0.4588	0.1275	0.1275	0.9649
11/21/2005	0.0205	0.0632	**0.3239**	**2725**	**2500**	**269.44**	4444.374	272500	0.1920	0.1225	0.1225	0.4055
10/24/2005	0.0279	0.0632	**0.4417**	**2475**	**2000**	**497.89**	2288.882	247500	0.1089	0.11	0.11	-0.0026
9/19/2005	0.0376	0.0632	**0.5950**	**2625**	**2500**	**257.08**	13208.25	262500	0.5924	0.1	0.1	1.3057
8/22/2005	0.0223	0.0632	**0.3523**	**2675**	**2500**	**228.23**	5323.223	267500	0.2343	0.0871	0.0871	0.6343
7/18/2005	0.0164	0.0632	**0.2597**	**2950**	**2500**	**468.26**	1826.131	295000	0.0729	0.0844	0.0844	-0.0474
6/20/2005	0.0177	0.0632	**0.2805**	**2825**	**2500**	**346.73**	2173.28	282500	0.0906	0.0802	0.0802	0.0458
5/23/2005	0.0214	0.0632	**0.3378**	**2775**	**2500**	**307.63**	3263.028	277500	0.1384	0.0787	0.0787	0.2023
4/18/2005	0.0241	0.0632	**0.3807**	**2675**	**2500**	**232.85**	5784.866	267500	0.2546	0.0744	0.0744	0.4144
3/21/2005	0.0237	0.0632	**0.3740**	**3100**	**3000**	**198.60**	9859.914	310000	0.3745	0.0743	0.0743	0.5860
2/21/2005	0.0193	0.0632	**0.3048**	**3175**	**3000**	**231.20**	5620.049	317500	0.2084	0.0742	0.0742	0.4541
1/24/2005	0.0206	0.0632	**0.3256**	**2725**	**2500**	**261.46**	3646.046	272500	0.1575	0.0742	0.0742	0.3652
12/20/2004	0.0219	0.0632	**0.3459**	**2475**	**2000**	**488.41**	1340.631	247500	0.0638	0.0741	0.0741	-0.0348
11/22/2004	0.0192	0.0632	**0.3033**	**2125**	**2000**	**160.37**	3537.244	212500	0.1960	0.0741	0.0741	0.5155

Covered Calls on INDF

Date	Annualized Volatility			Stock Price	Strike Price	Premiums	Outflows	Inflows	Returns	Annualized (6)	SBI Rate 1 mo.	Sharpe Ratio
	σ	(√250)	(σ√250)	1	2	3	4	5	6	7	8	
6/23/2008	0.0214	0.0632	**0.3391**	**2375**	**2000**	**392.24**	1724.28	237500	0.007260127	0.0855	0.0869	-0.0042
5/19/2008	0.0234	0.0632	**0.3704**	**2675**	**2500**	**231.64**	5664.269	267500	0.021174838	0.2493	0.0824	0.4507
4/21/2008	0.0353	0.0632	**0.5575**	**2300**	**2000**	**347.12**	4712.344	230000	0.020488452	0.2412	0.0798	0.2896
3/25/2008	0.0346	0.0632	**0.5468**	**2300**	**2000**	**345.36**	4535.572	230000	0.019719876	0.2322	0.0794	0.2794
2/18/2008	0.0478	0.0632	**0.7561**	**2775**	**2500**	**403.01**	12801.02	277500	0.046129791	0.5431	0.0795	0.6132
1/21/2008	0.0369	0.0632	**0.5841**	**2900**	**2500**	**460.35**	6034.672	290000	0.020809213	0.2450	0.08	0.2825
12/26/2007	0.0288	0.0632	**0.4561**	**2575**	**2500**	**183.54**	10854.33	257500	0.042152734	0.4963	0.08	0.9128
11/19/2007	0.0385	0.0632	**0.6094**	**2575**	**2500**	**227.11**	15210.63	257500	0.059070393	0.6955	0.0825	1.0059
10/22/2007	0.0177	0.0632	**0.2803**	**1900**	**2000**	**28.77**	12877.22	190000	0.067774834	0.7980	0.0825	2.5526
9/24/2007	0.0174	0.0632	**0.2756**	**1980**	**2000**	**59.83**	7982.672	198000	0.040316526	0.4747	0.0825	1.4231
8/20/2007	0.0393	0.0632	**0.6221**	**1770**	**1500**	**306.42**	3641.903	177000	0.020575724	0.2423	0.0825	0.2568
7/23/2007	0.0233	0.0632	**0.3686**	**2175**	**1500**	**685.29**	1028.604	217500	0.004729212	0.0557	0.0825	-0.0728
6/18/2007	0.0357	0.0632	**0.5648**	**1975**	**2000**	**123.31**	14831.19	197500	0.075094624	0.8842	0.085	1.4149
5/21/2007	0.0173	0.0632	**0.2739**	**1680**	**1500**	**194.36**	1435.551	168000	0.008544947	0.1006	0.0875	0.0479
4/23/2007	0.0219	0.0632	**0.3464**	**1660**	**1500**	**182.23**	2223.37	166000	0.013393797	0.1577	0.09	0.1954
3/20/2007	0.0169	0.0632	**0.2670**	**1390**	**1500**	**11.32**	12131.57	139000	0.087277475	1.0276	0.09	3.5121
2/20/2007	0.0265	0.0632	**0.4190**	**1680**	**1000**	**687.68**	767.892	168000	0.004570785	0.0538	0.0925	-0.0923
1/22/2007	0.0319	0.0632	**0.5048**	**1550**	**1500**	**122.56**	7256.209	155000	0.046814253	0.5512	0.095	0.9037
12/18/2006	0.0118	0.0632	**0.1870**	**1360**	**1000**	**368.09**	809.2081	136000	0.00595006	0.0701	0.0975	-0.1467
11/20/2006	0.0140	0.0632	**0.2206**	**1390**	**1000**	**398.51**	850.5291	139000	0.006118914	0.0720	0.1025	-0.1381
10/30/2006	0.0126	0.0632	**0.1993**	**1310**	**1000**	**318.92**	891.8335	131000	0.006807889	0.0802	0.1075	-0.1372
9/18/2006	0.0250	0.0632	**0.3950**	**1250**	**1000**	**260.30**	1029.946	125000	0.008239571	0.0970	0.1125	-0.0392
8/22/2006	0.0197	0.0632	**0.3110**	**1060**	**1000**	**81.64**	2163.535	106000	0.020410704	0.2403	0.1175	0.3949
7/24/2006	0.0264	0.0632	**0.4171**	**990**	**1000**	**47.60**	5759.591	99000	0.058177691	0.6850	0.1225	1.3487
6/19/2006	0.0419	0.0632	**0.6625**	**920**	**500**	**425.20**	520.1576	92000	0.005653887	0.0666	0.125	-0.0882
5/22/2006	0.0537	0.0632	**0.8492**	**910**	**1000**	**58.18**	14818.03	91000	0.162835536	1.9173	0.125	2.1106
4/24/2006	0.0174	0.0632	**0.2751**	**950**	**1000**	**14.93**	6493.15	95000	0.068348945	0.8048	0.1274	2.4625
3/20/2006	0.0150	0.0632	**0.2367**	**860**	**500**	**365.28**	528.0254	86000	0.006139831	0.0723	0.1274	-0.2328
2/20/2006	0.0147	0.0632	**0.2318**	**840**	**500**	**345.28**	528.4377	84000	0.006290925	0.0741	0.1275	-0.2305
1/23/2006	0.0262	0.0632	**0.4140**	**860**	**500**	**365.28**	528.4406	86000	0.006144658	0.0723	0.1275	-0.1332

