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Use of calls for the investor with limited capital

William Wallace Edwards

The University of Montana

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THE USE OF CALLS FOR THE INVESTOR WITH LIMITED CAPITAL

By

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B.A., Bowling Green State University, 1965

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Master of Business Administration

UNIVERSITY OF MONTANA

1973

Approved by:

[Signatures]

Chairman, Board of Examiners

Dean, Graduate School

[Date]

May 31, 1973
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CHAPTER I

DESCRIPTIONS OF OPTIONS

The purpose of this study was to analyze the advantages and disadvantages of investing in stock options, namely puts and calls. The analysis performed attempted to show that as an investment tool, puts and calls can be profitable to the investor, especially one who has limited capital available for investment.

A random sample of 50 calls, available from January 7 through June 30, 1972, was selected from the weekly lists of puts and calls published by Starr and Kuehl, Inc. of San Francisco, California. Since about 75 per cent of all option contracts are calls, the analysis will be limited to this type of option in order to keep this study within manageable proportions. Appendix I lists the names of the companies, and their associated ticker symbols, that were randomly selected for this study.

The statistical analysis to determine the profitability of calls appears in Chapter III. The analysis attempted to determine if the length of a call, the ratings of the stock under option, or the type of call being considered had any relation to its profitability. Before determining the
profitability, however, an understanding of what options are and how they may be used is required.

Dealing in stock options is not new, it has been going on for generations. What is new though, is the publicity now being given to these vehicles of the investment trade.

It had previously been thought that only the expert and highly sophisticated investor should trade in options. The average investor has always shied away from these options, and the volume of securities under option has never amounted to more than 2 per cent of total New York Stock Exchange trading in any year.\(^1\)

However, since 1970, the number of put and call brokers has been on the rise, as well as the number of brokerage houses that have established option departments. The general feeling among Wall Streeters is that once the masses of people become educated on the idea of trading puts and calls, the business faces tremendous growth.

Options may be purchased through a stockbroker, who in turn refers the business to one or more option brokers, or options may be purchased directly from put and call brokers.

When an investor buys an option, he is purchasing a legal instrument entitling him to a choice. The option may or may not be exercised at the buyer's discretion. Since the buyer has complete freedom to exercise an option or let it

lapse, the total loss is limited to the price paid for the option. This limited loss feature is important to the option buyer.

There are two basic types of options, call options and put options. There are also several variations of the basic options known as straddles, strips, straps, and spreads. The definitions of these and other terms associated with option contracts are as follows:

1. **Call Option.** An option to buy a given amount (100 shares) of a particular stock, at a stated price, during a prescribed period of time. (Units of 100 shares are traded exclusively in normal transactions).

2. **Put Option.** An option to sell a given amount (100 shares) of a particular stock, at a stated price, during a prescribed period of time.

3. **Straddle.** This is a call option and a put option on the same stock, at the same striking price, for the same period of time.

4. **Strip.** A combination of three separate options, two puts and a call on the same stock, at the same striking price, for the same period of time.

5. **Strap.** A combination of three separate options, two calls and a put on the same stock, at the same striking price, for the same period of time.

6. **Spread.** A combination of a call and a put on the same stock, but for different striking prices, or for different time periods, or both.

7. **Duration.** The period of time covered by the option contract. The most common durations are 35 days, 65 days, 95 days, 6 months and 10 days, and one year.

---

8. **Striking Price.** The price at which the option may be exercised. Also known as the Strike Price. On puts and calls it is automatically reduced by the value of cash dividends and rights which accrue to the stock during the life of the option. Stock dividends or new shares from a split go with the original stock when either type of option is exercised.

9. **Market Options.** When the strike price of an option is same as the market price of the stock at the time the contract was made.

10. **Endorsement.** A guarantee by a Member Firm of the New York Stock Exchange that the option contract will be honored.

11. **Expiration Date.** The date on or before which an option may be exercised, option contracts must be physically presented to the endorsing Member Firm before 3:15 p.m. New York time on the expiration date.

12. **Writer.** The original seller or creator of an option.

13. **Premium.** This is the amount of dollars that the buyer pays for the option. The seller receives the premium less a differential that is paid to a third party for arranging the transaction.³

In the cases of strips, straps, straddles, and spreads the separate options are purchased simultaneously, but each of the separate options can be exercised independently during the life of the contract.

The premium the buyer pays for an option contract will run anywhere from 5 per cent to 30 per cent of the market value of the stock at the time the contract is made.⁴

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Each of these figures is considered to be the extremes with the average premium being around 15 per cent of the stock's market value.

As one can see, the amount of the premium is a major consideration for both the buyer and the seller in dealing with options. There are several factors used in determining option premiums, such as:

1. The supply of people who are willing to write on the stock in question.

2. The market on which the stock trades. Puts and calls can, for instance, be purchased on over-the-counter stocks, however, the option premium is higher than it would be if the stock traded on the New York Stock Exchange.

3. The volatility of the stock in question. The greater the volatility of a given issue, the higher the premium, since the potential risk which the writer must assume is increased.

