

My Internship Experience at Merrill Lynch, New York  
Stock Option Scenario Analysis


By

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A research paper submitted in fulfillment of the requirements for 3 credits  
UNDERGRADUATE INDEPENDENT RESEARCH PROJECT, Fall term  
1998, Professor Tyler Shumway, Faculty Supervisor.

## Faculty Comments

Helen describes her experience as an intern at Merrill Lynch in New York. She explains the work she performed with two detailed examples. Her experience apparently left quite an impression on her.

  
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Signature of Faculty Supervisor

*Assistant Professor of Finance*  
\_\_\_\_\_  
Title

The internship program which lasted for 10 weeks placed me in the heart of the financial world-New York City. It was my first time in the vivid, dynamic city; first time working in the lionized wall street area. The World Trade Center area that I worked in is where the premier investment banks cluster. Thus it was not peculiar to see people on the streets sharing the same characteristics: they were all driven by a sense of super-confidence, well-dressed in perfectly ironed suits, and was each holding their own company bag with a manifest company logo. From the brilliance revealed on their face, I could tell they were all proud to be working in this business, all were proud to be a banker. It is true that their daily business so much relies on this sense of confidence, such as whether to buy or sell depends on their belief that they always make the right decisions. I was totally amazed by their sense of pride, which I regarded as their nostrums for success.

I was placed under the Private Client Group of Merrill Lynch & Co, where I was assigned a supervisor. She was a woman in her late thirties and was a Vice President of the division. As a financial consultant, she advised clients on the asset allocation of their portfolios and also had her focus placed on the stock options of the clients, which she would propose the right time to exercise. The Private Client Group in Merrill Lynch is not as team-oriented as some other groups. There at PCG, different people have different focuses. Since their salaries largely arise from the commissions for each deal, each person has his or her own working style and marketing effort.

My job contributed to a great chunk of the marketing effort of my supervisor. For my first routine in the morning, I would track down the daily headline news depicted in the internal Merrill Lynch raider, which acted like a combination of a Bloomberg and a database of our clients. I would sift out those that were related to merger and acquisition transactions, whether the merger had been taken or was probable would all fall into my attention. Followed by a brief summary about the size of the deal and research at the company library about the industry background, I discussed the deal with my supervisor in a cold conference. The main

reason why we worked closely with the M&A transactions was that, huge amounts of cash or stocks were involved in these transactions. When a firm was bought out by others, the executives and board of directors would possibly be taken over by the other firm as well. Therefore, these people saw the need to exercise their huge stock options or sell their concentrated shares. When the deal was all cash, which indicated that the acquired one would most probably be private, the substantial amount of cash received by these executives also brought with them enormous responsibilities towards planning and asset management. Therefore it was our concern to turn these individuals to be our private clients. We would finance the exercise price and provide the expertise in 144 issues and block trading. For the cash deals, we suggested portfolio management strategies. These clients would then, hopefully, be our long-term clients. For large acquisition deals, we benefited from the size of assets and the commissions resulted. For smaller deals, such as those less than a hundred million, we saw the network and the connections that could be built up which might be paramount to us in the long term.

The entire procedure had to be sharp and fast, where quick but discerning decisions had to be made on whether the deal was possible, by considering factors such as the feasibility of the acquisition, constraints of the industry and our competitors who are involved in advising the acquisition. Whenever deals were decided to be possible, letters would be sent to these individuals immediately. If things turn out smoothly, phone calls for advice would be expected from these individuals in a week's time.

Another news tracking relates to the insider trading transactions. Since many concentrated stock owners would prefer not making their transactions public, we advised them on the block trading and tax issues. By the same token, cash received by these people after selling of the stocks would hopefully be entered into our asset management pool.

Another big chunk of my job relates to more a technical side of making analyses on clients' portfolios. These clients may be those involved in the M&A and Insider Trading

transactions as mentioned above, or others who proactively came to us with a huge amount of capital to invest. Since these clients had a large capital base, their capital structures are far too complicated that, instead of giving advice upfront based on the market situations, a detailed investment plan had to be made after technically analyzing their investment constraints, risk tolerance, retirement plans, real estate plans, financial needs and preference of liquidity. My job thus was to implement different modeling and statistical analysis in the analyzing of each of the factors.

First of all, quantitative financial goals were determined with the clients, which served as the directions of the entire analysis. These goals may be " To maintain a \$120,000 per year retirement lifestyle", " To ensure survivor income of \$90,000 per year", " To provide sufficient funds in the event of disability" or " To provide education costs for children". All these then acted as the Future Values (FV) in my modeling. Other than the goals, factors such as the risk-tolerance level and preference of liquidity were also determined with the clients.