12/19/2005	0.0250	0.0632	**0.3953**	**950**	**500**	**455.28**	528.4377	95000	0.005562502	0.0655	0.1275	-0.1569
11/21/2005	0.0196	0.0632	**0.3092**	**840**	**500**	**345.08**	507.8203	84000	0.006045479	0.0712	0.1225	-0.1660
10/24/2005	0.0269	0.0632	**0.4261**	**770**	**500**	**274.57**	456.5536	77000	0.005929268	0.0698	0.11	-0.0943
9/19/2005	0.0490	0.0632	**0.7747**	**760**	**500**	**265.62**	562.2452	76000	0.007397964	0.0871	0.1	-0.0166
8/18/2005	0.0108	0.0632	**0.1712**	**950**	**500**	**453.62**	361.6028	95000	0.003806345	0.0448	0.0871	-0.2470
7/18/2005	0.0190	0.0632	**0.3006**	**1100**	**1000**	**112.31**	1231.045	110000	0.011191319	0.1318	0.0844	0.1576
6/20/2005	0.0193	0.0632	**0.3049**	**1190**	**1000**	**197.37**	736.5943	119000	0.006189868	0.0729	0.0802	-0.0240
5/23/2005	0.0209	0.0632	**0.3308**	**1040**	**1000**	**66.35**	2635.04	104000	0.025336922	0.2983	0.0787	0.6639
4/18/2005	0.0263	0.0632	**0.4166**	**1080**	**1000**	**104.22**	2422.329	108000	0.022428975	0.2641	0.0744	0.4553
3/21/2005	0.0322	0.0632	**0.5086**	**1280**	**1000**	**289.03**	902.5005	128000	0.007050785	0.0830	0.0743	0.0171
2/21/2005	0.0175	0.0632	**0.2761**	**940**	**1000**	**11.02**	7102.198	94000	0.075555301	0.8896	0.0742	2.9537
1/24/2005	0.0219	0.0632	**0.3456**	**820**	**500**	**323.08**	308.2131	82000	0.003758696	0.0443	0.0742	-0.0867
12/20/2004	0.0236	0.0632	**0.3739**	**750**	**500**	**253.08**	307.904	75000	0.004105387	0.0483	0.0741	-0.0689
11/22/2004	0.0252	0.0632	**0.3981**	**700**	**500**	**203.11**	310.5574	70000	0.004436535	0.0522	0.0741	-0.0549