4. The current market price of the stock in relation to the issue's yearly price range.

5. Stocks with small numbers of shares outstanding demand higher premiums since this significantly affects a stock's volatility and it also influences the ability of the writer to dispose of, or purchase stock.

6. The duration of the contract. Usually the premium is higher for a longer term contract.

7. The strike price of the option. Premiums are lower for calls in which the strike price is greater than the current market price of the stock in question.

Following are examples of put and call options which show how these options work in the investment trade.

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Call Option

As previously stated, calls are options to buy 100 shares of a stock at a fixed price on or before a specific date, for which the buyer pays a premium. Hence, calls are usually purchased by persons who believe the price of a stock will rise substantially within a given period of time.

Example 1: Suppose an investor feels that the price of ABC stock will rise substantially during the next six months. ABC is now selling for $20.00 per share and he decides to buy a six-month ten-day call on ABC for $275.00. The investor has a call which may be exercised at any time within the next six months and ten days. When he buys the call option, the investor knows that his maximum possible loss is $275.00, the premium paid for the option. The investor must also realize that ABC must rise by $2.75 per share, plus buy and sell commissions, if he is to break even on the transaction. Of course, the buy and sell commissions will be charged only if the option is exercised. If the stock in this example rises above $20.00 per share but less than the $2.75 per share plus buy and sell commissions necessary for the investor to break even, the investor will minimize his loss by exercising the option as long as he is able to exceed the commissions on the purchase and sale of the stock. The investor may also choose to exercise the option by calling the stock and then holding it in his cash or margin account rather than selling it.
immediately. Depending on the amount of profit which the person has earned when he exercises the option, he may or may not be called upon to deposit additional funds in his account at this time. The investor must meet minimum margin requirements based on the value of 100 shares of stock purchased at the striking price.

Example 2: Given the facts of Example 1, assume that ABC rises to $32.00 per share three months after the investor purchases the call option. This is as high as he expects the stock to go, or he is satisfied with the sure $12.00 per share increase. Therefore, he decides to exercise his option by calling the 100 shares of ABC. At this time he pays $2,000 (100 share at $20.00 per share), and his broker calls the stock from the seller of the option. The investor then sells these shares on the open market for the prevailing price, $3,200 ($32.00 per share). He has a net profit of $925 ($1,200 - $275), less buy and sell commissions on the stock.

Example 3: Now assume that everything in Example 2 has occurred except that the option buyer does not want to, or simply cannot, pay out any more money to call 100 shares of ABC. In this case, he need not call the stock at all, he can simply sell his option. He will receive the same amount of money as in Example 2. His broker will present his option, with the necessary amount of money, to the option seller's broker and receive the stock. The option buyer's broker will
immediately sell that stock on the open market and give the option buyer the amount of profit that resulted from the transaction, less commissions on the purchase and sale of the stock.

**Put Option**

Put options are options to sell 100 shares of a stock at a fixed price on or before a specific date, for which the buyer pays a premium. Hence, puts are purchased by those who anticipate a substantial decline in the price of a stock.

Example: Suppose an investor feels ABC stock will have a rapid decline in price in the near future. He now calls his broker and has him quote the price of a six-month ten-day put on ABC. His broker tells him that he can buy such a put on ABC at $30.00 per share for $375.00. The investor agrees to make the purchase. Now suppose that four months go by and ABC is down to $18.00 per share. If he exercises his put at this time, his gain will be $825.00, less buy and sell commissions. Here is what happened. The investor went into the open market and bought 100 shares of ABC at $18.00 per share for $1,800 and immediately sold (put it to the option seller) at $30.00 per share or $3,000.00. His net profit on the transaction is $825 ($1,200 - $375), less buy and sell commissions on the stock, and his liability never exceeded the cost of the option, $375.00.

In the above examples of put and call transactions, the buy and sell commissions on the stock were omitted for
ease of illustration. Commission rates will vary with the
dollar value of the transaction. The following Table shows
the commission rates for single round lot orders traded on
the New York and American Stock Exchanges. In addition,
there is a provision that the maximum commission on single
round lot orders is $65.00.

\begin{center}
\begin{tabular}{|c|c|}
\hline
Dollar Value of Transaction & Commission \\
\hline
$2,500 and above & 0.9 per cent + $22.00 \\
2,499 to $800 & 1.3 per cent + 12.00 \\
799 to 100 & 2.0 per cent + 6.40 \\
\hline
\end{tabular}
\end{center}

Source: "The Fundamentals of Trading in Stocks and Bonds
for the Modern Investor," Understanding the Modern
Securities Market, (New York: Commodity Research

This chapter has dealt with the description of put
and call options, terms associated with trading in these
types of options, and examples showing how these options
work.

In all the examples, the outcomes were very advan-
tageous to the option buyer. Remember, these are just hypo-
thetical examples used for illustration only. As can be seen
from the analysis in Chapter III, options are not always
profitable, to say the least.
If stock options are not "sure things," then why are they considered by some to be such good investment tools? What advantages do they offer the investor over outright purchase of the stock being considered? These questions are considered in the analysis presented in Chapter II.
CHAPTER II

REASONS FOR BUYING OPTIONS

There are two distinct schools of thought about stock options with respect to speculation and safety. Both views and the arguments supporting them are presented below.