A net worth report was firstly created in giving the client the overall picture of his current assets and liabilities. The net worth would be projected compoundly to meet the future financial goals. Net Worth is calculated using the following logistic:

$$\text{Net Worth} = \text{Personal Assets} + \text{Portfolio Assets} + \text{Retirement Assets} - \text{Liabilities.}$$

An example of the calculation of the net worth is given below :

**Net Worth**

<b><u>Assets</u></b>	<b><u>Estimated Market Value</u></b>
<b><u>Personal Assets</u></b>	
Primary Residence	\$310 000
Secondary Residence	110,000
Other Personal Property _____	<b>25,000</b>
<i>Total Personal Assets</i>	\$445,000
 <b><u>Portfolio Assets</u></b>	
Checking Accounts	\$4,000
Savings Accounts	1, 000
Common Stocks	225 000
Stock Mutual Funds	22,000

Vested Employee Stock options	43,017	
<i>Total Portfolio Assets</i>		\$295,017
<b><u>Retirement Assets</u></b>		
IRA Accounts		<u>\$150,078</u>
<i>Total Assets</i>		<b>\$890,095</b>
<b><u>Liabilities</u></b>		
Primary Residence Mortgage	\$70,000	
Secondary Residence Mortgage	110,000	
Margin Loan	<b><u>48,000</u></b>	
<i>Total Liabilities</i>		<b>\$228,000</b>
<b>NET WORTH: \$662,095</b>		

Another part of the analysis was concerned with one of the big determinants of the discounting cashflow model. Since the annual income picture of the client determines the magnitude he needs to invest for meeting the financial goals, in-depth examination on the annual income and the effect of tax and inflation on it has to be conducted. The annual income may arise from different areas, but can be basically categorised into the following three, namely *earned income*, *dividends*, and *taxable interest*. For periods after retirement, income comes from *pension plans*, and *social security*.

The value of income from investment is much affected by inflation. Inflation could wipe out most or all the increase in value of an investment with a low rate of return. In addition, the taxes paid on the investment return would further reduce any gains. Other than inflation and taxes, insurance or mortgage plans that the client involved would also be taken into consideration, as the two would much reduce the annual income as well.

When all the elements were gathered, it would be time to turn over to the Future Value Model where the future values (FVs) of the income are projected across the remaining life time (it is assumed that a male client would die at the age of 85 and 90 for a female client) by applying the growth rates. Normally, the FVs of income were far lower than the values of the financial goals. Thus, asset allocation decisions now played an essential role in

determining how the weight of current investments could be adjusted or new instruments could be added in to achieve those goals. The judgement was made on the parameters of current growth rate of the assets Vs risk tolerance level of the client. The proposed efficient frontier and the SML line were drawn, stating the proposed return in light of client specific risk-tolerance level. Selection of each of the instruments such as the choice between a Large-cap or Small-cap stock could then be subjectively determined by my supervisor together with the client; as a feasible investing analysis not only rests on the technical analyses but also the qualitative elements, such as my supervisor's experience in interpreting market changes and her techniques in riding out market downturns.

Below is an illustration of one of my client's asset allocation proposal:

	<u>Current</u>		<u>Proposed</u>		<u>Net Change</u>
	Asset Allocation	%	<u>Asset Allocation</u>	%	
Equities	\$539,320	53	\$405,208	40	\$(134 112)
Fixed Income	\$22,178	2	\$506,510	50	\$484 332
Cash	<u>\$451,521</u>	45	<u>\$101.302</u>	10	<u>\$(350.219)</u>
TOTAL	\$1,013,019	100%	\$1,013,020	100%	

For clients with stock options on hand, I also took part in the technical analysis in locating the most feasible choice of the four strategies: 1)Exercise and sell 2)Exercise and sell enough stock to cover the exercise costs 3) Postpone 4) Exercise and hold. The analysis based on a series of cashflows projecting for each of the strategies in the 3 years future period. Other than taking into account the yielding of the cashflows, facts such as the expiration date, income tax liability attributable to the execution, and possible adverse Board of Directors reaction to the sale of stock are also hinging factors.

To make a conclusion of the two-month learning experience, I really benefited from the way it provided me the chance for real-life application of the financial models I learnt in class. It also sharpened my communication skills during the interaction with clients. Far more than these, what made the whole internship most meaningful and worthwhile was, my being a

witness of the craziest period of wall street this year when the Dow Jones dropped to the valley bottom by 300 points and bounced back the other day by 200, gave me the huge enthusiasm about the market. I was always excited to see and predict how the market would look on the next day.