Covered Calls on ISAT

Date	Annualized Volatility			Stock Price	Strike Price	Premiums	Outflows	Inflows	Returns	Annualized (6)	SBI Rate 1 mo.	Sharpe Ratio
	σ	(√250)	(σ√250)	1	2	3	4	5	6	7	8	
6/23/2008	0.0442	0.0632	0.6992	6000	6500	306.05	80604.71	600000	0.1343	1.5818	0.0869	2.1380
5/16/2008	0.0192	0.0632	0.3029	6000	5000	1036.80	3680.03	600000	0.0061	0.0722	0.0824	-0.0336
4/18/2008	0.0211	0.0632	0.3341	6500	6500	271.32	27132.04	650000	0.0417	0.4915	0.0798	1.2321
3/19/2008	0.0331	0.0632	0.5237	6800	6500	593.97	29397.22	680000	0.0432	0.5090	0.0794	0.8203
2/15/2008	0.0517	0.0632	0.8177	7350	6500	1189.69	33968.74	735000	0.0462	0.5442	0.0795	0.5683
1/18/2008	0.0299	0.0632	0.4732	7100	7000	460.30	36029.89	710000	0.0507	0.5975	0.08	1.0937
12/19/2007	0.0285	0.0632	0.4499	8500	8500	467.48	46748.28	850000	0.0550	0.6476	0.08	1.2614
11/16/2007	0.0435	0.0632	0.6871	8800	8500	875.04	57503.70	880000	0.0653	0.7694	0.0825	0.9997
10/19/2007	0.0401	0.0632	0.6343	7850	8500	344.35	99434.61	785000	0.1267	1.4914	0.0825	2.2214
9/21/2007	0.0228	0.0632	0.3612	7100	8000	55.97	95597.25	710000	0.1346	1.5853	0.0825	4.1612
8/16/2007	0.0280	0.0632	0.4434	6550	7000	180.03	63003.21	655000	0.0962	1.1325	0.0825	2.3684
7/25/2007	0.0231	0.0632	0.3651	7350	7000	540.41	19040.98	735000	0.0259	0.3050	0.0825	0.6095
6/19/2007	0.0174	0.0632	0.2746	6850	7000	171.52	32152.48	685000	0.0469	0.5527	0.085	1.7032
5/23/2007	0.0171	0.0632	0.2706	7000	6500	587.57	8756.67	700000	0.0125	0.1473	0.0875	0.2209
4/20/2007	0.0179	0.0632	0.2831	6400	6500	184.75	28475.37	640000	0.0445	0.5239	0.09	1.5324
3/22/2007	0.0176	0.0632	0.2775	6000	6000	214.25	21424.64	600000	0.0357	0.4204	0.09	1.1907
2/22/2007	0.0175	0.0632	0.2765	5950	5500	524.56	7455.65	595000	0.0125	0.1475	0.0925	0.1991
1/24/2007	0.0322	0.0632	0.5089	6100	6000	431.40	33139.92	610000	0.0543	0.6397	0.095	1.0793
12/20/2006	0.0230	0.0632	0.3632	5750	6500	44.48	79448.12	575000	0.1382	1.6268	0.0975	4.2106
11/22/2006	0.0189	0.0632	0.2986	5750	5500	376.24	12624.07	575000	0.0220	0.2585	0.1025	0.5224
11/1/2006	0.0199	0.0632	0.3154	5350	5000	446.90	9690.03	535000	0.0181	0.2133	0.1075	0.3353
9/25/2006	0.0231	0.0632	0.3648	4875	5000	169.52	29452.00	487500	0.0604	0.7113	0.1125	1.6417
8/29/2006	0.0232	0.0632	0.3663	4725	4500	356.94	13193.51	472500	0.0279	0.3288	0.1175	0.5767
7/31/2006	0.0169	0.0632	0.2678	4275	4000	342.50	6750.23	427500	0.0158	0.1859	0.1225	0.2368
6/26/2006	0.0314	0.0632	0.4963	4250	4000	408.28	15827.95	425000	0.0372	0.4385	0.125	0.6317
5/29/2006	0.0311	0.0632	0.4913	5150	4500	750.52	10051.53	515000	0.0195	0.2298	0.125	0.2133
5/1/2006	0.0194	0.0632	0.3071	5300	5000	409.58	10957.95	530000	0.0207	0.2434	0.1274	0.3778
3/27/2006	0.0201	0.0632	0.3182	5075	5000	254.47	17947.12	507500	0.0354	0.4164	0.1274	0.9083
2/27/2006	0.0187	0.0632	0.2960	5150	5000	292.13	14213.39	515000	0.0276	0.3250	0.1275	0.6671
1/30/2006	0.0208	0.0632	0.3291	5800	5500	438.17	13816.60	580000	0.0238	0.2805	0.1275	0.4649

Covered Calls on PGAS

Date	Annualized Volatility			Stock Price	Strike Price	Premiums	Outflows	Inflows	Returns	Annualized (6)	SBI Rate 1 mo.	Sharpe Ratio
	σ	(√250)	(σ√250)	1	2	3	4	5	6	7	8	
6/23/2008	0.0183	0.0632	**0.2900**	**14000**	**14000**	**518.049**	51804.91	1400000	0.0370	0.4357	0.0869	1.2026
5/16/2008	0.0255	0.0632	**0.4036**	**14250**	**14000**	**841.263**	59126.34	1425000	0.0415	0.4885	0.0824	1.0064
4/18/2008	0.0327	0.0632	**0.5171**	**12700**	**12500**	**897.040**	69703.96	1270000	0.0549	0.6462	0.0798	1.0955
3/19/2008	0.0335	0.0632	**0.5294**	**13450**	**13000**	**1098.950**	64895.04	1345000	0.0482	0.5681	0.0794	0.9231
2/15/2008	0.0672	0.0632	**1.0623**	**12750**	**12500**	**1705.368**	145536.8	1275000	0.1141	1.3440	0.0795	1.1903
1/18/2008	0.0333	0.0632	**0.5258**	**12850**	**12500**	**1000.213**	65021.34	1285000	0.0506	0.5958	0.08	0.9809
12/19/2007	0.0237	0.0632	**0.3739**	**15000**	**15000**	**694.579**	69457.86	1500000	0.0463	0.5452	0.08	1.2441
11/16/2007	0.0328	0.0632	**0.5192**	**15850**	**15500**	**1178.900**	82890.03	1585000	0.0523	0.6157	0.0825	1.0271
10/19/2007	0.0214	0.0632	**0.3385**	**13550**	**13500**	**599.552**	54955.19	1355000	0.0406	0.4775	0.0825	1.1670
9/21/2007	0.0292	0.0632	**0.4622**	**10700**	**10500**	**708.308**	50830.82	1070000	0.0475	0.5593	0.0825	1.0316
8/16/2007	0.0329	0.0632	**0.5205**	**9000**	**9000**	**568.497**	56849.69	900000	0.0632	0.7437	0.0825	1.2705
7/20/2007	0.0274	0.0632	**0.4329**	**9100**	**9000**	**534.822**	43482.22	910000	0.0478	0.5626	0.0825	1.1090
6/15/2007	0.0230	0.0632	**0.3629**	**9450**	**9000**	**694.123**	24412.31	945000	0.0258	0.3042	0.085	0.6039
5/16/2007	0.0142	0.0632	**0.2240**	**10500**	**10500**	**309.681**	30968.06	1050000	0.0295	0.3473	0.0875	1.1597
4/20/2007	0.0205	0.0632	**0.3244**	**10700**	**10500**	**549.164**	34916.44	1070000	0.0326	0.3842	0.09	0.9069
3/16/2007	0.0229	0.0632	**0.3627**	**9100**	**9000**	**465.967**	36596.74	910000	0.0402	0.4735	0.09	1.0573
2/16/2007	0.0221	0.0632	**0.3502**	**8750**	**8500**	**526.588**	27658.81	875000	0.0316	0.3722	0.0925	0.7986
1/19/2007	0.0687	0.0632	**1.0863**	**8200**	**8000**	**1142.229**	94222.94	820000	0.1149	1.3529	0.095	1.1580
12/13/2006	0.0265	0.0632	**0.4184**	**11300**	**11000**	**751.656**	45165.56	1130000	0.0400	0.4706	0.0975	0.8917
11/15/2006	0.0176	0.0632	**0.2777**	**11350**	**11000**	**620.612**	27061.21	1135000	0.0238	0.2807	0.1025	0.6419
10/18/2006	0.0159	0.0632	**0.2510**	**11000**	**11000**	**367.962**	36796.22	1100000	0.0335	0.3939	0.1075	1.1408
9/13/2006	0.0225	0.0632	**0.3552**	**12550**	**12500**	**597.413**	54741.27	1255000	0.0436	0.5136	0.1125	1.1291
8/14/2006	0.0249	0.0632	**0.3941**	**12650**	**12500**	**713.851**	56385.13	1265000	0.0446	0.5248	0.1175	1.0336
7/19/2006	0.0323	0.0632	**0.5110**	**10400**	**10000**	**880.644**	48064.38	1040000	0.0462	0.5442	0.1225	0.8251
6/14/2006	0.0435	0.0632	**0.6877**	**10300**	**10000**	**1016.371**	71637.11	1030000	0.0696	0.8189	0.125	1.0090
5/17/2006	0.0345	0.0632	**0.5457**	**12800**	**12500**	**1023.364**	72336.37	1280000	0.0565	0.6654	0.125	0.9902
4/19/2006	0.0002	0.0632	**0.0027**	**10450**	**10000**	**555.605**	10560.51	1045000	0.0101	0.1190	0.1274	-3.0951
3/15/2006	0.0014	0.0632	**0.0226**	**9500**	**9500**	**101.682**	10168.24	950000	0.0107	0.1260	0.1274	-0.0607
2/15/2006	0.0390	0.0632	**0.6167**	**9700**	**9500**	**838.075**	63807.49	970000	0.0658	0.7745	0.1275	1.0492
1/18/2006	0.0326	0.0632	**0.5149**	**8150**	**8000**	**602.292**	45229.24	815000	0.0555	0.6534	0.1275	1.0214
12/14/2005	0.0431	0.0632	**0.6807**	**7000**	**7000**	**582.760**	58276.01	700000	0.0833	0.9802	0.1275	1.2527