On the one side are those who view puts and calls, and their variations, as highly speculative in nature. This argument is that options are purchased by those who believe the price of a stock will change fairly substantially over a short period of time. The given period of time in which the stock must move is the major factor that makes options speculative. This viewpoint is understandable when considering a 30 or 60 day option on a highly volatile "glamour" issue, a stock that swings fast and wide. Another argument concerns the fact that a person can gain a position in a stock with a very small amount of cash, and if he guesses right, can reap substantial profits. The possibilities of large profits from a small investment also supports the argument that options are highly speculative.

According to Webster's New World Dictionary, speculation is the assumption of a business risk in hopes of
making a huge profit. What must be looked at in discussing speculation is the degree of risk involved, whether large or small, in the investment.

Risk is the possibility or probability of loss as compared to the possibility or probability of gain.

The limited risk feature of put and calls is the reason others feel that these options are actually anti-speculative in nature. It is not their contention that options may be purchased without any degree of risk involved, but their point is that the risk is limited. At the time a person purchases an option his maximum loss is determined.

If an investor goes into the open market and buys 100 shares of any given stock, his maximum loss is also determined; it is whatever was paid for the stock. But with options the dollar amount of possible loss is much less, amounting to only the premium paid for the option.

For example, an individual is considering the purchase of stock selling at $35.00 per share. It will cost $3,500.00 plus commission to buy this stock on the open market. A call is available for a premium of $400.00. It is easy to see the difference of possible loss; $400.00 for

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the option and $3,500 if the investor had actually purchased
the stock.

Based on the above information, it can be said that
stock options are both speculative and anti-speculative in
nature. An investor's personal reasons for using those
options will be the determining factor.

There are some distinct advantages offered by stock
options that are not available to the investor when dealing
in the open market. The first of these has already been
discussed, limited risk.

The second advantage which must be considered is
the added leverage a person has with options. This is
especially advantageous to the investor with limited capital
available for investment.

If an individual has been looking at a certain stock,
and has studied the fundamentals of the company's financial
structure, he may be convinced that the price of the stock
is going to rise rather substantially over the next six
months. The stock of this company is now selling at a
price at which the individual cannot afford to purchase 100
shares on the open market. He may have a few hundred dollars
available for investment though, and he really hates to see
this opportunity slip by. Just because the stock is selling
on the open market at a price that is too high for the
investor does not mean that he cannot take advantage of this

\[8\text{Ibid., p. 212.}\]
opportunity. With the purchase of a call on the stock he will be able to reap almost the same rewards, if his expectations were right, as he would had he purchased the stock on the open market. The gain to the investor would be reduced by the premium price of the call. However, since his initial cash outlay was considerably less (premium cost versus cost on open market) his rate of return on investment would be substantially higher. The leverage available from the use of stock options is better than that obtainable from buying on margin.

A third advantage of stock options is very easy to understand. That is, they offer unlimited profit potential. As stated earlier, an individual's risk is limited to the premium paid for the option, but the profit potential is limited only by the movement of the stock's price during the period of the option.

It is estimated that some 40 per cent of all options bought are never exercised. This does not mean that some 40 per cent of all options purchased are unprofitable, although this might be true.

Many unexercised options are bought by investors who would rather not have to exercise them. This leads us to the fourth reason why it may be advantageous to deal in

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10 Robertson, "Wall Street's New Options," p. 213.
options; they can be used as a hedge to protect current holdings. For instance, a person holds shares of a company's stock in his account. The price of the stock has gone up since he purchased it. The investor wants to insure his profit but not close out his position by selling the stock. He can buy a put as a protection against a decline in the market value of his stock. For example: an investor has 100 shares of stock which was bought for $20.00 a share. That stock is now selling for $30.00 a share on the open market. To protect his paper profit of $10.00 a share in case the market price declines below its current level, he will buy a put with a strike price of $30.00 per share. If the market price of the stock should decline to $25.00 a share he still has his $10.00 a share profit, minus the premium price of the put. As the buyer of the option, he can "put it to" the seller for $30.00 a share, the strike price of the put.

There are also a few tax considerations which should be looked at in the discussion of stock options. A stock option is a capital asset. If a call is profitable, and held for six months and one day it would be advantageous to sell the call rather than exercise it. If it is exercised, then the stock must be held for another six months before any profits qualify for long-term capital gains treatment. If

the call is sold and it was held for more than six months, the gain is long term for tax purposes. Puts work the same way and this gives them a distinct advantage over short sales. A put can produce a long-term capital gain when it is held for longer than six months, and then sold, whereas profits from a short sale, even one realized over many years, is always treated as a short-term gain.

In general, it makes sense to sell a profitable put or call after six months and one day and to sell an unprofitable put or call before six months. This is because a short-term loss is worth more as an offset against ordinary income than a long-term loss. Of course, the specified period in the option will have to be for at least six months and ten days. The options for 30, 60, or 90 days, although capital assets, would never qualify for long-term treatment. The selling of these options would always receive short-term treatment in tax computations.