I also gained knowledge that is far beyond what can be attained from textbooks, such as how the Dow Jones would drop the other day right after the crashes of the Russian and Hong Kong markets, how highly levered companies would underperform in a market-anticipated recession, how large volume of insider selling marks the downturn of the company, and, how the price of the acquired company rises with that of the acquirer drops right after a M&A transaction.

Although the two months had been in some sense a tough period in terms of the long hours and the demanding job nature, I gained more than I contributed. Definitely, it was a worthwhile learning experience and I sincerely look forward to going back to this field after I graduate from college.



## Stock Option Scenario Analysis

The decision to exercise a stock option always depends on several factors namely the time restrictions, value of the underlying stock, cash flow restrictions, tax impact of taking actions, and the overall financial circumstances which includes the different level of financial needs and constraints. By taking all the above factors into consideration, it comes up to four types of strategies for exercising a stock option: *exercise and sell*, *exercise and sell enough stock to cover the costs*, *postpone*, and, *exercise and hold*. The optimal decision varies across different holders based on the interaction of factors mentioned above. To illustrate the four strategies, a scenario is analyzed as the below.

Robert Graham, holds the stock options of Barnes and Nobles where he works as a Vice President. He has three grants of stock options expiring at different dates stated in the table below. The current market price of a share of Barnes and Nobles stock is \$48. The marginal income tax assumes the combination of a federal tax, tax at the state level, and the Medicare tax., which makes a combined tax rate of 41.13%.

<b>Grant Date</b>	<b>Name of Grant</b>	<b>Number of Shares</b>	<b>Expiring Date</b>	<b>Exercise Price</b>	<b>Vesting Date</b>
06/01/94	1994 Grant	4,600	01/04/06	\$18.63	06/01/96
06/01/96	1996 Grant	3,200	01/06/06	\$26.13	06/01/98
06/01/96	1996 Grant B	800	01/06/06	\$26.13	06/01/99

### **Strategy #1- Exercise and Sell**

This strategy involves the exercise of a stock option grant and the immediate sale of the underlying shares of stock. The reasons for taking this option may be :

- There is an immediate cash need.
- There has been significant appreciation in the value of the underlying stock.
- An unexercised stock option is about to expire.

### Mathematical Illustration of Strategy #1:

Name of Grant	1994 Grant	1996 Grant	1996 Grant
Market Value/Share	\$48.00	\$48.00	\$48.00
Exercise Price	\$18.63	\$26.13	\$26.13
Bargain Element	\$29.37	\$21.87	\$21.87
Number of Shares	4600	3200	800
Marginal Income Tax Rate	41.13%	41.13%	41.13%
Total Proceeds if Exercise and Sold	$\$48 * 4600 = \$220,800$	\$153,600	\$38,400
Cost to exercise the option	$(\$18.63 * 4600) = (\$85,698)$	(\$83,616)	(\$20,904)
Estimated Income Tax Due	$(41.13% * (\$48 - \$18.63) * 4600)$ = (\$55,567)	(\$28,784)	(\$7,196)
<b>Net Cash in Mr. Graham's pocket</b>	<b>\$79,535</b>	<b>\$41,200</b>	<b>\$10,300</b>

**Total cash resulted = \$79,535 + \$41,200 + \$10,300 = \$131,035**

### Strategy#2—Exercise and Sell Enough Stock to Cover Your Costs

This means an exercising of the stock option while immediately selling sufficient shares of the optioned stock to pay for the costs associated with the exercise. Total exercise costs will comprise of the exercise price of the stock option as well as the tax liability due. The most possible reason for taking this strategy would be that the option is about to expire and Mr. Graham would like to own shares of Barnes of Nobles stock without committing additional funds.

### Mathematical Illustration of Strategy #2%

Name of Grant	1994 Grant	1996 Grant	1996 Grant
Market Value/Share	\$48.00	\$48.00	\$48.00
Exercise Price	\$18.63	\$26.13	\$26.13
Bargain Element	\$29.37	\$21.87	\$21.87
Number of Shares	4600	3200	800
Marginal Income Tax Rate	41.13%	41.13%	41.13%
Cost to exercise the option	$(\$18.63 * 4600) = (\$85,698)$	(\$83,616)	(\$20,904)
Estimated Income Tax Due	$(41.13% * (\$48 - \$18.63) * 4600)$ = (\$55,567)	(\$28,784)	(\$7,196)
Total Cost to Exercise	(\$141,265)	(\$112,400)	(\$-28,100)