11/16/2005	0.0179	0.0632	**0.2829**	**5350**	**5000**	**438.972**	8897.234	535000	0.0166	0.1958	0.1225	0.2592
10/19/2005	0.0475	0.0632	**0.7517**	**5200**	**5000**	**572.278**	37227.8	520000	0.0716	0.8429	0.11	0.9751
9/14/2005	0.0350	0.0632	**0.5542**	**3700**	**3500**	**361.054**	16105.37	370000	0.0435	0.5125	0.1	0.7444
8/17/2005	0.0247	0.0632	**0.3903**	**3450**	**3000**	**487.951**	3795.105	345000	0.0110	0.1295	0.0871	0.1087
7/13/2005	0.0387	0.0632	**0.6117**	**3150**	**3000**	**311.768**	16176.81	315000	0.0514	0.6047	0.0844	0.8505
6/14/2005	0.0208	0.0632	**0.3282**	**3050**	**3000**	**152.304**	10230.37	305000	0.0335	0.3949	0.0802	0.9590
5/18/2005	0.0231	0.0632	**0.3658**	**2700**	**2500**	**249.723**	4972.263	270000	0.0184	0.2168	0.0787	0.3776
4/13/2005	0.0295	0.0632	**0.4670**	**2625**	**2500**	**218.762**	9376.179	262500	0.0357	0.4206	0.0744	0.7413
3/16/2005	0.0178	0.0632	**0.2813**	**2650**	**2500**	**190.743**	4074.316	265000	0.0154	0.1810	0.0743	0.3794
2/16/2005	0.0331	0.0632	**0.5238**	**2750**	**2500**	**324.602**	7460.166	275000	0.0271	0.3194	0.0742	0.4681
1/19/2005	0.0241	0.0632	**0.3803**	**1980**	**1500**	**489.535**	953.5443	198000	0.0048	0.0567	0.0742	-0.0460
12/15/2004	0.0263	0.0632	**0.4161**	**1625**	**1500**	**160.130**	3512.978	162500	0.0216	0.2545	0.0741	0.4336
11/19/2004	0.0242	0.0632	**0.3823**	**1375**	**1000**	**381.216**	621.6392	137500	0.0045	0.0532	0.0741	-0.0546