When a put or call expires unexercised, it is treated as a capital loss; it is long-term if it has been held longer than six months, and short-term if held less than six months.¹²

So far the mechanics of stock options have been examined and the reasons that these types of options might be advantageous to an investor have been considered. A background has been established for an analysis of some actual

call offerings which were available between January and June, 1972. Calls are used for the analysis since about 75 per cent of the option trade is made up of this type of option.

In Chapter III 50 calls available on the common stock of companies listed on the New York and American Stock Exchanges were analyzed. The analysis attempted to determine whether or not calls are an advantageous investment tool for use by investors with limited capital.
CHAPTER III

ANALYSIS OF PROFITABILITY

The analysis presented in this chapter consists of a determination of the profitability of a selected sample of calls and an analysis of the relationships of duration of call, Standard and Poor's stock rating, and strike price to profitability. The sample consisted of 50 calls randomly selected from 900 calls offered for sale by Starr & Kuehl, Inc. during the period January through June, 1972.

Profitability for any one call was determined by the net proceeds received from exercising the option, had the option been exercised. The net proceeds figure was arrived at by taking the market price of the common stock at the time of conversion and subtracting all costs associated with the transaction. For example: a call was purchased on XYZ Company stock for a premium of $300.00, with a strike price of $20.00. The stock is now selling at $27.00 a share and the holder of the call wishes to exercise his option. He can buy the stock for $2,000, sell it for $2,700, and at this point have a $400 gain. The buy and sell commissions on the transaction will amount to $85, $38 on the buy and $47 on the sell. His net profit on the entire transaction
is $700 - $300 - $85 = $315. This could also be stated as
MP - SP - P - C = NP, where MP equals market price of stock
at time of option exercise, SP equals strike price, P equals
premium paid for the option, C equals the total commissions
incurred in exercising the option, and NP equals the net
profit. The strike price was reduced by any dividends which
accrued to the stock during the duration of the call.

The profitability of the calls under analysis was
determined in two ways, profitability at the high market
price of the stock during the period it was under call, and
profitability at the expiration date of the call.

It cannot be assumed that a person will exercise an
option at the optimum point during its life, but this type
analysis was done to show what the optimum results would be.
It can be assumed, however, that if a stock rises consider­
ably in a short period of time a holder of a call on that
stock will exercise his option and take his assured profits.
The exercising of the option would probably not be at the
stock’s high selling point, but it would be somewhere in
that area.

The price used in determining profitability on the
expiration date was the closing price of the stock on that
day. An assumption had to be made in this area as to what
price to use and the closing price was chosen. There is a
reason for this assumption. Since the holder of the option
has waited this long, the entire life of the option, either
the call is not profitable or the holder is hoping for a further rise in the price of the stock to better his investment. For this he will wait to the last possible minute.

Several other assumptions were made in determining a call's profitability. They are listed below:

1. In order for the call to be exercised at its high market price, the proceeds from the transaction had to cover all associated costs and still show a gain.

2. Even though a call was not profitable at its expiration date it would be exercised if the transaction reduced the amount of loss. For example: if a call premium amounted to $300.00 and by exercising the call the loss would amount to only $275.00, then the call was exercised. In this case the price of the stock would have had to go up more than enough to cover the buy and sell commission involved in exercising the option.

3. If the market price of the stock under call went down, or had not risen enough to cover all associated transaction costs, then the call option was allowed to expire and the amount of loss was equal to the premium paid for the call.

Of the 50 calls selected for this analysis 21, or 42 per cent, would have been profitable had they been exercised at some point during the time period of the option. Of the 21 calls which were profitable 10 showed a gain at the expiration date, only 20 per cent of the sample.

After computing the profitability of each of the 50 calls at their high market price during the option period and at their expiration date, a Chi Square test was performed to determine whether or not the profitability of the call was related to the duration of the option. The profitability used in this test was the high market price of the stock.
during the option period. This was done so that all calls which showed a profit at some time during the life of the option would be included in the test. There were calls of 90 days, 6 months, and one year represented in the sample.

The null hypothesis is that the duration of the option has no effect on probability. If this were true, each length of call would be represented in the group of profitable calls in the same proportion as they were represented in the sample of all calls. The .05 level of significance was chosen for the test.

The distribution used in the Chi Square test was as shown in Table 2. The Fe column contains the expected frequencies based on the null hypothesis as stated above. The Fo column contains the observed frequencies. Ninety day calls are represented by $L_1$, 6 month calls by $L_2$, and one year calls by $L_3$.

**TABLE 2**

<table>
<thead>
<tr>
<th>CHI SQUARE DISTRIBUTION OF CALL DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fe</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>$L_1$</td>
</tr>
<tr>
<td>$L_2$</td>
</tr>
<tr>
<td>$L_3$</td>
</tr>
</tbody>
</table>
The computed value of chi square was .5156 which is less than the critical value of 5.99 for a chi square distribution with 2 degrees of freedom. Since the computed chi square value is less than the critical value the null hypothesis cannot be rejected. Based on this sample, there is no relationship between the profitability of a call and its duration.

The common stocks of companies are rated by Standard and Poor's corporation based on the records of earnings and dividends of the company. The ratings given are A+, A, A-, B+, B, B-, C and NR for not rated.