<b>The Number of Shares to Sell In Order to Cover the Costs:</b>	$(\$141,265/\$48) = 2,943$	<b>2,342</b>	<b>585</b>
<b>Net Amount of Shares You Will Own:</b>	$(4,600-2,943) = 1,657$	<b>858</b>	<b>215</b>

### Strateev#3 Postpone

It involves taking no action at present. During the time Mr. Graham owns unexercised stock options, he would retain the ability to participate in the potential appreciation of Barnes and Nobles stock, without committing money towards the purchase of actual shares. The stock options then become investment tools since they provide leverage. Therefore reasons in choosing this over the others can be summarized as the below:

- Mr. Graham wants to participate in the expected appreciation of Barnes and Nobles without committing funds.
- He wants to postpone any income tax liability attributable to the exercise of stock options.

He wants to take advantage of the leverage associated with the stock option grants.

### **Mathematical Illustration of Strategy #3( Take 1994 Grant as an example):**

Name of Grant	1994 Grant
Market Value/Share	\$48.00
Exercise Price	\$18.63
Bargain Element	\$29.37
Number of Shares	4600
Marginal Income Tax Rate	41.13%
Total Proceeds if Exercise and Sold	$\$48*4600 = \$220,800$
Cost to exercise the option	$(\$18.63*4600) = (\$85,698)$
Estimated Income Tax Due	$(41.13%*(\$48-\$18.63)*4600)$ $= (\$55,567)$
<b>Net Cash in Mr. Graham's pocket</b>	<b>\$79,535</b>

	<u>In 1 Year</u>	<u>In 3 Years</u>	<u>In 5 Years</u>
If he could earn a 5% return on the money...			
<b>\$79,535 would grow to:</b>	<b>\$79,535*1.05 = \$83,512</b>	<b>\$92,072</b>	<b>\$101,509</b>
But to Equal the Same Rate of Return, the Barnes & Nobles Stock would			
<b>Have to At Least Go Up By:</b>	(**) 3.06%	9.75%	16.91%
<b>To a Market Price of:</b>	(*)\$49.47	\$52.68	\$56.11
 Therefore, in the Future:			
When He Exercises and Sells He Will Have:	\$49.47* 4,600 = \$227,562	\$242,328	\$258,106
He Will Pay Estimated Taxes of:	(((\$49.47-\$18.63)*4,600*43.13%)= ( \$58,349)	(\$64,422)	(\$70,911)
And an Exercise Cost of:	(\$18.63*4,600) = (\$85,698)	(\$85,698)	(\$85,698)
 <b>To Equal a Minimum Net Cash of:</b>	<b>\$83,512</b>	<b>\$92,072</b>	<b>\$103,435</b>

NOTE:

(\*) :  $(\$x - \$18.63) * (1 - 0.4113) * 4,600 = \$83,512$   
 $\$x = \$49.47$

(\*\*) :  $(\$49.47 - \$48) / \$48 = 3.06\%$

**Strategy#4 Exercise and Hold**

This entails the exercise of a stock option grant and the subsequent hold of the underlying stock.

Reasons for choosing this strategy:

- The stock option is about to expire, and it is believed that the stock is going to appreciate in value.
- The board of director's policy may stipulate that certain employees must own Barnes and Nobles stock. Or, Mr. Graham may want to avoid possible adverse public reaction to the sale of the company's stock.
- The stock may pay a dividend that substantially or totally offsets the costs associated with the exercise of the stock option and the subsequent hold of the underlying shares of stock.

**Mathematical Illustration of Strategy #4( Take 1994 Grant as an example)**

		In 1 Year	In 3 Years	In 5 Years
Market Value/Share(Estimated)	\$48.00	\$60.00	\$75.00	\$107.00
Exercise Price	\$18.63	\$18.63	\$18.63	\$18.63
Bargain Element	\$29.37	\$41.37	\$56.37	\$88.37
Number of Shares	4600	4600	4600	4600
Marginal Income Tax Rate	41.13%	41.13%	41.13%	41.13%
		\$60* 4,600 = \$276,000	\$345,000	\$492,200
Gross Proceeds		(\$18.63*4,600) = (\$85,698)	(\$85,698)	(\$85,698)
Costs To Exercise		(41.13%*(\$48-\$18.63)*4600) =	(\$55,567)	(\$55,567)
Estimated Income Tax Due		(\$55,567)		
		<b>134,735</b>	<b>203,735</b>	<b>350,935</b>
<b>Net Proceeds:</b>				