Covered Calls on TLKM

Date	Annualized Volatility			Stock Price	Strike Price	Premiums	Outflows	Inflows	Returns	Annualized (6)	SBI Rate 1 mo.	Sharpe Ratio
	σ	(√250)	(σ√250)	1	2	3	4	5	6	7	8	
6/23/2008	0.0192	0.0632	**0.3039**	7750	7500	**445.05**	19504.72	775000	0.0252	0.2963	0.0869	0.4871
5/19/2008	0.0143	0.0632	**0.2266**	8600	8500	**310.30**	21029.63	860000	0.0245	0.2879	0.0824	0.5687
4/21/2008	0.0140	0.0632	**0.2220**	9000	9000	**260.34**	26034.18	900000	0.0289	0.3406	0.0798	0.3778
3/25/2008	0.0227	0.0632	**0.3591**	9800	9500	**604.95**	30495.3	980000	0.0311	0.3664	0.0794	0.4518
2/18/2008	0.0287	0.0632	**0.4539**	9950	9500	**803.34**	35333.73	995000	0.0355	0.4181	0.0795	0.5072
1/21/2008	0.0239	0.0632	**0.3786**	8900	8500	**649.15**	24914.86	890000	0.0280	0.3296	0.08	0.3507
12/26/2007	0.0221	0.0632	**0.3498**	10050	10000	**463.28**	41327.87	1005000	0.0411	0.4842	0.08	0.7453
11/19/2007	0.0233	0.0632	**0.3691**	10450	10000	**740.63**	29062.67	1045000	0.0278	0.3275	0.0825	0.4497
10/22/2007	0.0257	0.0632	**0.4060**	11300	11000	**728.38**	42838.19	1130000	0.0379	0.4464	0.0825	0.9442
9/24/2007	0.0204	0.0632	**0.3233**	10950	10500	**712.02**	26201.69	1095000	0.0239	0.2817	0.0825	0.4934
8/20/2007	0.0353	0.0632	**0.5581**	10500	10500	**708.40**	70840.15	1050000	0.0675	0.7944	0.0825	1.0613
7/23/2007	0.0180	0.0632	**0.2849**	11050	11000	**426.58**	37658.41	1105000	0.0341	0.4013	0.0825	1.0969
6/15/2007	0.0122	0.0632	**0.1928**	9750	9500	**407.91**	15790.66	975000	0.0162	0.1907	0.085	0.3168
5/21/2007	0.0147	0.0632	**0.2318**	9500	9500	**288.60**	28859.79	950000	0.0304	0.3577	0.0875	0.5455
4/23/2007	0.0163	0.0632	**0.2572**	10550	10500	**378.99**	32898.67	1055000	0.0312	0.3672	0.09	0.7936
3/20/2007	0.0204	0.0632	**0.3224**	9500	9500	**387.90**	38789.52	950000	0.0408	0.4808	0.09	1.4216
2/20/2007	0.0151	0.0632	**0.2385**	9650	9500	**388.35**	23834.57	965000	0.0247	0.2908	0.0925	0.5201
1/22/2007	0.0139	0.0632	**0.2204**	10150	10000	**385.33**	23532.88	1015000	0.0232	0.2730	0.095	0.3674
12/18/2006	0.0221	0.0632	**0.3497**	10000	10000	**442.66**	44265.9	1000000	0.0443	0.5212	0.0975	1.0629
11/20/2006	0.0192	0.0632	**0.3042**	9550	9500	**401.61**	35160.69	955000	0.0368	0.4335	0.1025	1.0246
10/30/2006	0.0097	0.0632	**0.1538**	8300	8000	**399.60**	9960.303	830000	0.0120	0.1413	0.1075	0.1079
9/18/2006	0.0143	0.0632	**0.2265**	8200	8000	**375.53**	17553.45	820000	0.0214	0.2520	0.1125	0.3334
8/22/2006	0.0174	0.0632	**0.2759**	8000	8000	**293.74**	29374.2	800000	0.0367	0.4323	0.1175	0.7054
7/24/2006	0.0203	0.0632	**0.3203**	7400	7000	**563.85**	16384.55	740000	0.0221	0.2607	0.1225	0.4303
6/19/2006	0.0359	0.0632	**0.5670**	7450	7000	**775.58**	32557.88	745000	0.0437	0.5146	0.125	0.6043
5/22/2006	0.0251	0.0632	**0.3965**	7200	7000	**476.77**	27677.25	720000	0.0384	0.4526	0.125	0.7475
4/24/2006	0.0148	0.0632	**0.2345**	7450	7000	**558.80**	10880.45	745000	0.0146	0.1720	0.1274	0.1752
3/20/2006	0.0195	0.0632	**0.3091**	7000	7000	**286.50**	28650.28	700000	0.0409	0.4819	0.1274	0.9064
2/20/2006	0.0185	0.0632	**0.2918**	6250	6000	**398.40**	14840.27	625000	0.0237	0.2796	0.1275	0.4146
1/23/2006	0.0209	0.0632	**0.3312**	6100	6000	**320.34**	22033.71	610000	0.0361	0.4253	0.1275	1.1320
12/19/2005	0.0220	0.0632	**0.3478**	6000	6000	**271.97**	27197.04	600000	0.0453	0.5337	0.1275	1.1829

11/21/2005	0.0103	0.0632	**0.1624**	**5200**	**5000**	**268.62**	6861.826	520000	0.0132	0.1554	0.1225	0.1917
10/24/2005	0.0218	0.0632	**0.3444**	**5150**	**5000**	**313.13**	16312.7	515000	0.0317	0.3729	0.11	0.6043
9/19/2005	0.0319	0.0632	**0.5044**	**5300**	**5000**	**498.96**	19896.05	530000	0.0375	0.4420	0.1	0.9068
8/22/2005	0.0260	0.0632	**0.4117**	**5100**	**5000**	**312.67**	21267.24	510000	0.0417	0.4910	0.0871	1.7405
7/18/2005	0.0217	0.0632	**0.3434**	**5150**	**5000**	**305.90**	15590.33	515000	0.0303	0.3564	0.0844	1.1195
6/20/2005	0.0149	0.0632	**0.2350**	**5350**	**5000**	**407.48**	5748.168	535000	0.0107	0.1265	0.0802	0.2043
5/23/2005	0.0183	0.0632	**0.2892**	**4600**	**4500**	**224.43**	12442.73	460000	0.0270	0.3185	0.0787	0.8119
4/18/2005	0.0140	0.0632	**0.2212**	**4500**	**4500**	**128.70**	12870.49	450000	0.0286	0.3368	0.0744	0.6032
3/21/2005	0.0162	0.0632	**0.2563**	**4525**	**4500**	**160.81**	13580.86	452500	0.0300	0.3534	0.0743	0.5448
2/21/2005	0.0088	0.0632	**0.1399**	**4625**	**4500**	**173.60**	4859.7	462500	0.0105	0.1237	0.0742	0.1675
1/24/2005	0.0155	0.0632	**0.2443**	**4850**	**4500**	**398.14**	4813.663	485000	0.0099	0.1169	0.0742	0.1870
12/20/2004	0.0224	0.0632	**0.3546**	**4925**	**4500**	**497.30**	7230.219	492500	0.0147	0.1729	0.0741	0.3328
11/22/2004	0.0202	0.0632	**0.3188**	**4950**	**4500**	**507.23**	5723.471	495000	0.0116	0.1361	0.0741	0.2624