A Chi Square test was performed to determine whether or not the profitability of the call was related to the ratings given the stock under call. As in the preceding test the profitability used was the high market price of the stock during the option period. The null hypothesis is that the rating given a stock has no effect on profitability. If this were true, each stock rating would be represented in the group of profitable calls in the same proportion as they were represented in the sample of all calls. The .05 level of significance was also used for this test.

The distribution used for the Chi Square test was as shown in Table 3. The B- and C rated stocks were grouped

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together because of the small number of stocks with these ratings selected in the random sample. The A+, A, and A-rated stocks were also grouped together under A for the same reason.

**TABLE 3**

<table>
<thead>
<tr>
<th></th>
<th>Fe</th>
<th>Fo</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2.5</td>
<td>5</td>
</tr>
<tr>
<td>B+</td>
<td>5.5</td>
<td>6</td>
</tr>
<tr>
<td>B</td>
<td>5.9</td>
<td>5</td>
</tr>
<tr>
<td>B- &amp; C</td>
<td>2.5</td>
<td>1</td>
</tr>
<tr>
<td>NR</td>
<td>4.6</td>
<td>4</td>
</tr>
</tbody>
</table>

The computed value of chi square was 3.7936 which is less than the critical value of 9.49 for a chi square distribution with 4 degrees of freedom. Since the computed value of chi square is less than the critical value the null hypothesis cannot be rejected. Based on this sample, there is no relationship between the profitability of a call and the Standard and Poor's rating of the stock which is under call.

The Chi Square test was also performed using the above two null hypotheses and the profitability of the calls at their expiration date. There was no difference in the
outcome of either. In both cases, the computed value of chi
square was less than the critical value and the null hypo­
theses could not have been rejected in either case.

So far it has been determined, through the use of
chi square testing, that profitability of calls cannot be
determined by the duration of the call or by the rating
given the stock by Standard and Poor's.

In the following tests the calls have been divided
into two groups. One group consists of those calls which
had a strike price greater than the market price of the stock
at the time the call was offered. The other group consists
of market options, those calls which had a strike price
equal to the market price at the time the call was offered.
The null hypothesis tested is that there is no difference in
profitability between these types of calls and that one is
not more profitable than the other.

Of the 50 calls selected for the analysis, 27 had a
strike price greater than the market price and 23 had a
strike price equal to the market price at the time the call
was offered. Information on the first group is contained in
Appendix II while information on the second group is contain­
ed in Appendix III. Each appendix gives the ticker symbol
of the stock under call, the premium of the call, and the
call's net profit at the stock's high market price and at
the expiration date.
The first analysis performed was a determination of the profitability of the calls, based on the sample, by comparing the two groups of calls mentioned above at the high market price of the stock. This gives the optimum profitability of the sample. In discussing this analysis, those calls whose strike price was greater than the market price are referred to as Group 1 and those calls whose strike price was equal to the market price are referred to as Group 2. The statistical information shown in Table 4 was used in testing the hypothesis.

**TABLE 4**

**STATISTICAL DATA ON CALLS AT HIGH MARKET PRICE**

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Calls in Group</td>
<td>27</td>
<td>23</td>
</tr>
<tr>
<td>Average Premium Paid</td>
<td>$193.05</td>
<td>$362.50</td>
</tr>
<tr>
<td>Number of Profitable Calls</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Mean Net Profit of Calls</td>
<td>$260.07</td>
<td>$91.10</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>$782.27</td>
<td>$533.52</td>
</tr>
<tr>
<td>Standard Error of the Mean</td>
<td>$150.53</td>
<td>$111.25</td>
</tr>
<tr>
<td>Per Cent of Profitable Calls</td>
<td>40.7</td>
<td>43.5</td>
</tr>
<tr>
<td>Per Cent Average Return on Investment</td>
<td>134.7</td>
<td>25.1</td>
</tr>
</tbody>
</table>

The average premium paid for calls falling into Group 1 is lower than for Group 2 because the strike price
is greater than the market price for this type of call. The Group 1 calls command a smaller premium because the stock price must advance more before a profit is realized.

The null hypothesis is that there is no difference in profitability between Group 1 and Group 2 calls. As shown in Table 4 the percentage of profitable calls is slightly higher for Group 2 as compared to Group 1. However, the mean net profit and mean return on investment of those calls which were profitable is considerably higher for Group 1 as compared to Group 2. There does appear to be a difference in profitability between the two groups.

A t test was computed to determine if the difference between Groups 1 and 2 is statistically significant. The t test was chosen for this and the following test since the standard error was estimated from the two samples and not from the population parameters. The finite correction factor for the unequal sample size was employed in these tests.

The computed value of $t$ was 4.5044 which is greater than the critical value of 2.013 for a $t$ distribution with 48 degrees of freedom at the .05 level of significance. Based on the results of the test the null hypothesis can be rejected. The difference in profitability between Group 1 and Group 2 calls shown in Table 4 is statistically significant. Based on the sample, Group 1 calls are more profitable than Group 2 calls at the high market price of the stock.
The same test as described above was applied to the Group 1 and Group 2 calls again, this time using the market price of the stock at the expiration date to determine profitability. The null hypothesis was the same, that there is no difference in profitability between the two groups of calls. The statistical information used in testing the hypothesis is shown in Table 5.