Covered Calls on UNSP

Date	Annualized Volatility			Stock Price	Strike Price	Premiums	Outflows	Inflows	Returns	Annualized (6)	SBI Rate 1 mo.	Sharpe Ratio
	σ	(√250)	(σ√250)	1	2	3	4	5	6	7	8	
6/23/2008	0.0304	0.0632	**0.4804**	**1960**	**1500**	**472.94**	1293.67	196000	0.0066	0.0777	0.0869	-0.0214
5/16/2008	0.0213	0.0632	**0.3363**	**1760**	**1500**	**273.02**	1301.67	176000	0.0074	0.0871	0.0824	0.0130
4/18/2008	0.0624	0.0632	**0.9866**	**1670**	**1500**	**282.92**	11292.24	167000	0.0676	0.7961	0.0798	1.0378
3/19/2008	0.0446	0.0632	**0.7051**	**1640**	**1500**	**215.56**	7556.00	164000	0.0461	0.5425	0.0794	0.7290
2/15/2008	0.0623	0.0632	**0.9847**	**2500**	**2500**	**289.96**	28996.42	250000	0.1160	1.3656	0.0795	1.9263
1/18/2008	0.0440	0.0632	**0.6957**	**2575**	**2500**	**251.38**	17637.53	257500	0.0685	0.8065	0.08	1.0206
12/19/2007	0.0326	0.0632	**0.5162**	**2050**	**2000**	**154.15**	10415.10	205000	0.0508	0.5982	0.08	0.9555
11/16/2007	0.0391	0.0632	**0.6189**	**2175**	**2000**	**261.10**	8609.57	217500	0.0396	0.4661	0.0825	0.7042
10/19/2007	0.0268	0.0632	**0.4245**	**1750**	**1500**	**269.01**	1901.01	175000	0.0109	0.1279	0.0825	0.1178
9/21/2007	0.0489	0.0632	**0.7738**	**1540**	**1500**	**161.33**	12133.22	154000	0.0788	0.9277	0.0825	2.0929
8/16/2007	0.0469	0.0632	**0.7423**	**1330**	**1000**	**346.61**	1660.52	133000	0.0125	0.1470	0.0825	0.0962
7/20/2007	0.0161	0.0632	**0.2549**	**1730**	**1500**	**241.20**	1119.73	173000	0.0065	0.0762	0.0825	-0.0217
6/14/2007	0.0182	0.0632	**0.2885**	**1540**	**1500**	**79.59**	3959.21	154000	0.0257	0.3027	0.085	0.6526
5/16/2007	0.0202	0.0632	**0.3186**	**1400**	**1000**	**407.27**	726.75	140000	0.0052	0.0611	0.0875	-0.0533
4/20/2007	0.0246	0.0632	**0.3883**	**1410**	**1000**	**417.50**	750.34	141000	0.0053	0.0627	0.09	-0.0783
3/16/2007	0.0310	0.0632	**0.4908**	**1040**	**1000**	**84.22**	4422.15	104000	0.0425	0.5006	0.09	1.4940
2/16/2007	0.0220	0.0632	**0.3475**	**1090**	**1000**	**107.48**	1747.91	109000	0.0160	0.1888	0.0925	0.2526
1/19/2007	0.0253	0.0632	**0.4001**	**1030**	**1000**	**67.93**	3792.51	103000	0.0368	0.4335	0.095	0.6988
12/15/2006	0.0286	0.0632	**0.4523**	**980**	**500**	**484.05**	404.60	98000	0.0041	0.0486	0.0975	-0.1226
11/17/2006	0.0158	0.0632	**0.2505**	**900**	**500**	**404.25**	425.26	90000	0.0047	0.0556	0.1025	-0.1451
10/20/2006	0.0124	0.0632	**0.1965**	**840**	**500**	**344.46**	445.92	84000	0.0053	0.0625	0.1075	-0.1436
9/15/2006	0.0255	0.0632	**0.4036**	**870**	**500**	**374.67**	466.56	87000	0.0054	0.0631	0.1125	-0.1179
8/16/2006	0.0172	0.0632	**0.2724**	**1040**	**1000**	**62.70**	2269.51	104000	0.0218	0.2569	0.1175	0.3124
7/21/2006	0.0268	0.0632	**0.4235**	**1060**	**1000**	**92.66**	3265.59	106000	0.0308	0.3627	0.1225	0.7481
6/16/2006	0.0488	0.0632	**0.7709**	**850**	**500**	**355.54**	553.66	85000	0.0065	0.0767	0.125	-0.0749
5/19/2006	0.0508	0.0632	**0.8039**	**1030**	**1000**	**114.84**	8483.73	103000	0.0824	0.9698	0.125	1.9277
4/21/2006	0.0288	0.0632	**0.4549**	**770**	**500**	**275.29**	528.81	77000	0.0069	0.0809	0.1274	-0.1830
3/17/2006	0.0268	0.0632	**0.4232**	**680**	**500**	**185.38**	538.25	68000	0.0079	0.0932	0.1274	-0.0874
2/17/2006	0.0322	0.0632	**0.5094**	**520**	**500**	**44.07**	2406.75	52000	0.0463	0.5450	0.1275	1.1380