**TABLE 5**

**STATISTICAL DATA ON Calls AT EXPIRATION DATE**

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Calls in Group</td>
<td>27</td>
<td>23</td>
</tr>
<tr>
<td>Average Premium Paid</td>
<td>$193.05</td>
<td>$362.50</td>
</tr>
<tr>
<td>Number of Profitable Calls</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Mean Net Profit of Calls</td>
<td>$104.95</td>
<td>($141.40)</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>$593.85</td>
<td>$479.93</td>
</tr>
<tr>
<td>Standard Error of the Mean</td>
<td>$114.29</td>
<td>$100.07</td>
</tr>
<tr>
<td>Per Cent of Profitable Calls</td>
<td>25.9</td>
<td>13.0</td>
</tr>
<tr>
<td>Per Cent Average Return on Investment</td>
<td>54.4</td>
<td>(39.0)</td>
</tr>
</tbody>
</table>

It can readily be seen that the Group 1 calls were more profitable since the Group 2 calls show an overall loss. The average outcome on the Group 2 calls was a loss of $141.40 per transaction with an average return on investment of minus 39.0 per cent. The t test was performed to determine if the difference is statistically significant.
The computed value of t was 8.1455 which is greater than the critical value of 2.013 for a t distribution with 48 degrees of freedom at the .05 level of significance. As was the case in the previous test, the null hypothesis can be rejected. The statistical information in Table 5 shows that there is a difference in profitability between Group 1 and Group 2 calls and the results of the test has shown that this difference is statistically significant. Based on the sample, Group 1 calls are more profitable than Group 2 calls at the expiration date.

The analysis performed in this chapter on 50 randomly selected calls has determined the following information as to their profitability:

1. Profitability cannot be determined by the duration of the call.

2. Profitability cannot be determined by the ratings given the stocks by Standard and Poor's Corporation.

3. If one type of call is more profitable than another it appears from this sample that the calls which have a strike price greater than the market price are more profitable than calls which have a strike price equal to the market price at the time the call is offered.

The conclusions reached from this study are presented in Chapter IV.
CHAPTER IV

CONCLUSIONS

The advantages available to the investor when dealing in stock options have been analyzed in this study. His risk is limited and his potential for profit is limited only to the extent a stock can rise during a given length of time.

Although only 42 per cent of the calls under study were profitable at some time during their life, the mean return on investment is encouraging, especially on those calls which had a strike price greater than the market price. This group of calls also has the smallest required outlay of cash required for investment.

It has been shown that with a minimum dollar investment, large rewards can be reaped. An investor with limited capital available for investment can use calls to his advantage. As was shown in this study, his potential for profitable investments is only 42 per cent at the most. Naturally he will not show a profit on every investment. But the opportunity is there to come out substantially ahead in the long run.

In looking at calls as an investment tool, this study has shown that calls with a strike price greater than the market price offers more of a potential reward to the

29
investor. It appears that the biggest reason for this is that his initial outlay of capital is, on the average, considerably less. The premium required is lower because the market price of the stock must rise before reaching the strike price.

As was stated in the null hypotheses, the ratings of stocks did not appear to have an effect on a call's profitability. Just because a stock has a high rating does not mean it has a greater chance for being profitable. Also, one length of call cannot be determined to be more profitable than another.

One last point should be made as a result of this study. Of the 21 calls which were profitable at some point during the option period, only 10 were still profitable at the expiration date. This should give an indication to the investor that exercising his option to insure his profits is better than waiting until the expiration date and losing everything.
<table>
<thead>
<tr>
<th>Company Name</th>
<th>Abbreviation</th>
<th>Industry/Company Name</th>
<th>Abbreviation</th>
</tr>
</thead>
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<tr>
<td>ALLEGHANY CORP.</td>
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<td>GENERAL BATTERY</td>
<td>GBY</td>
</tr>
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<td>ALZA CORP.</td>
<td>AZA</td>
<td>GENERAL FIREPROOFING</td>
<td>GLP</td>
</tr>
<tr>
<td>AMERICAN INVESTMENT</td>
<td>AIC</td>
<td>GRANITEVILLE</td>
<td>GVL</td>
</tr>
<tr>
<td>AMERICAN MOTORS</td>
<td>AMO</td>
<td>GULF &amp; WESTERN</td>
<td>GW</td>
</tr>
<tr>
<td>AMPLEX</td>
<td>APX</td>
<td>HARRAH'S</td>
<td>HRR</td>
</tr>
<tr>
<td>ASHLAND OIL CANADA</td>
<td>AHX</td>
<td>HOMESTAKE MINING</td>
<td>HM</td>
</tr>
<tr>
<td>A-T-O INC.</td>
<td>ATO</td>
<td>INTERNATIONAL INDUSTRIES</td>
<td>INT</td>
</tr>
<tr>
<td>AVNET INC.</td>
<td>AVT</td>
<td>INTER. MINERALS &amp; CHEM.</td>
<td>IGL</td>
</tr>
<tr>
<td>AVON PRODUCTS</td>
<td>AVP</td>
<td>JIM WALTER CORP.</td>
<td>JWC</td>
</tr>
<tr>
<td>BANGOR PUNTA</td>
<td>BNK</td>
<td>MCCRORY CORP.</td>
<td>MS</td>
</tr>
<tr>
<td>BERKEY PHOTO</td>
<td>BKY</td>
<td>MCDERMOTT (J. RAY) INC.</td>
<td>MDE</td>
</tr>
<tr>
<td>BOEING AIRCRAFT</td>
<td>BA</td>
<td>MILTON ROY COMPANY</td>
<td>MRC</td>
</tr>
<tr>
<td>BOISE-CASCADE</td>
<td>BCC</td>
<td>MOBIL OIL</td>
<td>MOB</td>
</tr>
<tr>
<td>BUTTES GAS &amp; OIL</td>
<td>BGO</td>
<td>NVP COMPANY</td>
<td>NVP</td>
</tr>
<tr>
<td>CHRYSLER</td>
<td>C</td>
<td>OCCIDENTAL PETROLEUM</td>
<td>OXY</td>
</tr>
<tr>
<td>COMPUTER SCIENCES</td>
<td>CSC</td>
<td>PENNZOIL</td>
<td>PZL</td>
</tr>
<tr>
<td>CONTINENTAL AIRLINES</td>
<td>CAL</td>
<td>PHILLIPS PETROLEUM</td>
<td>P</td>
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<tr>
<td>CONTINENTAL OIL</td>
<td>CLL</td>
<td>PIONEER PLASTICS</td>
<td>PPK</td>
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<td>SKYLINE CORP.</td>
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<td>EK</td>
<td>TELEDYNE</td>
<td>TDY</td>
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<td>UNITED AIRCRAFT</td>
<td>UA</td>
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<tr>
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<td>EVY</td>
<td>U. S. STEEL</td>
<td>X</td>
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<tr>
<td>GAF CORP</td>
<td>GAF</td>
<td>VARIAN ASSOCIATES</td>
<td>VAR</td>
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## APPENDIX II

### CALLS UNDER STUDY—STRIKE PRICE

**GREATER THAN MARKET PRICE**

<table>
<thead>
<tr>
<th>TKR SYM</th>
<th>PREMIUM</th>
<th>NET PROFIT AT MKT HIGH</th>
<th>% GAIN (LOSS)</th>
<th>NET PROFIT AT EXP.</th>
<th>% GAIN (LOSS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GW</td>
<td>$300.00</td>
<td>$574.00</td>
<td>191.3%</td>
<td>$66.50</td>
<td>22.9%</td>
</tr>
<tr>
<td>HRR</td>
<td>137.50</td>
<td>2,880.00</td>
<td>2,094.5%</td>
<td>1,742.50</td>
<td>1,267.3%</td>
</tr>
<tr>
<td>APX</td>
<td>137.50</td>
<td>(137.50)</td>
<td>(100.0)%</td>
<td>(137.50)</td>
<td>(100.0)%</td>
</tr>
<tr>
<td>AVP</td>
<td>137.50</td>
<td>962.50</td>
<td>700.0%</td>
<td>62.50</td>
<td>45.5%</td>
</tr>
<tr>
<td>PPK</td>
<td>137.50</td>
<td>(137.50)</td>
<td>(100.0)%</td>
<td>(137.50)</td>
<td>(100.0)%</td>
</tr>
<tr>
<td>GVL</td>
<td>237.50</td>
<td>(237.50)</td>
<td>(100.0)%</td>
<td>(237.50)</td>
<td>(100.0)%</td>
</tr>
<tr>
<td>AHX</td>
<td>137.50</td>
<td>(137.50)</td>
<td>(100.0)%</td>
<td>(137.50)</td>
<td>(100.0)%</td>
</tr>
<tr>
<td>MRC</td>
<td>237.50</td>
<td>(237.50)</td>
<td>(100.0)%</td>
<td>(237.50)</td>
<td>(100.0)%</td>
</tr>
<tr>
<td>BNK</td>
<td>262.50</td>
<td>(262.50)</td>
<td>(100.0)%</td>
<td>(262.50)</td>
<td>(100.0)%</td>
</tr>
<tr>
<td>BGO</td>
<td>137.50</td>
<td>(137.50)</td>
<td>(100.0)%</td>
<td>(137.50)</td>
<td>(100.0)%</td>
</tr>
<tr>
<td>JWC</td>
<td>312.50</td>
<td>(312.50)</td>
<td>(100.0)%</td>
<td>(312.50)</td>
<td>(100.0)%</td>
</tr>
<tr>
<td>GBY</td>
<td>137.50</td>
<td>(137.50)</td>
<td>(100.0)%</td>
<td>(137.50)</td>
<td>(100.0)%</td>
</tr>
<tr>
<td>AVT</td>
<td>237.50</td>
<td>(237.50)</td>
<td>(100.0)%</td>
<td>(237.50)</td>
<td>(100.0)%</td>
</tr>
<tr>
<td>MDE</td>
<td>237.50</td>
<td>1,874.50</td>
<td>789.3%</td>
<td>1,499.50</td>
<td>631.4%</td>
</tr>
<tr>
<td>VAR</td>
<td>137.50</td>
<td>71.50</td>
<td>52.0%</td>
<td>(76.50)</td>
<td>(55.6)%</td>
</tr>
<tr>
<td>INT</td>
<td>137.50</td>
<td>(137.50)</td>
<td>(100.0)%</td>
<td>(137.50)</td>
<td>(100.0)%</td>
</tr>
<tr>
<td>AIC</td>
<td>137.50</td>
<td>(137.50)</td>
<td>(100.0)%</td>
<td>(137.50)</td>
<td>(100.0)%</td>
</tr>
<tr>
<td>CLL</td>
<td>137.50</td>
<td>844.00</td>
<td>613.8%</td>
<td>844.00</td>
<td>613.8%</td>
</tr>
<tr>
<td>MOB</td>
<td>137.50</td>
<td>1,465.00</td>
<td>1,065.5%</td>
<td>1,327.50</td>
<td>965.5%</td>
</tr>
<tr>
<td>Y</td>
<td>212.50</td>
<td>6.50</td>
<td>3.1%</td>
<td>(141.50)</td>
<td>(66.6)%</td>
</tr>
<tr>
<td>X</td>
<td>312.50</td>
<td>90.50</td>
<td>29.0%</td>
<td>(182.00)</td>
<td>(58.2)%</td>
</tr>
<tr>
<td>GLP</td>
<td>137.50</td>
<td>(137.50)</td>
<td>(100.0)%</td>
<td>(137.50)</td>
<td>(100.0)%</td>
</tr>
<tr>
<td>NVF</td>
<td>137.50</td>
<td>(137.50)</td>
<td>(100.0)%</td>
<td>(137.50)</td>
<td>(100.0)%</td>
</tr>
<tr>
<td>P</td>
<td>137.50</td>
<td>944.00</td>
<td>686.5%</td>
<td>944.00</td>
<td>686.5%</td>
</tr>
<tr>
<td>CSC</td>
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<td>(137.50)</td>
<td>(100.0)%</td>
<td>(137.50)</td>
<td>(100.0)%</td>
</tr>
<tr>
<td>OXY</td>
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<td>424.50</td>
<td>308.7%</td>
<td>(137.50)</td>
<td>(100.0)%</td>
</tr>
<tr>
<td>MS</td>
<td>525.00</td>
<td>(452.50)</td>
<td>(86.2)%</td>
<td>(452.50)</td>
<td>(86.2)%</td>
</tr>
</tbody>
</table>