Dividend Hedge Capture Strategy

Date	Annualized Volatility			Stock Price	Strike Price	Call Premiums		Cash Flows	Outflows	Returns	Annualized	SBI 1 mo.	Sharpe Ratio
6/19/2008	0.025667	0.063246	0.405838	28050	27000	1997.046761	AALI	625					
6/18/2008	0.02353	0.063246	0.372039	26350	27000	924.097126		414.77677					
6/17/2008	0.023812	0.063246	0.376501	26600	27000	1054.124697		-850					
6/16/2008	0.022714	0.063246	0.359139	27450	27000	1468.901467		189.77677	27450	0.0069	0.0814	0.0835	-0.0103
6/14/2007	0.020127	0.063246	0.318244	14100	15000	225.7434777	AALI	230					
6/13/2007	0.017302	0.063246	0.273576	14800	15000	422.0967912		228.101147					
6/12/2007	0.017359	0.063246	0.274477	14900	15000	475.2292459		-400					
6/11/2007	0.017135	0.063246	0.270929	15300	15000	703.3303929		58.10114698	15300	0.0038	0.0447	0.0875	-0.2092
5/17/2006	0.022525	0.063246	0.356148	6500	7000	112.6400697	AALI	325					
5/16/2006	0.022922	0.063246	0.362433	6500	7000	117.009762		197.5732738					
5/15/2006	0.022922	0.063246	0.362433	6500	7000	117.009762		-500					
5/12/2006	0.021781	0.063246	0.344389	7000	7000	314.5830358		22.57327382	7000	0.0032	0.0380	0.1274	-0.4373
6/9/2005	0.012121	0.063246	0.19165	3475	3500	76.89803556	AALI	150					
6/8/2005	0.013766	0.063246	0.217661	3475	3500	87.30204821		49.71310276					
6/7/2005	0.014021	0.063246	0.221686	3500	3500	102.3075936		-75					
6/6/2005	0.014546	0.063246	0.229992	3575	3500	152.0206964		124.7131028	3575	0.0349	0.4107	0.0875	1.5805
7/22/2008	0.033853	0.063246	0.535265	2475	2700	76.79388705	ANTM	215.23					
7/21/2008	0.033121	0.063246	0.523683	2500	2700	82.25919282		121.9516042					
7/18/2008	0.020773	0.063246	0.328449	2450	2700	22.3936752		-325					
7/17/2008	0.017891	0.063246	0.282889	2775	2700	144.3452794		12.18160418	2775	0.0044	0.0517	0.0896	-0.185
6/23/2008	0.022104	0.063246	0.349489	19450	20000	603.6419819	ASII	484					
6/20/2008	0.022085	0.063246	0.349188	19700	20000	718.8457414		181.5555089					
6/19/2008	0.022867	0.063246	0.361564	19650	20000	722.6345783		-350					
6/18/2008	0.022908	0.063246	0.362208	20000	20000	904.1900871		315.5555089	20000	0.0158	0.1858	0.0859	0.488
6/19/2007	0.018864	0.063246	0.298265	16450	16000	881.4364335	ASII	630					

6/18/2007	0.019742	0.063246	0.31215	16400	16000	872.2818817		- 65.22730393					
6/15/2007	0.019718	0.063246	0.31177	16500	16000	938.3257474		100					
6/14/2007	0.019772	0.063246	0.312617	16400	16000	873.0984435		664.7726961	16400	0.0405	0.4773	0.085	1.9180
6/20/2006	0.030364	0.063246	0.480102	9550	9000	894.5419634	ASII	340					
6/19/2006	0.03082	0.063246	0.4873	9400	9000	797.0463597		- 317.8982213					
6/16/2006	0.02968	0.063246	0.469279	9500	9000	848.801124		500					
6/15/2006	0.029639	0.063246	0.468631	9000	9000	530.9029028		522.1017787	9000	0.0580	0.6830	0.125	2.7285
6/21/2005	0.023451	0.063246	0.370797	13000	13500	382.1176498	ASII	270					
6/20/2005	0.022733	0.063246	0.359447	12850	13500	308.4791571		251.9815199					
6/17/2005	0.020835	0.063246	0.329434	13150	13500	384.2384928		-450					
6/16/2005	0.021802	0.063246	0.344718	13600	13500	636.2200127		71.9815199	13600	0.0053	0.0623	0.0802	-0.0874
6/20/2008	0.032789	0.063246	0.518441	1210	1200	81.28396377	BBNI	29.4					
6/19/2008	0.032735	0.063246	0.517584	1220	1200	86.9813856		23.5064404					
6/18/2008	0.032789	0.063246	0.518441	1220	1200	87.09846168		-40					
6/17/2008	0.031978	0.063246	0.50561	1260	1200	110.6049021		12.9064404	1260	0.0102	0.1206	0.0835	0.181
6/22/2007	0.021978	0.063246	0.347507	2475	2500	95.52282376	BBNI	72.5					
6/21/2007	0.022107	0.063246	0.349538	2475	2500	96.10156178		52.2108424					
6/20/2007	0.022107	0.063246	0.349538	2475	2500	96.10156178		-100					
6/19/2007	0.020616	0.063246	0.325966	2575	2500	148.3124042		24.7108424	2575	0.0096	0.1130	0.085	0.136
6/20/2006	0.027467	0.063246	0.434299	1140	1000	158.9908552	BBNI	53.26					
6/19/2006	0.027078	0.063246	0.428143	1120	1000	141.1652749		36.55010734					

6/28/2005	0.025654	0.063246	0.405629	1700	1500	222.1651304	BBNI	118.07					
6/27/2005	0.025681	0.063246	0.406048	1700	1500	222.2058294		114.8528262					
6/24/2005	0.024363	0.063246	0.385207	1760	1500	275.3381167		-120					
6/23/2005	0.018831	0.063246	0.297739	1880	1500	390.1909429		112.9228262	1880	0.0601	0.7072	0.0806	3.0689
6/23/2008	0.024225	0.063246	0.383036	4725	5000	114.8854354	BBRI	196.34					
6/20/2008	0.024016	0.063246	0.379728	4900	5000	184.9367304		132.8632008					
6/19/2008	0.02441	0.063246	0.385962	4900	5000	188.44736		-200					
6/18/2008	0.027039	0.063246	0.427519	5100	5000	321.3105608		129.2032008	5100	0.0253	0.2983	0.0859	1.0385
6/18/2007	0.026014	0.063246	0.411317	5950	6000	278.0546239	BBRI	173.04					
6/15/2007	0.02548	0.063246	0.402881	5800	6000	200.9915546		89.90268905					
6/14/2007	0.025455	0.063246	0.402478	5850	6000	223.0275256		-200					
6/13/2007	0.024179	0.063246	0.382296	6050	6000	312.9302147		62.94268905	6050	0.0104	0.1225	0.085	[illegible]
6/26/2006	0.034849	0.063246	0.551007	3950	4000	246.4091838	BBRI	155.64					
6/23/2006	0.034777	0.063246	0.549878	4000	4000	272.9956226		81.82156526					
6/22/2006	0.034571	0.063246	0.546621	4075	4000	315.0669921		-125					
6/21/2006	0.034836	0.063246	0.550808	4200	4000	396.8885573		112.4615653	4200	0.0268	0.3153	0.125	0.930
6/21/2005	0.017671	0.063246	0.279395	2875	2500	394.60779	BBRI	152.93					
6/20/2005	0.017426	0.063246	0.275533	2825	2500	346.3136691		68.85934					
6/17/2005	0.014727	0.063246	0.232855	2700	2500	225.5587642		-75					
6/16/2005	0.013971	0.063246	0.220907	2775	2500	294.4181042		146.78934	2775	0.0529	0.6228	0.0802	2.65
7/1/2008	0.046836	0.063246	0.740535	6700	6000	989.4099642	ISAT	187.9 -					
[illegible]	[illegible]	[illegible]	[illegible]	6750	6000	1026.048487		304.7894765 400					
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	0.5208	0.0869	2.121