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### APPENDIX III

**CALLS UNDER STUDY—STRIKE PRICE EQUAL TO MARKET PRICE**

<table>
<thead>
<tr>
<th>TKR</th>
<th>SYM</th>
<th>PREMIUM</th>
<th>NET PROFIT AT MKT HIGH</th>
<th>% GAIN (LOSS)</th>
<th>NET PROFIT AT EXP.</th>
<th>% GAIN (LOSS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EK</td>
<td>$537.50</td>
<td>$1,754.25</td>
<td>362.4</td>
<td>$1,754.25</td>
<td>326.4</td>
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<tr>
<td>CDA</td>
<td>562.50</td>
<td>745.00</td>
<td>132.4</td>
<td>257.00</td>
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<tr>
<td>EI</td>
<td>325.00</td>
<td>(87.50)</td>
<td>(26.9)</td>
<td>(87.50)</td>
<td>(26.9)</td>
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<tr>
<td>SKY</td>
<td>750.00</td>
<td>906.00</td>
<td>120.8</td>
<td>(69.00)</td>
<td>(9.5)</td>
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<td>CAL</td>
<td>312.50</td>
<td>355.50</td>
<td>113.8</td>
<td>(312.50)</td>
<td>(100.0)</td>
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<td>UA</td>
<td>437.50</td>
<td>200.50</td>
<td>45.8</td>
<td>(406.50)</td>
<td>(92.9)</td>
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<td>C</td>
<td>375.00</td>
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<td>(304.50)</td>
<td>(81.2)</td>
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<td>(312.50)</td>
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<tr>
<td>RAM</td>
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<td>(312.50)</td>
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<tr>
<td>EVY</td>
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<td>(100.0)</td>
<td>(287.50)</td>
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<td>(100.0)</td>
<td>(237.50)</td>
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<tr>
<td>BKY</td>
<td>337.50</td>
<td>177.50</td>
<td>52.4</td>
<td>(337.50)</td>
<td>(100.0)</td>
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<td>BA</td>
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<td>(100.0)</td>
<td>(362.50)</td>
<td>(100.0)</td>
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<tr>
<td>HM</td>
<td>362.50</td>
<td>303.00</td>
<td>83.6</td>
<td>(341.00)</td>
<td>(94.1)</td>
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<td>AMO</td>
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<td>(136.50)</td>
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<td>(250.00)</td>
<td>(100.0)</td>
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<td>(100.0)</td>
<td>(337.50)</td>
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<td>AZA</td>
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<td>DLN</td>
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<td>(387.50)</td>
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<td>(100.0)</td>
<td>(325.00)</td>
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<td>631.50</td>
<td>229.6</td>
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SELECTED BIBLIOGRAPHY