6/29/2007	0.016575	0.063246	0.262077	6500	6500	219.2390301	ISAT	129.75					
6/28/2007	0.016909	0.063246	0.267359	6600	6500	282.2217287		1.165870511					
6/27/2007	0.016852	0.063246	0.266458	6750	6500	383.9095351		0					
6/26/2007	0.016967	0.063246	0.268275	6750	6500	385.0754056		130.9158705	6750	0.0194	0.2284	0.085	0.7010
7/25/2006	0.01738	0.063246	0.274801	4225	4000	303.3514909	ISAT	149.32					
7/24/2006	0.017416	0.063246	0.275367	4200	4000	283.701293		128.8338642					
7/21/2006	0.017349	0.063246	0.274309	4225	4000	303.1860287		-150					
7/20/2006	0.017377	0.063246	0.274752	4375	4000	432.0198929		128.1538642	4375	0.0293	0.3449	0.1225	1.0874
7/1/2005	0.018268	0.063246	0.288839	5650	5500	293.3548461	ISAT	154.23					
6/30/2005	0.018139	0.063246	0.286805	5500	5500	200.2901088		1.389301836					
6/29/2005	0.017404	0.063246	0.275175	5600	5500	252.416363		0					
6/28/2005	0.017583	0.063246	0.278012	5600	5500	253.8056648		155.6193018	5600	0.0278	0.3272	0.0806	1.2057
7/8/2008	0.021858	0.063246	0.345608	11900	12500	270.9013869	PGAS	171.175					
7/7/2008	0.02224	0.063246	0.351649	12350	12500	471.9954365		127.8271388					
7/4/2008	0.022453	0.063246	0.355008	12500	12500	555.564402		-250					
7/3/2008	0.021599	0.063246	0.341516	12750	12500	683.3915408		49.00213883	12750	0.0038	0.0453	0.0873	-0.2056
6/27/2007	0.02791	0.063246	0.441298	9650	9000	911.879723	PGAS	208.45					
								-					
6/26/2007	0.027795	0.063246	0.439475	10100	9000	1270.730016		402.1994717					
6/25/2007	0.021945	0.063246	0.346984	9950	9000	1081.879295		500					
6/22/2007	0.021951	0.063246	0.34707	9450	9000	679.6798236		306.2505283	9450	0.0324	0.3816	0.085	1.450
[illegible]	[illegible]	[illegible]	[illegible]	11250	11000	1020.062766	PGAS	104.43					

6/27/2005	0.025788	0.063246	0.407742	3000	3000	150.5896022	PGAS	51.2					
6/24/2005	0.025848	0.063246	0.408698	3325	3000	380.4172562		- 40.17337775					
6/23/2005	0.025484	0.063246	0.402945	3300	3000	358.2386523		50					
6/22/2005	0.025533	0.063246	0.403713	3250	3000	318.0652745		61.02662225	3250	0.0188	0.2211	0.0806	0.6869
7/25/2007	0.01907	0.063246	0.301517	10950	11000	392.4877354	TLKM	245.755					
7/24/2007	0.019087	0.063246	0.301793	11000	11000	419.7517916		164.4243188					
7/23/2007	0.019104	0.063246	0.302064	11050	11000	448.0427755		-300					
7/20/2007	0.017787	0.063246	0.281232	11350	11000	612.4670943		110.1793188	11350	0.0097	0.1143	0.0825	0.1558
7/26/2006	0.020441	0.063246	0.323207	7300	7000	490.5664837	TLKM	104.43					
7/25/2006	0.020634	0.063246	0.326246	7350	7000	529.5962805		14.12874184					
7/24/2006	0.020564	0.063246	0.325153	7400	7000	566.9391503		0					
7/21/2006	0.02193	0.063246	0.346746	7400	7000	581.0678921		118.5587418	7400	0.0160	0.1886	0.1225	0.3234
7/20/2005	0.018807	0.063246	0.297366	5250	5000	353.2196064	TLKM	51.2					
7/19/2005	0.021172	0.063246	0.334764	5150	5000	301.2222456		90.03396639					
7/18/2005	0.02218	0.063246	0.350691	5150	5000	309.8733117		-100					
7/15/2005	0.02473	0.063246	0.39101	5250	5000	399.9072781		41.23396639	5250	0.0079	0.0925	0.0844	0.0395
6/26/2008	0.02952	0.063246	0.466747	1880	1900	97.89542534	UNSP	17					
6/25/2008	0.032457	0.063246	0.513191	1940	1900	141.6766351		-11.7926442					
6/24/2008	0.031989	0.063246	0.505786	1980	1900	165.3121567		20					
6/23/2008	0.032311	0.063246	0.51088	1960	1900	153.5195125		25.2073558	1960	0.0129	0.1514	0.085	0.3248
6/14/2007	0.020058	0.063246	0.317151	1540	1500	84.23556898	UNSP	15					
6/13/2007	0.020271	0.063246	0.32052	1540	1500	84.78527211		29.69195445					
6/12/2007	0.020631	0.063246	0.326198	1510	1500	67.37594129		-50					
								-					

7/4/2006	0.034719	0.063246	0.548962	980	500	485.1814882	UNSP	9					
7/3/2006	0.032799	0.063246	0.518605	930	500	435.1815731		- 19.99990988					
6/30/2006	0.031311	0.063246	0.495066	890	500	395.1817167		20					
6/29/2006	0.030484	0.063246	0.481987	870	500	375.1818068		9.00009012	870	0.0103	0.1218	0.125	-0.0156